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BSAI and GOA Pacific Cod MSC Reassessment

Public Comment Draft Report

Certificate Numbers: MSC-F-31192 and MSC- F-31193 (MRAG -F-0070 and MRAG-F-0071)

March 10th, 2020

Conformity Assessment Body (CAB)	MRAG Americas, Inc.
Assessment team	Erin Wilson (Team Leader), Jake Rice, Paul Knapman, Don Bowen
Fishery client	Alaska Fisheries Development Foundation
Assessment Type	2nd Re-assessment

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2 Glossary

Glossary of Abbreviations

ABC	Acceptable Biological Catch
ACAP	Agreement on the Conservation of Albatrosses and Petrels
ADFG	Alaska Department of Fish and Game
ADP	Annual Deployment Plan
ADR	Alternative Dispute Resolution
AFA	American Fisheries Act
AFDF	Alaska Fisheries Development Foundation
AFSC	Alaska Fisheries Science Center
AI	Aleutian Islands
AIFEP	Aleutian Islands Fishery Ecosystem Plan
AMEF	Alaska Marine Ecosystem Forum
AP	Advisory Panel
B	Biomass
BOF	Board of Fisheries
BS	Bering Sea
BSAI	Bering Sea and Aleutian Islands
BS FEP	Bering Sea Fishery Ecosystem Plan
CDQ	Community Development Quota
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COBLZ	*Chinoecetes opilio* Bycatch Limitation Zone
CoC	Chain of Custody
CP	Catcher-Processor
EBFM	Ecosystem-Based Fisheries Management
EBS	Eastern Bering Sea
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	Exempted Fishing Permit
EIS	Environmental Impact Statement
EM	Electronic Monitoring
EO	Executive Order
ESA	Endangered Species Act
ETP	Endangered, Threatened, and Protected
F	Fishing Mortality
FABC	Fishing Mortality rate used to set ABC
FCR	Fisheries Certification Requirements\
FOFL	Fishing Mortality rate used to set OFL
FE	Fishing Effects
FEP	Fishery Ecosystem Plan
FFP	Federal Fisheries Permit
FMP	Fishery Management Plan
GHL	Guideline Harvest Level
GOA	Gulf of Alaska
HAPC	Habitat Area of Particular Concern
HCR	Harvest Control Rule
IUCN	International Union for Conservation of Nature
LLP	License Limitation Program
LOF	List of Fisheries
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSRA	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NBSRA	Northern Bering Sea Research Area
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

NPFMC	North Pacific Fisheries Management Council (or the Council)
OFL	Overfishing Limit
OLE	Office of Law Enforcement
OY	Optimum Yield
PBR	Potential Biological Removal
PI	Performance Indicator
PRI	Point of Recruitment Impairment
PSC	Prohibited Species Catch
RPP	Rockfish Pilot Program
SAFE	Stock Assessment and Fishery Evaluation
SI	Scoring Issue
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
UoA	Unit of Assessment
UoC	Unit of Certification
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System

3 Executive summary

3.1 Changes since previous assessment

To be drafted at Announcement Comment Draft Report stage
To be completed at Public Certification Report stage

MRAG Americas was contracted by the Alaska Fisheries Development Foundation to undertake a reduced reassessment of the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Pacific cod fisheries against the Marine Stewardship Council (MSC) Standard. The BSAI and GOA Pacific cod fisheries are currently certified under the MSC and Responsible Fisheries Management (RFM) Standards. Under the MSC certification there are 24 Units of Assessment (UoA), with 4 gear types in the Eastern Bering Sea; 4 in the Aleutian Islands and 4 in the GOA (detailed below in Section 5) and a state and federal management component for each region (detailed in Appendix 2). No changes in the fishery occurred that would result in a change in certification from the last surveillance.

The assessment of the fishery is being conducted by Erin Wilson (team leader) covering Principle 3, Jake Rice, covering Principle 1, Don Bowen covering Principle 2, and Paul Knapman covering Principle 3 of the components of the MSC Standard, respectively.

The reassessment site-visit was held in Seattle, WA the week of June 17th, 2019, and was held in conjunction with the MSC and RFM reassessment and/or surveillance activities for flatfish and pollock, and also with the full assessment of the Bering Sea and Aleutian Island (BSAI) Atka mackerel, Pacific Ocean perch and Northern rockfish and GOA Pacific Ocean perch, northern rockfish and dusky rockfish and was attended by participants detailed below. This report will give the results of the Eastern Bering Sea (EBS), Aleutian Islands (AI) and the GOA collectively, as opposed to previous surveillance reports that were separated for the BSAI and the GOA UoAs.

Principle 1
Strengths: There are three important strengths of the P1 evaluation of these stocks. The first hinges on the long history and excellent performance of the stock assessment approach for the stocks. The second hinges on the high reliability of data on the magnitude and composition of the commercial catches. The third hinges on the robustness of the testing of the Harvest Control Rule (HCR) for these stocks, including their benchmarks and triggers. Together these give high confidence that the EBS stock is healthy and being managed, consistent with a precautionary approach, while providing high yields from the stock. The weaknesses for the GOA and AI stocks slightly temper the strength of those conclusions for the EBS stocks, but the qualifications do not challenge the overall confidence that the management of these stocks results in exploitation wholly consistent with Principle 1 of the MSC.

Weaknesses: The key weakness for AI with regard to P1 is simply that there is so much untrawlable bottom in the AI area that the survey cannot survey the entire stock, so a survey-based absolute biomass estimate is not available. This requires that relative indicators of stock status rather than absolute ones be used and means that the assessment is a Tier 5 in the National Marine Fisheries Service (NMFS) terminology, rather than the Tier 1 or 2 approaches that allow absolute stock size to be tracked and absolute benchmarks to be used. These relative indicators are still sufficient for an evaluation of the AI stock on P1, and the results are strongly encouraging. The key weakness for the GOA stock is that the stock is in the southern portion of the range of the stock, and the waters in much of the GOA have been not just anomalously warm, but warmer than any other time in recent years. There is good documentation from both field and laboratory studies that these very warm waters are having a large negative effect on recruitment and may me reducing adult survival as well. This means that even though the HCR for the stock is robust and evidence supports that it is being implemented effectively, it has not prevented the stock from declining to near its lower Limit Reference Point. Current environmental condition may well allow a rapid recovery of this stock; however, recovery remains dependent on environmental conditions in the early 2020s. Nevertheless, even if the management of the stock cannot make the stock immune to natural variation, the performance of the fishery is being adapted annually to respond to the impacts of the environmental drivers. As such, the stock is being managed consistent with the MSC intent and standards, even though the stock has been in decline during the recent few years.

Principle 2
Strengths:
EBS and AI: Observer coverage on catcher processors, accounting for over 90% of the catch, is 100% resulting in high quality annual information on the species composition of removals and bycatch. There is a well-developed strategy for managing impacts on bycatch, Endangered, Threatened and Protected (ETP) species, habitats and the ecosystem. There is an ongoing commitment to collect information the needed to assess that status of removals and bycatch against biologically based limits.

GOA: Observer coverage on catcher processors is also 100% in the GOA resulting in high quality annual information on the species composition of removals and bycatch. Although coverage is less on catcher vessels, the results of the

coverage are analyzed annually to ensure that data quality meets requirements to accurately estimate removals and bycatch. There is a well-developed strategy for managing impacts on bycatch, ETP species, habitats and the ecosystem. There is an ongoing commitment to collect information needed to assess that status of removals and bycatch against biologically based limits.

Weaknesses:
EBS, AI and GOA: Many of the primary and secondary species taken in the fishery are not reported at the species level making it difficult to assess status with respect to biological limits. Bait species used in the fishery are not reported in enough detail to fully assess status with respect to biological limits. Indirect effects on Steller lions and northern fur seals are difficult to measure and thus some uncertainty remains regarding indirect effect on these ETP species. There are few empirical studies of the longer-term impact of the trawling for Pacific cod on bottom structure. The impact of trawling may be greater on the hard and complex bottom in the AI.

Principle 3
Strengths: The federal groundfish fishery is a well-managed fishery. The North Pacific Fishery Management Council (Council) operating procedures and management processes are thorough and supported by national law. The decision-making process and the overall roles and responsibilities are transparent, and both long-term and short-term objectives for management of this fishery are evident.

Weaknesses: In addition to the federal managed fishery, there is a 'parallel fishery' in state waters that mirror the federal fisheries in terms of seasons, closed areas, bycatch limits, observer coverage and legal gear types. The 'parallel fishery' is ultimately managed by the federal authorities and therefore follows the objectives laid out in the federal fishery management plans (FMPs). The state of Alaska also has an open-access state-waters fishery where the guideline harvest level (GHL) for this fishery is deducted from the combined federal ABC. The objectives and management review at the state level are vague. Clearly stated objectives from the Alaska Board of Fisheries (BOF) and a better explanation of how the state manages the parallel fishery and the state-water component are needed. There are no clear objectives for the management of Pacific cod, as well as no clear evidence of how the management system is externally reviewed.

Based on the information to date, the BSAI and GOA Pacific cod fishery received the following scores listed in Table 1.

Table 1 Overall principle scores

Principle 1	EBS			AI			GOA	
	90.8			81.6			94.2	
Principle 2	BSAI trawl	BSAI longline	BSAI pot	BSAI jig	GOA trawl	GOA longline	GOA pot	GOA jig
	91.3	91.0	100.3	93.7	99.7	91.0	91.3	102.7
Principle 3	Federal				State			
	94.4				85.4			

The fishery received 3 conditions total: 1 for 1.1.1 for the GOA stock status; and 2 conditions in Principle 3 for the state-waters management component, 3.2.1 Fishery specific objectives and 3.2.4 Management Evaluation.

MRAG Americas recommends this fishery be recertified against the MSC Standard.

4 Report details

4.1 Authorship and peer review details

To be drafted at Announcement Comment Draft Report stage
Peer reviewer information to be completed at Public Comment Draft Report stage

Ms. Erin Wilson will serve as team leader for the assessment**.** Erin Wilson joined MRAG Americas Inc. in 2015, where she currently works as a Senior Fisheries Consultant. She has served as a team member for several MSC assessments and conducts routine audits for the International Seafood Sustainability Foundation (ISSF). Prior to joining MRAG Americas, she spent 2 years working at the Oregon Department of Fish and Wildlife (ODFW) as a Natural Resource Specialist and Biological Technician for the Oregon Marine Reserves. She has collaborated on a multitude of projects that focus on marine science and conservation in both a biological and social science aspect. She received a M.Sc. in Marine Resource Management from Oregon State University and a B.S. in Zoology (with a marine emphasis) and a Spanish minor from Colorado State University. In addition, Erin has passed MSC v1.3, v2.0, v2.1 team leader and ISO 19011 training.

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. 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 and reviewer of more than 30 groundfish, pelagic, and invertebrate fisheries certifications in the Pacific, Atlantic and Southern Oceans.

Mr. Paul Knapman. Paul is an independent consultant based in Halifax, Nova Scotia, Canada. Paul began his career in fisheries nearly 30 years ago as a fisheries officer in the UK, responsible for the enforcement of UK and EU fisheries regulations. He then worked with the UK government's nature conservation advisors (1993-2001), as their Fisheries Programme Manager, responsible for establishing and developing an extensive programme of work with fisheries managers, scientists, the fishing industry and ENGOs, researching the effects of fishing and integrating nature conservation requirements into national and European fisheries policy and legislation. Between 2001-2004 he was Head of the largest inshore fisheries management organisation in England, with responsibility for managing an extensive area of inshore fisheries on the North Sea coast. The organisations responsibilities and roles included: stock assessments; setting and ensuring compliance with allowable catches; developing and applying regional fisheries regulations; the development and implementation of fisheries management plans; acting as the lead authority for the largest marine protected area in England. In 2004, Paul moved to Canada and established his own consultancy providing analysis, advisory and developmental work on fisheries management policy in Canada and Europe. He helped draft the management plan for one of Canada's first marine protected areas, undertook an extensive review on IUU fishing in the Baltic Sea and was appointed as rapporteur to the European Commission's Baltic Sea Regional Advisory Council. In 2008, Paul joined Moody Marine as their Americas Regional Manager, with responsibility for managing and developing their regional MSC business. He became General Manager of the business in 2012. Paul has been involved as a lead assessor, team member and technical advisor/reviewer for more than 50 different fisheries in the MSC programme. He returned to fisheries consultancy in 2015. Paul has passed MSC v1.3, v2.0, v2.1 and ISO 19011 training and has no Conflict of Interest in relation to this fishery.

4.2 Peer Reviewers

Only one peer reviewer was selected for this assessment, which was not confirmed by the Peer Review College for

4.3 RBF

Not applicable. The RBF process was not used in this reassessment.

4.4 Version details

Table 2. Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	**Version 2.1**
MSC Fisheries Standard	**Version 2.01**
MSC General Certification Requirements	**Version 2.3**
MSC Reduced Re-assessment Reporting Template	**Version 2.1**

5 Unit(s) of Assessment and Certification and results overview

5.1 Unit(s) of Assessment and Unit(s) of Certification

5.1.1 Unit(s) of Assessment

To be drafted at Announcement Comment Draft Report stage

Table 3. Unit(s) of Assessment (UoA)

UoA 1	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Eastern Bering Sea
Geographical area	US Federal Exclusive Economic Zone (EEZ) and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal trawl
Client group	Alaska Fisheries Development Foundation (AFDF)
Other eligible fishers	N/A
UoA 2	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Eastern Bering Sea
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 3	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Eastern Bering Sea
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Jig
Client group	AFDF

Other eligible fishers	N/A
UoA 4	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Eastern Bering Sea
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 5	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Aleutian Islands
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 6	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Aleutian Islands
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 7	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Aleutian Islands
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Jig
Client group	AFDF
Other eligible fishers	N/A

UoA 8	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Aleutian Islands
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 9	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Gulf of Alaska
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Demersal trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 10	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Gulf of Alaska
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 11	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Gulf of Alaska
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 12	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Gulf of Alaska

Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Jig
Client group	AFDF
Other eligible fishers	N/A

5.1.2 Unit(s) of Certification

To be drafted at Client and Peer Review Draft Report stage
To be completed at Public Certification Report stage

Due to the complexity of this fishery, the UoAs in this report varied across the different Principles. The scores were based on the three different regions for Principle 1, EBS, AI and GOA. For Principle 2, the scores were broken down by the four different gear types in the BSAI and GOA. For Principle 3, there were 2 different scoring components, the state and the federal management system, each scored independently. Because of this scoring method, it created 24 UoCs. Due to the excessive number of tables, the UoC tables were moved to Appendix 2 at the end of the report.

5.1.3 Scope of assessment in relation to enhanced or introduced fisheries –

MRAG Americas, Inc. has determined that these fisheries are within scope of the MSC and do not include enhanced or introduced species, explosives or poison, unilateral exemptions, or successful prosecution for forced or child labour. The client group has submitted to the MSC the policies, practices and measures in place for these fisheries to ensure the absence of forced and child labour.

5.2 Assessment results overview

5.2.1 Determination, formal conclusion and agreement

To be drafted at Final Draft Report
To be completed at Public Certification Report

The report shall include a formal statement as to the certification determination recommendation reached by the assessment team on whether the fishery should be certified.

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.

Reference(s): FCP v2.1 Section 7.21

5.2.2 Principle level scores

To be drafted at Client and Peer Review Draft Report

Table 4. Principle level scores

Principle 1	EBS			AI			GOA	
	90.8			81.6			94.2	
Principle 2	BSAI trawl	BSAI longline	BSAI pot	BSAI jig	GOA trawl	GOA longline	GOA pot	GOA jig
	92	91.7	100.7	94.0	100	91.7	91.7	102.7
Principle 3	Federal				State			
	96.9				84.8			

5.2.3 Summary of conditions

To be drafted at Client and Peer Review Draft Report

The report shall include a table summarising conditions raised in this assessment. Details of the conditions shall be provided in the appendices. If no conditions are required, the report shall include a statement confirming this.

Reference(s): FCP v2.1 Section 7.18

Table X – Summary of conditions

Condition number	Condition	Performance Indicator (PI)	Related to previous condition?
1	By the 4th year surveillance audit, it needs to be highly likely that the GOA stock is above the PRI. This is dues to anomalously warm temperatures and not due to overfishing.	1.1.1	**No**
2	By the 4th year surveillance audit, short and long-term objectives need to be explicit within the State's fishery specific management system.	3.2.1	**No**
3	By the 4th year surveillance audit, recent evidence needs to be provided on how the State's fishery-specific management is externally reviewed.	3.2.4	**No**

5.2.4 Recommendations

To be drafted at Client and Peer Review Draft Report stage

Principle 1: Exploration of the costs and benefits of Harvest Control Rules that respond more rapidly and with more initial restrictions on fisheries, when early evidence of possible "warm events" appears in the oceanographic or ecosystem modelling. The explorations should include the tradeoffs of risks of false alarms and misses in such more "interventionist" rules, the costs of the industry and communities of such alternative rules, and the possibilities of faster payoffs back to the fisheries and communities by allowing somewhat faster increases in harvest once evidence of the oceanographic anomaly has reversed.

Principle 3: Because of the increasing amount of catch being taken in state-managed waters, it is recommended the Client work with Alaska Department of Fish and Game (ADFG) and the BOF to instate clear objectives, both short and long-term, for the Pacific cod fishery. An external review of the BOF fishery specific management system should be evident and occurring on a regular basis.

6 Traceability and eligibility

6.1 Eligibility date

As the fishery is currently certified, and the reassessment is expected to conclude before the expiration of the existing certificate, the products from this fishery should remain continuously eligible subject to a successful recertification assessment.

6.2 Traceability within the fishery

To be drafted at Announcement Comment Draft Report stage
To be completed at Public Certification Report stage

National Oceanic Atmospheric Administration (NOAA) Fisheries, Alaska Region, manages U.S. fisheries in the Exclusive Economic Zone (EEZ) of the waters off Alaska; the State of Alaska manages within the State Waters (inside 3nm). 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 (the Interagency Electronic Reporting System for reporting commercial fishery landings in Alaska) and through monitoring of vessel activity by fisheries enforcement bodies and satellite monitoring equipment (Vessel Monitoring System - VMS). All shoreside landings are recorded on eLandings records as the start of rigorous monitoring and traceability of the Pacific cod landings.

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.

At-sea landings consist of catcher vessels delivering to motherships, and catcher-processors that process 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, headed and gutted (H&G), oil and meal). Product recovery rates convert processed fish to round weight equivalents. At-sea landings must be recorded on logbooks. 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 very low.

Table 5. Traceability within the fishery

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)? If Yes, please describe: - If this may occur on the same trip, on the same vessels, or during the same season; - How any risks are mitigated.	*No*
Will vessels in the UoC also fish outside the UoC geographic area? If Yes, please describe: - If this may occur on the same trip; - How any risks are mitigated.	*Some of the vessels may fish in the lower 48 states during other seasons. Always with temporal and spatial separation and there is no risk associated.*
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities. - Transport - Storage - Processing - Landing - Auction If Yes, please describe how any risks are mitigated.	*Yes, there is catch of non-certified stocks (i.e. non-cod and non-certified other groundfish) handled during catching and at-sea and shoreside processing activities. Traceability risks are mitigated through the eLandings/fish receiving ticket system and vessel-level traceability systems described above.*
Does transhipment occur within the fishery? If Yes, please describe: - If transhipment takes place at-sea, in port, or both; - If the transhipment vessel may handle product from outside the UoC; - How any risks are mitigated.	*Product is transferred to cargo vessels which transport it to secondary processing locations internationally.* *All of the mitigation measures described above apply.*
Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	*No*

6.3 Eligibility to enter further chains of custody

To be drafted at Announcement Comment Draft Report stage
To be completed at Public Certification Report stage

Traceability of product to the point of offload is excellent, and EBS, AI, 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 onshore processing facilities. Chain of Custody for unprocessed on-shore landings starts upon delivery to a processing facility. Chain of custody of at-sea processors starts on board at delivery to the factory. All licensed Pacific cod fishing vessels in the EBS, AI, and GOA may participate in the fishery.

The following companies are participants in the MSC Pacific cod BSAI fishery:

Trawl: Alyeska Seafoods, American Seafoods Company, Cape Romanzof, Fishermen's Finest, Golden Harvest Alaska, Icicle Seafoods, North Star Fishing Company, Ocean Peace, O'Hara Corporation, Peter Pan Seafoods, Silver Bay Seafoods, Trident Seafoods, UniSea, United States Seafood, Westward Seafoods.

Longline: Alaskan Leader Fisheries, Aleutian Spray Fisheries, Alyeska Seafoods, Blue North Fisheries, Clipper Seafoods, Coastal Villages Longline, Deep Sea Fisheries, EastWest Seafoods, Golden Harvest Alaska, Icicle Seafoods, Peter Pan Seafoods, Prowler Fisheries, Shelford's Boat, Ltd., Spire Fisheries, Tatoosh Seafoods, Trident Seafoods, Unisea, Westward Seafoods.

Pot: Alyeska Seafoods, Arctic Sablefish, LLC, Blue North Fisheries, Deep Sea Fisheries, EastWest Seafoods, Golden Harvest Alaska, Icicle Seafoods, Peter Pan Seafoods, Prowler Fisheries, Shelford's Boat, Ltd., Trident Seafoods, UniSea, Westward Seafoods.

Jig: Alaska Jig Association, Golden Harvest Alaska, Peter Pan Seafoods, Trident Seafoods, UniSea, Westward Seafoods.

Certified BSAI MSC Pacific cod Vessels: Alaskan Leader Fisheries (Alaskan Leader, Bering Leader, Bristol Leader, Northern Leader), Aleutian Spray Fisheries (US Liberator, Siberian Sea), Arctic Sablefish (Aleutian Sable), Blue North Fisheries (Blue North, Blue Gadus, Blue Attu, Blue Ballard), Clipper Seafoods (Clipper Endeavor, Clipper Sunrise, Clipper Epic, Frontier Spirit, Frontier Mariner, Frontier Explorer), Coastal Villages Longline (Deep Pacific, Flicka, Lilli Ann, Deep Sea Fisheries (Alaska Mist), Fishermen's Finest (American No. 1, US Intrepid, America's Finest), North Star Fishing Company (Africa, Cape Horn, North Star, Rebecca Irene, Unimak), Ocean Peace (Ocean Peace, Seafisher, Alaska Victory, Alaska Warrior), O'Hara Corporation (Araho, Constellation, Defender, Enterprise, Alaska Spirit), Prowler Fisheries (Arctic Prowler, Ocean Prowler, Bering Prowler, Prowler), Shelford's Boat, Ltd. (Alaskan Lady, Aleutian Lady), Tatoosh Seafoods (Beauty Bay), United States Seafoods (Seafreeze America, Legacy, Seafreeze Alaska, Vaerdal).

6.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to enter further chains of custody

There are no IPI stocks in this fishery.

7 Scoring

7.1 Summary of Performance Indicator level scores

To be drafted from Announcement Comment Draft Report

Fishery Assessment Scoring Worksheets BSAI and GOA Pacific cod - Principle 1-3

Principle	Component	Weight	Performance Indicator (PI)		Weight	EBS	AI	GOA
One	Outcome	0.333	1.1.1	Stock status	0.500	80	80	60
			1.1.2	Stock rebuilding	0.500			100
	Management	0.667	1.2.1	Harvest strategy	0.250	90	80	90
			1.2.2	Harvest control rules & tools	0.250	95	85	80
			1.2.3	Information & monitoring	0.250	100	80	100
			1.2.4	Assessment of stock status	0.250	100	85	100

Principle	Component	Weight	Performance Indicator (PI)		Weight	BSAI trawl	BSAI longline	BSAI pot	BSAI jig	GOA trawl	GOA longline	GOA pot	GOA jig
Two	Primary species	0.200	2.1.1	Outcome	0.333	90	90	90	100	90	90	90	100
			2.1.2	Management strategy	0.333	95	95	95	95	95	95	95	95
			2.1.3	Information/Monitoring	0.333	80	80	80	80	80	80	80	80
	Secondary species	0.200	2.2.1	Outcome	0.333	90	90	90	90	90	90	90	90
			2.2.2	Management strategy	0.333	95	95	95	95	95	95	95	95
			2.2.3	Information/Monitoring	0.333	90	90	90	90	90	90	90	90
	ETP species	0.200	2.3.1	Outcome	0.333	85	85	85	85	85	85	85	85
			2.3.2	Management strategy	0.333	95	95	95	95	95	95	95	95
			2.3.3	Information strategy	0.333	90	90	90	100	90	90	90	100

	Habitats	0.200	2.4.1	Outcome	0.333	80	85	85	100	80	85	85	100
			2.4.2	Management strategy	0.333	100	100	100	100	100	100	100	100
			2.4.3	Information	0.333	80	80	85	85	80	80	85	85
	Ecosystem	0.200	2.5.1	Outcome	0.333	100	100	100	100	100	100	100	100
			2.5.2	Management	0.333	100	100	100	100	100	100	100	100
			2.5.3	Information	0.333	90	90	90	90	90	90	90	90

Principle	Component	Weight		Performance Indicator (PI)	Weight	Federal	State
Three	Governance and policy	0.500	3.1.1	Legal &/or customary framework	0.333	100	100
			3.1.2	Consultation, roles & responsibilities	0.333	100	100
			3.1.3	Long term objectives	0.333	100	80
	Fishery specific management system	0.500	3.2.1	Fishery specific objectives	0.250	100	60
			3.2.2	Decision making processes	0.250	90	90
			3.2.3	Compliance & enforcement	0.250	85	85
			3.2.4	Monitoring & management performance evaluation	0.250	100	70

7.2 Principle 1

7.2.1 Principle 1 background

Life histories and fishery history

EBS and AI Pacific Cod

The following information is excerpted directly from Thompson (2018) with references cited available in the source document:

Pacific cod (*Gadus macrocephalus*) is a transoceanic species, ranging from Santa Monica Bay, California, northward along the North American coast; across the GOA and EBS north to Norton Sound; and southward along the Asian coast from the Gulf of Anadyr to the northern Yellow Sea; and occurring at depths from shoreline to 500 m (Ketchen 1961, Bakkala et al. 1984). The southern limit of the species' distribution is about 34° N latitude, with a northern limit of about 65° N latitude (Lauth 2011). Pacific cod is distributed widely over the EBS as well as in the AI area. Tagging studies (e.g., Shimada and Kimura 1994) have demonstrated significant migration both within and between the EBS, AI, and GOA. However, 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). Research conducted in 2018 indicates that the genetic samples from the Northern Bering Sea survey in 2017 are very similar to those from the EBS survey area, and quite distinct from samples collected in the AI and the GOA (Spies et al., in prep.).

Although the resource in the combined EBS and AI (BSAI) region had been managed as a single unit from 1977 through 2013, separate harvest specifications have been set for the two areas since the 2014 season.

Pacific cod are 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 BSAI.

Spawning, eggs, and larvae
Pacific cod in the EBS form large spawning aggregations, and typically spawn once per year (Sakurai and Hattori 1996, Stark 2007), from late February or early March through early to mid-April (Neidetcher et al. 2014). Shimada and Kimura (1994) identified major spawning areas between Unalaska and Unimak Islands, and seaward of the Pribilof Islands along the shelf edge. Neidetcher et al. (2014) identified spawning concentrations north of Unimak Island, in the vicinity of the Pribilof Islands, at the shelf break near Zhemchug Canyon, and adjacent to islands in the central and western Aleutian Islands along the continental shelf. In their tagging study, Shimada and Kimura observed a few travel distances in excess of 500 nm, with a large number of travel distances in excess of 100 nm, which they inferred to be part of an annual migration between summer feeding grounds and winter spawning grounds. Shimada and Kimura and Neidetcher et al. speculated that variations in spawning time may be temperature related.

In a laboratory study, eggs hatched between 16-28 days after spawning, with peak hatching occurring on day 21 (Abookire et al. 2007). Settlement in the GOA is reported to occur from July onward (Blackburn and Jackson 1982, Abookire et al. 2007, Laurel et al. 2007), which, given a mean spawning date of mid-March (Neidetcher et al. 2014), and assuming that settlement occurs immediately after transformation, and subtracting about 20 days for the egg stage, implies that the larval life stage might last about 90 days. In the laboratory study by Hurst et al. (2010), postflexion larvae were all younger than 106 days post-hatching, and juveniles were all older than 131 days post-hatching, so it might be inferred that transformation typically takes place between 106 and 131 days after hatching. Several studies have demonstrated an impact of temperature on survival and hatching of eggs and development of embryos and larvae (e.g., Laurel et al. 2008, Hurst et al. 2010, Laurel et al. 2011, Laurel et al. 2012, Bian et al. 2014, Bian et al. 2016). Temperature has been (negatively) related to recruitment of Pacific cod (e.g., Doyle et al. 2009, Hurst et al. 2012).

Pacific cod eggs are demersal (Thomson 1963), but Pacific cod larvae move quickly to surface waters after hatching (Rugen and Matarese 1988, Hurst et al. 2009), and appear to be capable of traveling considerable distances. Rugen and Materese concluded that larval Pacific cod were transported from waters near the Kenai Peninsula and Kodiak Island to locations as far as Unimak Island. In the GOA, it is thought that movement of larvae has a significant shoreward component (Rugen and Materese, Abookire et al. 2001 and 2007, Laurel et al. 2007), but it is not obvious that this is always the case elsewhere in the species' range (Hurst et al. 2012), although Hurst et al. (2015) found that age 0 Pacific cod in the EBS were most abundant in waters along the Alaska peninsula to depths of 50 m.

Laurel et al. (2011) investigated the match-mismatch hypothesis for Pacific cod in the GOA. Their results showed that cold environments allow Pacific cod larvae to bridge gaps in prey availability (i.e., timing and magnitude), but negatively impact survival over longer periods. Under warmer conditions, mismatches in prey significantly impacted

growth and survival. However, both yolk reserves and compensatory growth mechanisms reduced the severity of mismatches occurring in the first 3 weeks of development.

Doyle et al. (2009) found that larval retention of Pacific cod during the month of April was key to late spring abundance in the GOA, but it is unknown whether this result holds elsewhere in the species' range. Neidetcher et al. (2014) speculated that spawning locations in the EBS are the product of "an accumulation of conditions beneficial to Pacific cod productivity," with no consistent basis in topography, current structure, or water column hydrology.

Juveniles
Juveniles usually tend to settle near the seafloor (Abookire et al. 2007, Laurel et al. 2007).

Some studies of Pacific cod in the GOA, and also some studies of Atlantic cod, suggest that young-of-the-year cod are dependent on eelgrass, but this may not be the case elsewhere in the species' range. In contrast to other parts of the range of Pacific cod, where sheltered embayments are key nursery grounds, Hurst et al. (2015) found that habitat use of age 0 Pacific cod in the EBS occurs along a gradient from coastal-demersal (bottom depths < 50 m) to shelf-pelagic (bottom depths 60-80 m), with densities near the coastal waters of the Alaska peninsula much higher than elsewhere. Hurst et al. (2012) and Parker-Stetter et al. (2013) also observed age 0 Pacific cod in the shelf-pelagic zone. Hurst et al. (2012) found evidence of density-dependent habitat selection at the local scale, but no consistent shift in distribution of juvenile Pacific cod in response to interannual climate variability. Hurst et al. (2015) state, "The ability to utilize a mosaic of habitats as nursery areas may contribute to the persistence of the Pacific cod population in the Bering Sea,"

Hurst et al. (2015) suggested that habitat use by age 0 Pacific cod in the EBS is related to temperature and the distribution of large-bodied demersal predators. Gotceitas et al. (1997) found that the habitat distribution of age 0 Atlantic cod was influenced by predators.

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% (Robert Gregory, DFO, *pers. commun.*); 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, DFO, *pers. commun.*).

Adults
Adult Pacific cod in the EBS are strongly associated with the seafloor (Nichol et al. 2007), suggesting that fishing activity has the potential to disturb habitat. Nichol et al. (2013) observed frequent diel vertical migration. Patterns varied significantly by location, bottom depth, and time of year, with daily depth changes averaging 8 m.

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, Handegard and Tjøstheim 2005), which may complicate attempts to estimate catchability (*Q*) or selectivity. It is not known whether Pacific cod exhibit a similar response.

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

Description of the Directed Fishery
During the early 1960s, a Japanese longline fishery harvested EBS Pacific cod for the frozen fish market. Beginning in 1964, the Japanese trawl fishery for walleye pollock (*Gadus chalcogrammus*) expanded and Pacific cod became an important bycatch species and an occasional target species when high concentrations were detected during pollock operations. By the time that the Magnuson Fishery Conservation and Management Act went into effect in 1977, foreign catches of Pacific cod had consistently been in the 30,000 - 70,000 t range for a full decade. In 1981, a U.S. domestic trawl fishery and several joint venture fisheries began operations in the EBS. The foreign and joint venture sectors dominated catches through 1988, but by 1989 the domestic sector was dominant and by 1991 the foreign and joint venture sectors had been displaced entirely.

Presently, the Pacific cod stock is exploited by a multiple-gear fishery, including trawl, longline, pot, and jig components (although catches by jig gear are very small in comparison to the other three main gear types, with an average annual catch of less than 200 t since 1992). The breakdown of catch by gear during the most recent complete

five-year period (2013-2017) is as follows: longline gear accounted for an average of 53% of the catch, trawl gear accounted for an average of 30%, and pot gear accounted for an average of 17%.

In the EBS, Pacific cod are caught throughout much of the continental shelf, with National Marine Fisheries Service (NMFS) statistical areas 509, 513, 517, 519, 521, and 524 each accounting for at least 5% of the total catch over the most recent 5-year period (2013-2017).

GoA Pacific Cod

The following section is excerpted directly from Barbeaux et. Al. (2018) with references for citations available in the source document:

Pacific cod is distributed widely over the GOA. Tagging studies (e.g., Shimada and Kimura 1994) have demonstrated significant migration both within and between the EBS, AI, and GOA. For the GOA it appears there is substantial migration between the southern Bering Sea and the western GOA, however little movement has been observed from the central GOA to the Western GOA. Two recent genetics studies using Restriction-site Associated DNA sequencing have indicated significant genetic differentiation among spawning stocks of Pacific cod in the GOA and the Bering Sea (Drinan et al. 2018; Spies et al. In Prep). The first study (Drinan et al. 2018) used 6,425 SNP loci to show high assignment success >80% of five spawning populations of Pacific cod throughout their range off Alaska. Further work using Alaskan samples in Drinan et al. (2018) as well as spawning fish near Unimak Pass, Pervenets Canyon, and Pribilof Island in the Eastern Bering Sea 2016-2018 and a sample from the Northern Bering Sea in August 2017 showed similar levels of differentiation among spawning groups (Spies et al. In Prep), using 3,599 SNP loci. The three spawning groups examined in the GOA, Hecate Strait, Kodiak Island, and Prince William Sound, were all genetically distinct and could be assigned to their population of origin with 80-90% accuracy (Drinan et al. 2018). Cod that spawned at Unimak Pass in 2003 and 2018 were genetically distinct from the Kodiak Sample (spawning year 2003), FST=0.004 and FST=0.001. There was strong evidence for selective differentiation of some loci, including one which aligned to the zona pellucida glycoprotein 3 (ZP3) in the Atlantic cod genome. This locus had the level of differentiation of any locus examined (FST=0.071). ZP3 is known to undergo rapid selection (Drinan et al. 2018), and further work is needed to characterize this gene among spawning populations of cod in the GOA and the Bering Sea.

Although there appears to be some genetic differentiation within the GOA management area and some cross migration between the Western GOA and southeastern Bering Sea the Pacific cod stock in the GOA region is currently managed as a single stock.

Spawning eggs and larvae
Pacific cod release all their eggs near the bottom in a single event during the late winter/ early spring period in the GOA (Stark 2007). Unlike most cod species, Pacific cod eggs are negatively buoyant and are semi-adhesive to the ocean bottom substrate during development (Alderdice and Forrester 1971). Hatch timing/success is highly temperature-dependent (Laurel et al. 2008), with optimal hatch occurring in waters ranging between 4-6°C (Bian et al. 2016) over a broad range of salinities (Alderdice and Forrester 1971). Eggs hatch into 4 mm larvae in ~2 wks at 5°C (Laurel et al 2008) and become surface oriented and available to pelagic icthyoplankton nets during the spring (Doyle and Mier 2016). During this period, Pacific cod larvae are feeding principally on eggs, nauplii and early copepodite stages of copepod prey (Strasburger et al. 2014). Warm surface waters can accelerate larval growth when prey are abundant (Hurst et al. 2010), but field observations indicate a negative correlation between temperature and abundance of Pacific cod larvae in the Central and Western Gulf of Alaska (Doyle et al. 2009, Doyle and Mier 2016). Laboratory studies suggest warm temperatures can indirectly impact Pacific cod larvae by way of two mechanisms: 1) increased susceptibility to starvation when the timing and biomass of prey is ‘mis-matched’ under warm spring conditions (Laurel et al. 2011), and 2) reduced growth by way of changes in the lipid/fatty acid composition of the zooplankton assemblage (Copeman and Laurel 2010).

The spatial-temporal distribution of Pacific cod larvae shifts with ontogeny and is dependent on a number of behavioral and oceanographic processes. In early April, Pacific cod larvae are most abundant around Kodiak Island before concentrations shift downstream to the SW in the Shumagin Islands in May and June (Doyle and Mier 2016). Newly hatched larvae are surface oriented and make extended diel vertical migrations with increased size and development (Hurst et al. 2009). Larvae undergo a significant developmental change (‘flexion’) between 10-15 mm and gradually become more competent swimmers with increasing size (Voesenek et al. 2018). Very late stage larvae (aka ‘pelagic juveniles’) eventually settle to the bottom in early July around 40 mm and use nearshore nurseries through the summer and early fall in the Gulf of Alaska (Laurel et al. 2017).

Juveniles
Shallow, coastal nursery areas provide age-0 juvenile Pacific cod ideal conditions for rapid growth and refuge from predators (Laurel et al. 2007). Settled juvenile cod associate with bottom habitats (e.g., macrophytes) and feed on

small calanoid copepods, mysids, and gammarid amphipods during this period (Abookire et al. 2007). At the end of August, age-0 cod become less associated with microhabitat features and gradually move into deeper water in the fall (Laurel et al. 2009). Overwintering dynamics are currently unknown for Pacific cod, although laboratory held age-0 juveniles are capable of growth and survival at very low temperature (0°C) for extended periods (Laurel et al. 2016a).

Pelagic age-0 juvenile surveys of Pacific cod have been conducted in some years (Moss et al. 2016), but they are prone to significant measurement error if they are conducted across the settlement period (Mukhina et al. 2003). Therefore, 1st year assessments of Pacific cod in the GOA are better suited during the early larval or later post-settled juvenile period. There are two surveys that routinely survey early life stages of Pacific cod in the GOA during these phases: 1) the RACE EcoFOCI ichthyoplankton survey in the western GOA (1979 – present; https://access.afsc.noaa.gov/ichthyo/index.php), and 2) the RACE FBE nearshore seine survey in Kodiak (2006 – present).

The EcoFOCI ichthyoplankton survey is focused in the vicinity of Kodiak Island, Shelikof Strait and Shelikof Sea Valley and captures Pacific cod larvae primarily in May when they are 5- 8 mm in size (Matarese et al. 2003). The Kodiak seine survey occurs in two embayments and is focused on post-settled age-0 juveniles later in the year (mid-July to late August) when fish are 40-100 mm in length (Laurel et al. 2016b). In 2018, Cooperative Research between the AFSC and UAF spatially extended the Kodiak seine survey to include 14 different bays on Kodiak Island, the Alaska Peninsula, and the Shumagin Islands (Litzow and Abookire 2018).

The summer thermal conditions in the Central/Western GOA have historically been well-suited for high growth and survival potential for juvenile Pacific cod (Laurel et al. 2017) but were likely sub-optimal during the 2014-16 marine heatwave. The Kodiak seine survey indicated that age-0 juvenile abundance was very low during this period. However, age 0 abundance returned to relatively high numbers following a period of relative cooling in 2017 and 2018. A strong 2018 age-0 cohort was also observed across the western GOA in the new Cooperative Research survey.

The direct impacts of temperature on life history processes in Pacific cod are stage- and size-dependent but these relationships generally are ‘dome shaped’ like other cod species (e.g., Hurst et al. 2010; Laurel et al. 2016a). In the earliest stages (eggs, yolk-sac larvae), individuals have less flexibility to behaviorally adapt and have finite energetic reserves (non-feeding). In later juvenile stages, individuals can move to more favorable thermal or food habitats that better suit their metabolic demands. Changes in seasonal temperatures also influence how energy is allocated. A recent laboratory study indicated age-0 juvenile Pacific cod shift more energy to lipid storage than to growth as temperatures drop, possibly as a strategy to offset limited food access during the winter (Copeman et al. 2017).

The Alaska Fisheries Science Center will be investigating environmental regulation of 1st year of life processes in Pacific cod to better understand the interrelationship between processes occurring during pre-settlement (spawning/larvae), settlement (summer growth) and post-settlement (1st overwintering) phases. Transport processes and connectivity between larval and juvenile nursery areas will continue to be an important area of research as the Regional Oceanographic Model (ROMS) for the GOA is updated.

Description of the Directed Fishery

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.

Presently, the Pacific cod stock is exploited by a multiple-gear fishery, including trawl, longline, pot, and jig components. 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 2017, for which data are not yet complete).

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 (Kimura et al. 1984). From 1994-2004, the assessment was conducted using the Stock Synthesis 1 modelling software (Methot 1986, 1990) with length-based data. The assessment was migrated to Stock Synthesis 2 (SS2) 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,” or SS3, in 2008) each year since then.

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 equalled 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 as this would require exceeding OFL. At no time since the separate State waters fishery began in 1997 has total catch exceeded ABC, and total catch has never exceeded OFL.

Historically, the majority of the GOA catch has come from the Central regulatory area. To some extent the distribution of effort within the GOA is driven by regulation, as catch limits within this region have been apportioned by area throughout the history of management under the MFCMA. Changes in area- specific allocation between years have usually been traceable to changes in biomass distributions estimated by AFSC trawl surveys or management responses to local concerns. Currently the area-specific ABC allocation is derived from the random effects model (which is similar to the Kalman filter approach).

In addition to area allocations, GOA Pacific cod is also allocated on the basis of processor component (inshore/offshore) and season. The inshore component is allocated 90% of the TAC and the remainder is allocated to the offshore component. Within the Central and Western Regulatory Areas, 60% of each component’s portion of the TAC is allocated to the A season (January 1 through June 10) and the remainder is allocated to the B season (June 11 through December 31, although the B season directed fishery does not open until September 1).
NMFS has also published the following rule to implement Amendment 83 to the GOA Groundfish FMP:

> “Amendment 83 allocates the Pacific cod TAC in the Western and Central regulatory areas of the GOA among various gear and operational sectors and eliminates inshore and offshore allocations in these two regulatory areas. These allocations apply to both annual and seasonal limits of Pacific cod for the applicable sectors. These apportionments are discussed in detail in a subsequent section of this rule. Amendment 83 is intended to reduce competition among sectors and to support stability in the Pacific cod fishery. The final rule implementing Amendment 83 limits access to the Federal Pacific cod TAC fisheries prosecuted in State of Alaska (State) waters adjacent to the Western and Central regulatory areas in the GOA, otherwise known as parallel fisheries. Amendment 83 does not change the existing annual Pacific cod TAC allocation between the inshore and offshore processing components in the Eastern regulatory area of the GOA.
>
> In the Central GOA, NMFS must allocate the Pacific cod TAC between vessels using jig gear, catcher vessels (CVs) less than 50 feet (15.24 meters) length overall using hook-and-line gear, CVs equal to or greater than 50 feet (15.24 meters) length overall using hook-and-line gear, catcher/processors (C/Ps) using hook-and-line gear, CVs using trawl gear, C/Ps using trawl gear, and vessels using pot gear. In the Western GOA, NMFS must allocate the Pacific cod TAC between vessels using jig gear, CVs using hook-and-line gear, C/Ps using hook-and-line gear, CVs using trawl gear, and vessels using pot gear. Table 3 lists the proposed amounts of these seasonal allowances. For the Pacific cod sector splits and associated management measures to become effective in the GOA at the beginning of the 2012 fishing year, NMFS published a final rule (76 FR 74670, December 1, 2011) and will revise the final 2012 harvest specifications (76 FR 11111, March 1, 2011).”
>
> NMFS proposes to calculate of the 2012 and 2013 Pacific cod TAC allocations in the following manner. First, the jig sector would receive 1.5 percent of the annual Pacific cod TAC in the Western GOA and 1.0 percent of the annual Pacific cod TAC in the Central GOA, as required by proposed § 679.20(c)(7). The jig sector annual allocation would further be apportioned between the A (60 percent) and B (40 percent) seasons as required by § 679.20(a)(12)(i). Should the jig sector harvest 90 percent or more of its allocation in a given area during the fishing year, then this allocation would increase by one percent in the subsequent fishing year, up to six percent of the annual TAC. NMFS proposes to allocate the remainder of the annual Pacific cod TAC based on gear type, operation type, and vessel length overall in the Western and Central GOA seasonally as required by proposed § 679.20(a)(12)(A) and (B).”

The longline and trawl fisheries are also associated with a Pacific halibut mortality limit which sometimes constrains the magnitude and timing of harvests taken by these two gear types.

Stock Assessment and Status

EBS Pacific Cod

Since 1992, the EBS (combined with AI until 2014) stock assessment model has been developed under some version of the Stock Synthesis (SS) modelling framework (Methot and Wetzel 2013). Since 2005, the EBS Pacific cod models have all used versions of SS based on the ADMB software package (Fournier et al. 2012). Thompson (2018) includes a history of previous model structures, including all SS-based models that have been fully vetted since 2015, in its Appendix 2.3. No alternative methods to Stock Synthesis have been tested in recent history, though many different parameterizations of the SS base model are tested each year based on recommendations from the North Pacific Fisheries Management Council (NPFMC) Scientific and Statistical Committee (SSC) and all are described at length in Thompson (2018).

According to the 2018 stock assessment, EBS Pacific cod is neither overfished nor experiencing overfishing. Stock status is determined relative to B40% and B35% which are regarded as reference points that trigger the harvest control rule. B40% can be considered a proxy for Bmsy-equivalent target reference point though it is really treated as a limit within management such that if female spawning biomass is assessed as below B40%, maximum allowable fishing mortality rate (FOFL) is reduced. The summary of results from the 2018 stock assessment using the author's selected model configuration is given in the table below - excerpted from Thompson (2018). Following this table is a Kobe-plot for this stock covering the period 1977 - 2020 indicating the stock is currently (and projected to stay) very close to both the F and B targets.

Table 6 2018 stock assessment Source: Thompson (2018)

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2018	2019	2019*	2020*
M (natural mortality rate)	0.36	0.36	0.34	0.34
Tier	3a	3a	3a	3b
Projected total (age 0+) biomass (t)	918,000	762,000	824,000	683,000
Projected female spawning biomass (t)	292,000	262,000	290,000	246,000
$B_{100\%}$	593,000	593,000	658,000	658,000
$B_{40\%}$	237,000	237,000	263,000	263,000
$B_{35\%}$	207,000	207,000	230,000	230,000
F_{OFL}	0.38	0.38	0.38	0.35
$maxF_{ABC}$	0.31	0.31	0.31	0.29
F_{ABC}	0.31	0.31	0.31	0.29
OFL (t)	238,000	201,000	216,000	164,000
maxABC (t)	201,000	170,000	181,000	137,000
ABC (t)	201,000	170,000	181,000	137,000
Status	As determined *last* year for:		As determined *this* year for:	
	2016	2017	2017	2018
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Projections are based on assumed catches of 201,000 t, 181,000 t, and 137,000 t in 2018, 2019, and 2020, respectively.

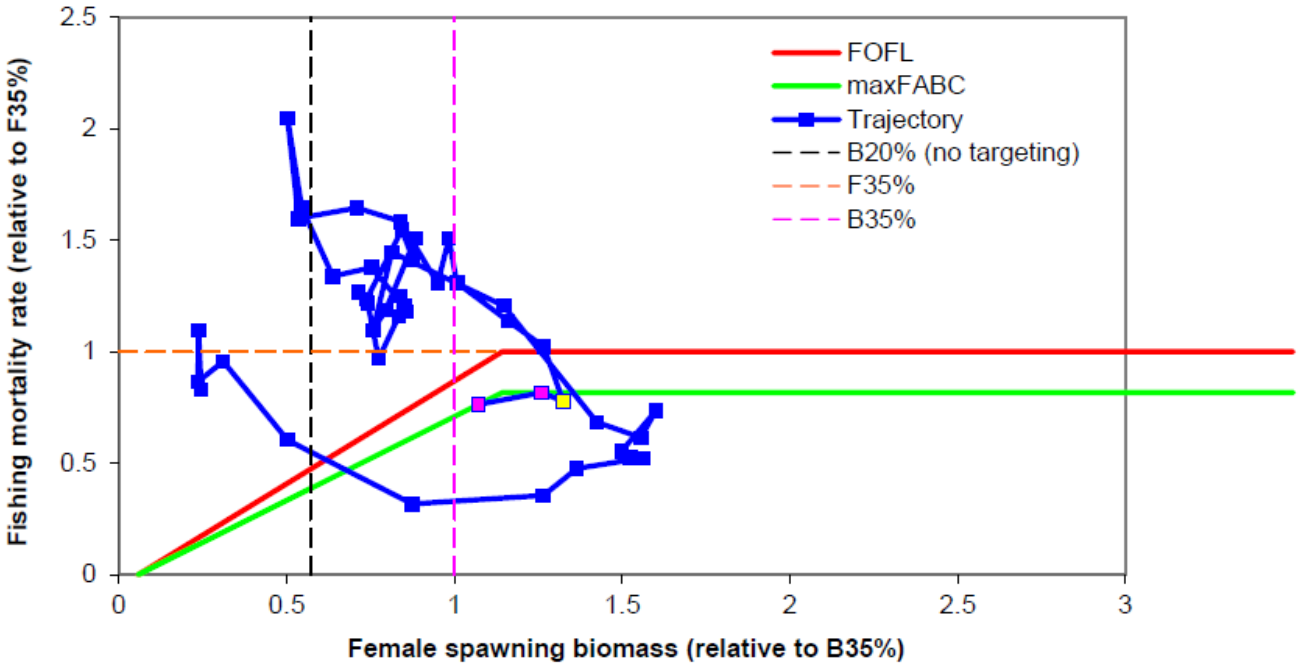

Figure 2.29—Trajectory of Pacific cod fishing mortality and female spawning biomass as estimated by Model 16.6i, 1977-2020 (yellow square = current year, magenta squares = first two projection years).

Figure 1 Trajectory of Pacific cod fishing mortality and female spawning biomass as estimated by Model 16.6i 1977 – 20202 (yellow square = current year, magenta squares = first two projection years) Source: Thompson (2018)

AI Pacific Cod

Since 2013, Aleutian Islands Pacific Cod has been assessed separately from the Eastern Bering Sea stock. The stock assessment uses a Tier 5 "random effects" model. This is a simple, state-space model that assumes that the observation error variance is equal to the sampling variances estimated from the haul-by-haul survey data. The log-scale process errors and observations are both assumed to be normally distributed. In order to be used for Tier 5 harvest control rules, these models also require an estimate of the natural mortality rate and of the year by year harvest rate that are considered reliable enough to guide management. If estimates of M and comparable estimates of F are available for a stock, it can be managed as a Tier 5 stock, even if biomass estimates are treated as relative, not absolute, and are not considered sufficiently consistent over time for Biomass-based Reference Points to guide management reliably. Rather inferences on sustainability of harvesting are based on F-based reference points, with an F = M strategy considered sustainable, and F = .75M as an upper benchmark considered to produce a substantial quantified degree of precaution into the harvest level (Further details in Thompson and Palsson 2018). With catches consistently at or below catches consistent with the operational annual estimate of F_{ABC} = .75 M in recent years, the stock is concluded to not have been being overfished. However, because the estimates of each set of F-based reference points are derived from the fishing year's survey data, evaluations of *sustainability* always lag one year behind the present year's assessments, to ensure the catches in and immediately past year did not exceed the F_{ABC} based on the current survey estimate of M in the same year.

The Tier 5 strategy has maintained relatively stable estimates of biomass. In the most current assessment, the 95% confidence interval around the mean biomass estimate for AI Pacific cod is 58,500-108,000 t., with the mean biomass estimates increasing slightly from the 2018 to the 2019 assessment.

Table 7 2018 Stock Assessment Source: Thompson and Paulson (2018)

Quantity	As estimated or *specified last* year for: 2018	2019	As estimated or *recommended this* year for: 2019	2020
M (natural mortality rate)	0.36	0.36	0.34	0.34
Tier	5	5	5	5
Biomass (t)	79,600	79,600	80,700	80,700
F_{OFL}	0.36	0.36	0.34	0.34
$maxF_{ABC}$	0.27	0.27	0.255	0.255
F_{ABC}	0.27	0.27	0.255	0.255
OFL (t)	28,700	28,700	27,400	27,400
maxABC (t)	21,500	21,500	20,600	20,600
ABC (t)	21,500	21,500	20,600	20,600
Status	As determined *last* year for: 2016	2017	As determined *this* year for: 2017	2018
Overfishing	No	n/a	No	n/a

More generally there is a sound basis to infer that this pattern should persist for the coming certification period, if AI Pcod remain a Tier 5 stock. Amendment 56 to the BSAI 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.

For Tier 5 stocks, the following formulas apply:
$F_{OFL}=M$ and
$F_{ABC} < 0.75M$

GoA Pacific Cod

Like the models used for EBS Pacific Cod, the GoA Pacific cod stock assessments use Stock Synthesis-based models (see above section for more description). The results from the 2018 stock assessment (Barbeaux et. al. 2018) are given in the table below. According to this assessment, overfishing is not occurring, though stock status is below B35%. This is a consequence of the design of the harvest control rule for the stock taking into account the well documented exceptionally large variation in year-class strengths on multi-decadal scales for Pacific cod, with the variation showing regime-like- patterns of variation, although the precise natural and causes of the apparent regimes remains under study (Lauren et al. 2008, 2009, 2016b, 2017, Moss et al 2016). The harvest control rule applied to the stock has resulted in ABCs and corresponding annual harvest being reduced, commensurate with declines in stock productivity (whether the reduced productivity is caused has been reduced larval/pre-recruit growth and survival, reduced growth and survivorship of post-recruits or a combination of ecosystem processes), leaving sufficient spawning biomass to have a high likelihood that the stock can rebuild to target levels if productivity increases to more historical levels and does not decline further under present productivity conditions. A Kobe plot showing stock status and fishing mortality relative to reference points used for the harvest control rule (see section above under EBS Pacific cod for more details) from 1977 to 2020 is given in the figure following the table. Both are excerpted from Barbeaux et al 2018).

Table 8 Source Barbeaux et al 2018

Quantity	As estimated or *specified last* year for:		As estimated or *specified this* year for:	
	2018	2019	2019	2020
M (natural mortality rate)	0.49	0.49	0.50	0.50
Tier	3b	3b	3b	3b
Projected total (age 0+) biomass (t)	170,565	198,942	266,066	329,133
Female spawning biomass (t)				
Projected	36,209	34,424	34,701	34,774
$B_{100\%}$	168,583	168,583	172,240	172,240
$B_{40\%}$	67,433	67,433	68,896	68,896
$B_{35\%}$	59,004	59,004	60,284	60,284
F_{OFL}	0.42	0.40	0.36	0.36
$maxF_{ABC}$	0.34	0.32	0.29	0.29
F_{ABC}	0.31	0.31	0.25	0.29
OFL (t)	23,565	21,412	23,669	26,078
maxABC (t)	19,401	17,634	19,665	21,592
ABC (t)	18,000	17,000	*17,000	21,592
Status	As determined *this* year for:			
	2016	2017	2017	2018
Overfishing	No	n/a	No	n/a
Overfished	n/a	no	n/a	No
Approaching overfished	n/a	no	n/a	No

*Reduction from max to 17,000t to maintain stock above $B_{20\%}$ in 2020 based on estimated end of year catch in 2018 of 13,096 t.

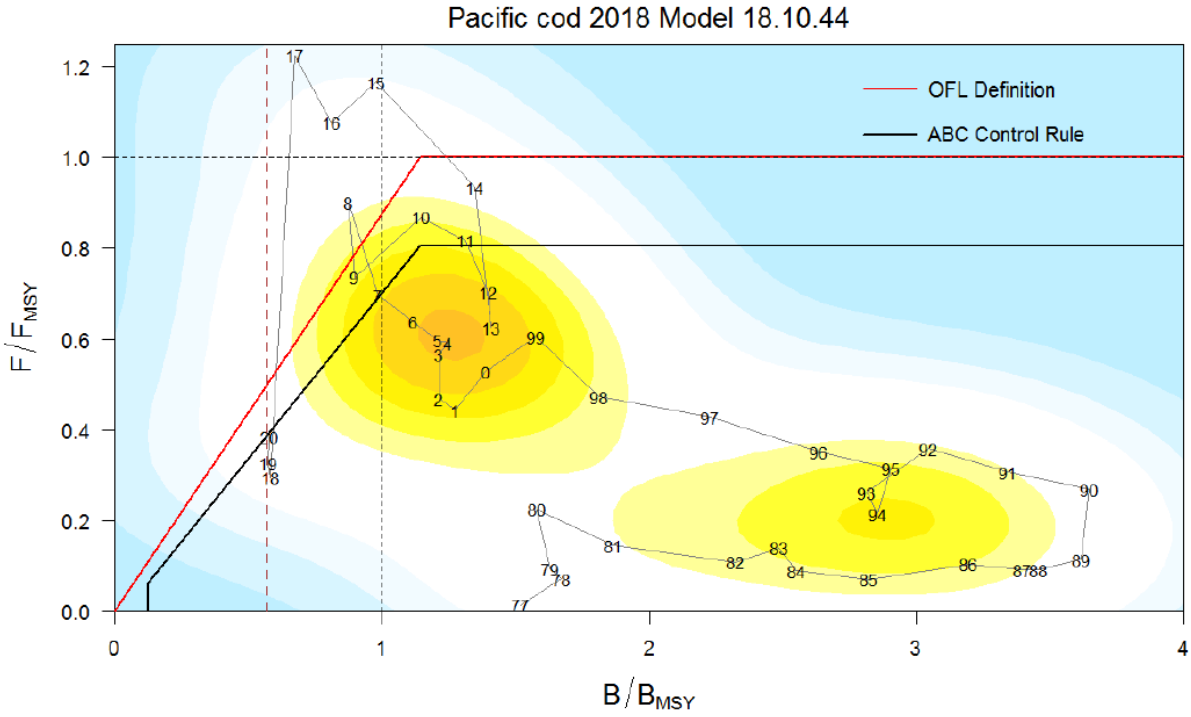

Figure 2.99 For Model 18.10.44 ratio of historical F/*Fmsy* versus female spawning biomass relative to *Bmsy* for GOA pacific cod, 1977-2020. Note that the proxies for *Fmsy* and *Bmsy* are *F35%* and *B35%*, respectively. The Fs presented are the sum of the full Fs across fleets. Dashed line is at $B_{20\%}$, Steller sea lion closure rule for GOA Pacific cod.

Figure 2 Source: Barbeaux et al 2018

7.2.2 Catch profiles

Table 9 Source: Eastern Bering Sea **Thompson (2018)**

Table 2.1c—Summary of 1991-2018 catches (t) of Pacific cod in the EBS by gear type. The small catches taken by "other" gear types have been merged proportionally with the catches of the gear types shown. Pot catches for 2014-2018 include the State-managed fishery. Catches for 2018 are through October 23.

Year	Trawl	Longline	Pot	Total
1991	129,393	77,505	3,343	210,241
1992	77,276	79,420	7,514	164,210
1993	81,792	49,296	2,098	133,186
1994	85,294	78,898	8,071	172,263
1995	111,250	97,923	19,326	228,498
1996	92,029	88,996	28,042	209,067
1997	93,995	117,097	21,509	232,601
1998	60,855	84,426	13,249	158,529
1999	51,939	81,520	12,408	145,867
2000	53,841	81,678	15,856	151,376
2001	35,670	90,394	16,478	142,542
2002	51,118	100,371	15,067	166,555
2003	46,717	108,769	19,957	175,443
2004	57,866	108,618	17,264	183,748
2005	52,638	113,190	17,112	182,940
2006	53,236	96,613	18,969	168,818
2007	45,700	77,181	17,248	140,129
2008	33,497	88,936	17,368	139,802
2009	36,959	96,606	13,609	147,174
2010	41,300	81,840	19,725	142,866
2011	64,088	117,075	28,064	209,226
2012	75,536	128,513	28,738	232,787
2013	81,619	124,823	30,262	236,704
2014	72,262	127,271	39,195	238,728
2015	66,680	128,217	37,942	232,838
2016	72,598	127,937	47,086	247,620
2017	68,906	122,768	46,184	237,858
2018	58,859	77,808	36,794	173,461

Table 10 Aleutian Islands (from Thompson and Palsson 2018)

Table 2A.1c—Summary of 1991-2018 catches (t) of Pacific cod in the AI. To avoid confidentiality problems, longline and pot catches have been combined. The small catches taken by "other" gear types have been merged proportionally with the catches of the gear types shown. Catches for 2018 are through October 28.

	Federal			State	
Year	Trawl	LL+pot	Subtotal	Subtotal	Total
1991	3,414	6,383	9,798		9,798
1992	14,587	28,481	43,068		43,068
1993	17,328	16,876	34,205		34,205
1994	14,383	7,156	21,539		21,539
1995	10,574	5,960	16,534		16,534
1996	21,179	10,430	31,609		31,609
1997	17,411	7,753	25,164		25,164
1998	20,531	14,196	34,726		34,726
1999	16,478	11,653	28,130		28,130
2000	20,379	19,306	39,685		39,685
2001	15,836	18,372	34,207		34,207
2002	27,929	2,872	30,801		30,801
2003	31,478	978	32,457		32,457
2004	25,770	3,103	28,873		28,873
2005	19,624	3,069	22,694		22,694
2006	16,956	3,535	20,490	3,721	24,211
2007	25,714	4,495	30,208	4,146	34,355
2008	19,404	7,506	26,910	4,319	31,229
2009	20,277	6,245	26,522	2,060	28,582
2010	16,759	8,280	25,039	3,967	29,006
2011	9,359	1,263	10,622	266	10,889
2012	9,786	3,201	12,988	5,232	18,220
2013	7,001	1,811	8,812	4,793	13,605
2014	5,715	439	6,154	4,451	10,605
2015	5,968	3,087	9,056	161	9,217
2016	10,654	1,710	12,364	882	13,245
2017	8,530	3,728	12,258	2,946	15,204
2018	9,051	4,812	13,864	5,695	19,558

Table 11 Gulf of Alaska (from Barbeaux et al 2018)

Table 2.5 Estimated retained-and discarded GOA Pacific cod from federal waters (source: AKFIN; *as of 2018-10-09)

Year	Discarded	Retained	Grand Total
1991	1,429	74,899	76,328
1992	3,920	76,827	80,747
1993	5,886	50,602	56,488
1994	3,122	44,363	47,485
1995	3,546	65,439	68,985
1996	7,555	60,725	68,280
1997	4,828	63,647	68,476
1998	1,732	60,389	62,121
1999	1,645	66,970	68,614
2000	1,378	53,130	54,508
2001	1,904	39,715	41,619
2002	3,715	38,631	42,345
2003	2,485	50,097	52,582
2004	1,268	55,355	56,624
2005	1,043	46,541	47,584
2006	1,852	46,045	47,897
2007	1,448	50,813	52,261
2008	3,307	55,707	59,014
2009	3,944	49,252	53,196
2010	2,871	75,454	78,325
2011	2,243	83,170	85,412
2012	973	76,945	77,918
2013	4,625	63,975	68,600
2014	5,234	79,606	84,840
2015	1,764	77,725	79,489
2016	896	63,191	64,087
2017	734	48,001	48,734
2018*	448	11,518	11,965

7.2.3 Total Allowable Catch (TAC) and catch data

Table 12 Total Allowable Catch (TAC) and catch data for the Bering Sea

TRAWL				
TAC	Year	**2018**	Amount	**188,836 t**[1, 2]
UoA share of TAC	Year	**2018**	Amount	**58,859 t**[1, 2]
UoA share of total TAC	Year	**2018**	Amount	**58,859 t**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**58,859 t**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**68,906 t**

[1] "The BS Pacific cod TAC is set to account for the 6.4 percent of the BS ABC for the State of Alaska's (State) guideline harvest level in State waters of the BS. The AI Pacific cod TAC is set to account for the 27 percent of the AI ABC for the State guideline harvest level in State waters of the AI." https://alaskafisheries.noaa.gov/sites/default/files/18_19bsaitable1.pdf
[2] The TAC is not set for a specific gear type but rather for the entire fleet using all relevant gears.

LONGLINE				
TAC	Year	**2018**	Amount	**188,836 t**[1, 2]
UoA share of TAC	Year	**2018**	Amount	**77,808 t**
UoA share of total TAC	Year	**2018**	Amount	**77,808 t**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**77,808 t**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**122,768 t**
POT				
TAC	Year	**2018**	Amount	**188,836 t**[1, 2]
UoA share of TAC	Year	**2018**	Amount	**36,794 t**
UoA share of total TAC	Year	**2018**	Amount	**36,794 t**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**36,794 t**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**46,184 t**
JIG[3]				
TAC	Year		Amount	
UoA share of TAC	Year		Amount	
UoA share of total TAC	Year		Amount	
Total green weight catch by UoC	Year (most recent)		Amount	
Total green weight catch by UoC	Year (second most recent)		Amount	

Table 13 Total Allowable Catch (TAC) and catch data for Aleutian Islands

TRAWL				
TAC	Year	**2018**	Amount	**15,695 t**[1, 2]
UoA share of TAC	Year	**2018**	Amount	**9051 t**

[3] "Presently, the Pacific cod stock is exploited by a multiple-gear fishery, including trawl, longline, pot, and jig components (although catches by jig gear are very small in comparison to the other three main gear types, with an average annual catch of less than 200 t since 1992). The breakdown of catch by gear during the most recent complete five-year period (2013-2017) is as follows: longline gear accounted for an average of 53% of the catch, trawl gear accounted for an average of 30%, and pot gear accounted for an average of 17%." https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/EBSpcod.pdf

UoA share of total TAC	Year	**2018**	Amount	**9051 t**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**9051 t**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**8530 t**
LONGLINE + POT				
TAC	Year	**2018**	Amount	**15,695 t**[1, 2]
UoA share of TAC	Year	**2018**	Amount	**4812 t**
UoA share of total TAC	Year	**2018**	Amount	**4812 t**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**4812 t**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**3728 t**
JIG[4]				
TAC	Year		Amount	
UoA share of TAC	Year		Amount	
UoA share of total TAC	Year		Amount	
Total green weight catch by UoC	Year (most recent)		Amount	
Total green weight catch by UoC	Year (second most recent)		Amount	

Table 14 Total Allowable Catch (TAC) and catch data for Gulf of Alaska

TRAWL				
TAC	Year	**2018**	Amount	**13,096 t**[2]
UoA share of TAC	Year	**2018**	Amount	**2882 t**[5]
UoA share of total TAC	Year	**2018**	Amount	**2882 t**[5]
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**2882 t**[5]
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**13,041 t**

[4] "Jig gear also contributes some of the catch, although the amounts are very small in comparison to the other three main gear types, with an average annual catch of 23 t since 1991, and no catch at all from 2012-2017. The breakdown of catch by gear during the most recent complete year (2017) is as follows: trawl gear accounted for 56% of the catch, longline gear accounted for 25%, and pot gear accounted for 19% of the catch." https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/AIpcod.pdf
[5] Total as of 10/9/2018.

LONGLINE				
TAC	Year	**2018**	Amount	**13,096 t**[2]
UoA share of TAC	Year	**2018**	Amount	**2537 t**[5]
UoA share of total TAC	Year	**2018**	Amount	**2537 t**[5]
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**2537 t**[5]
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**8978 t**
POT				
TAC	Year	**2018**	Amount	**13,096 t**[2]
UoA share of TAC	Year	**2018**	Amount	**2393 t**[5]
UoA share of total TAC	Year	**2018**	Amount	**2393 t**[5]
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**2393 t**[5]
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**13,426 t**
JIG[6]				
TAC	Year		Amount	
UoA share of TAC	Year		Amount	
UoA share of total TAC	Year		Amount	
Total green weight catch by UoC	Year (most recent)		Amount	
Total green weight catch by UoC	Year (second most recent)		Amount	

[6] "There is a small jig fishery for Pacific cod in the GOA, this is a primarily state managed fishery and there is no observer data documenting distribution. This fishery has taken on average 2,400 t per year. In 2017 and 2018 the jig fishery was nearly non-existent with catch at less than 290 t. Catch in both the Central and Western GOA was exceptionally low as were catch rates." https://www.afsc.noaa.gov/REFM/Docs/2018/GOA/GOApcod.pdf

7.2.4 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

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	Stock status relative to recruitment impairment			
	Guide post	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-N**	**EBS-Y** **AI-N** **GOA-N**

EBS Stock
The estimate of the 2019 SSB is 290 kt, whereas the B40%, which is a surrogate for Bmsy, is 263 kt. Moreover the 2018 assessment projection of the 2019 SSB is 303 kt, compared to the 2018 assessment estimate of 292 kt, confirming that there is little evidence of any retrospective bias in the assessment. With the SBB estimate at 115% of the Bmsy surrogate, there is a high degree of certainty that the stocks are above the PRI meeting the SG100 guidepost.

AI Stock
Relative estimates of biomass are available for the AI stock, and the time series of survey estimates of SSB is not taken as a reliable illustration of trends in actual SSB, given the large confidence intervals on the annual survey estimates. Nevertheless, both the absence of persistent trends in numbers at age and in numbers of incoming ages newly recruiting to the surveys suggest that there has not been any decline in stock productivity over the period of the fishery. Thus, even if the absolute status of the SSB is poorly known, it is highly likely to be above the level that would result in impairment of productivity, thereby meeting the SG80.

GOA Stock
The estimate of the 2019 SSB is 34,701 t, whereas the B40%, which is a surrogate for Bmsy, is 68,896. Moreover the 2018 assessment projection of the 2019 SSB is 34,414 t, confirming that there is little evidence of any retrospective bias in the assessment. With the SBB estimate at only 20% of the current estimate of B0, and 40% if a surrogate for Bmsy, the stock is likely to be near the lower limit for the long-term average PRI for the stock. However, the strong regime-like patterns of change in stock productivity, biomass and sensitivity to exploitation, as illustrated in the Kobe plot (Figure 2). To the extent that the two potential attractors in the Kobe plot reflect a true pattern in stock productivity, surrogate estimates of long-term average stock productivity would be an imperfect guide to harvest management, with periods of relatively high productivity at comparatively low ratios of SSB to B0, and lower productivity at higher ratios of SSB to B0. The lack of full understanding and attribution of the relative roles of SSB and environmental factors in GOA Pacific cod challenge the effectiveness of a single long-term strategy for harvest management in this stock.
However, there is evidence in several surveys that there are strong year-classes of pre-recruits in the typical juvenile range for the stock, and that the highly anomalous very warm water temperatures in this area have begun to return to more typical temperatures. Both of these lines of evidence suggest that the SSB that was sufficient to ensure a high probability that the stock productivity was not impaired might have been much lower than the long-term value of 68,896 during the recent anomalously warm period. During the warm period, the stock was able to produce typical numbers of pre-recruits, but they suffered very high natural mortality prior to recruitment to the SSB or fishery, with water temperature as the likely causal factor for the elevated natural mortality rate. As the hypothesised cause of the elevated pre-recruit natural mortality returns to more historically typical values, all currently available evidence indicates that the stock productivity has not been impaired by the relatively low SSB.
Moreover, in the two previous periods of anomalously warm temperatures in the GOA, the Pacific cod underwent similar rapid declines in recruitment. As illustrated in the Kobe plot (Figure 2), elevation of points on the Y (Fishing mortality ratio) axis did not start until there had already been substantial decline in the X (SSB ratio) axis, strongly

supporting the explanation that SSB followed the recruitment down, rather than being depleted by overfishing. Moreover, in both cases when the anomalously warm intervals passed, recruitment increased very rapidly while SSB was still anomalously low, and SSB began to grow as soon as the year-classes began to recruit.
The most recent warm event was longer and warmer than any on record and has only appeared to return to more typical conditions in recent months. Consequently, stock trajectory in the near future is highly uncertain. However, estimates of 0-group numbers and juveniles both show marked increases in 2018, providing little evidence that productivity has been impaired, even though SSB declined well below the long-term benchmarks for the stock. A condition that recruitment is to be monitored with particular care and fishing mortality kept low until increases in SSB are reliably documented in the assessments seems an appropriate action under the present circumstances.

The GOA stock has met the SG60 level for this scoring indicator, but not the SG 80 or 100 level.

	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
b	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is **a high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		**EBS-Y** **AI-Y** **GOA-N**	**EBS-N** **AI-N** **GOA-N**

EBS Stock:
The SSB has shown long term quasi-cyclic variation in response to variation in the strength of recruiting year classes. Although the stock was at a nadir of 115 kt (44% of B40%) in 2009, it has been increasing since, and passed the B40% level in 2016. Thus, it has recently been at a level consistent with Bmsy and it has been increasing. The period from 2016 to 2019 cannot be considered a long enough period of being above B40% for there to be a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level for a substantial period. This UoA achieved the SG 80 level for this scoring indicator, but not the SG 100 level.

AI Stock:
With no evidence of a progressive drop in survey biomass estimates or of an accelerating reduction in the proportion of the stock at older ages, there is no evidence that the stock is likely to be below a biomass consistent with producing as close to a multi-year MSY as is appropriate to expect from this type of stock.

GOA Stock:
At 34,700 t the stock is very close to the estimate of B20% (34,400 t) and thus well below the long-term surrogate of Bmsy. However, the maximum yield possible to produce under the environmental conditions of the mid 2010's was likely to be much lower than the long term "average" MSY, particularly given that analyses indicate both exceptionally strong and weak year classes seem more associated with anomalous environmental conditions than sizes of the SSB. The precautionary approach clearly mitigates against a score of 80 or higher on this criterion, even though exploitation has been consistent with the HCR for this stock over the past decade, and the evidence is strong that the recent decline in recruitment of the stock is driven by highly anomalous environmental conditions. Projections under different fishing scenarios indicate that as long as year-class strengths continue at present levels, the stock will be back to above B35% by 2023. In addition, the close monitoring and carefully managed harvesting called for in the condition under 1.1.1b would provide information on how well this expected stock increase was being realized. Appropriate actions in revision of the harvest strategy would hinge on the feedback from this intensive monitoring. Consequently, the condition proposed for 1.1.1b seems appropriate here as well, even though neither the SG80 level nor the SG100 level is currently met.

References

Thompson 2018; Thompson and Palsson 2018; Barbeaux et al 2018.

Stock status relative to reference points

	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	*EBS and GOA: B20%*	*EBS: 118,500 mt Female SSB* *GOA: 33,716 mt Female SSB*	*EBS 90,000/B_{LOSS} = 1.8.* *GOA: FSBcurrent/FSB20%=1.03 (103%)*
Reference point used in scoring stock relative to MSY (SIb)	*EBS: 40%B0* *GOA: 40%B0*	*EBS: 263 kt* *GOA: 68,800 t*	EBS FSBcurrent/FSB40%=1.23Unknown GOA FSSBcurrent/FSB40%= 0.50 (50%)

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**EBS>80** **AI>80** **GOA 60-79**
Information gap indicator	**More information sought for AI stock**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**EBS 80** **AI 80** **GOA 60**
Condition number (if relevant)	**1**

PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the 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 stock.
	Met?	**EBS: N/A** **AI: N/A** **GOA: Y**		**EBS: N/A** **AI: N/A** **GOA: Y**

The estimates of an increasing number of juveniles and 0-group Pacific cod in this stock give some indication that rebuilding in the stock may already have commenced. The return of natural mortality rates for all ages, but particularly for pre-recruits, to more typical levels will be crucial for the time required to rebuild to the neighbourhood of B40%. If natural mortality returns to typical levels for the near future, and fishing mortality is kept at the level of 2018 and advised for 2019, then rebuilding within one generation should be highly feasible. If natural mortality rates remain elevated in the longer term, then reconsideration of productivity-based reference points for the stock, including Bmsy and its surrogates, will be necessary. In addition, the harvest control rule, which reduces directed fishing to zero at B20% (above the scientifically determined PRI of B17.5%) ensures all efforts possible by the fishery are taken to promote rebuilding. There is evidence in several surveys with appropriate mesh sizes that there are strong year-classes of pre-recruits in the typical juvenile range for the stock, and that the highly anomalous very warm water temperatures in this area have begun to return to more typical temperatures. Moreover, directed fishing is disallowed if the stock goes below B20%. The GOA meets the SG100 level for this scoring issue.

b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.
	Met?	**EBS: N/A** **AI: N/A** **GOA: Y**	**EBS: N/A** **AI: N/A** **GOA: Y**	**EBS: N/A** **AI: N/A** **GOA: Y**

GOA Stock:
There is evidence for the GOA stock that numbers of pre-recruits in the stock range are higher than during the years of the warm pool. From the most recent assessment, the total stock biomass (0+) increased by 16% from 2017 to 2018, by another 35% from 2018 to 2019, and is projected to increase by another 24% from 2019 to 2020. In addition, the most recent estimates of natural mortality suggest that the life history parameter is returning to more typical levels as well, although the age disaggregation of natural mortality is too uncertain to conclude with any confidence how it will be expressed in stock biomass trajectories. In addition, in both previous times when anomalously warm water conditions were recorded in association with this stock, recovery of stock biomass commenced immediately after the anomalous conditions ameliorated and persisted until the stock was well above estimates of long-term B_{msy}. Together these pieces of information constitute strong evidence that stock rebuilding is underway already and if environmental conditions remain in states more characteristics of the GOA for the next few

years, rebuilding to the neighbourhood of B40% should be completed by the early 2020s. The GOA stock meets the SG100 level for this scoring indicator.

References

Thompson 2018; Thompson and Palsson 2018; Barbeaux et al 2018.

Scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**EBS: N/A** **AI: N/A** **GOA: 100**
Condition number (if relevant)	**N/A**

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-Y**

EBS and GOA Stocks:
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 BSAI and GOA Groundfish Fishery Management Plans (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 EBS and GOA have generally been managed under Tier 3 of Amendment 56.

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. For stocks which are subject to high levels of autocorrelated variation in year class strengths, and the available evidence indicated that physical or biological oceanographic conditions are a major cause of the variation in year class strength, no harvest strategy can always keep the SSB about Bmsy. However, the harvest strategy is **designed** to reduce fishing mortality at a rate that anticipates expected declines in year-class strength, and to stop fishing when SSB is below the PRI. Thus, it is designed to be responsive to stock status and achieve the management objectives, which include keeping the stock at or above Bmsy whenever possible, and not allowing the fishery to further deplete the stock during periods of poor recruitment for environmental causes

AI Stock:
For AI Pacific cod, the harvest strategy of 0.75 of the estimates of M from annual survey data ensures that the harvest rate is kept below the corresponding natural mortality rate for the population being surveyed. With F = M generally considered to be sustainable for stocks with life histories characteristic of pelagic and groundfish stocks, and taking 0.75 M to introduce a moderate degree of precaution, the harvest strategy is designed to achieve the management objectives, including allowing sustainability harvests and not allowing the harvest to deplete the stock. Moreover,

because an unknown, but unlikely to be a small proportion of the stock is typically located in habitats impossible to trawl with the survey gears, taking 0.75 M X only the portion of fishable biomass located in the surveyable portions of the entre stock area, the harvest strategy has an extra, in unquantifiable level of precaution inherent in the harvest estimate. With the harvest cap based on the survey biomass estimate from the most recent year, it is also inherently responsive to changes in stock status. Thus, that scoring level of SG 80 and SG 100 is met.

However, the degree of responsiveness of the harvest strategy to stock status is impossible to quantify because there is no certainty that any changes in stock status are equally represented in the portions of the stock in both the trawlable and untrawlable habitats. Consequently, it is not appropriate to conclude that all the parts of the harvest strategy always work fully together to achieve the objectives for the stock. It is *likely* to be the case that they work together, as there is little evidence of strong age separation (at least among mature ages) in the survey or commercial catches, but the *absence* of a specific pattern in some analytical results is rarely strong evidence for the *presence* of some specific property (like the parts of a harvest strategy working together effectively). Moreover, the harvest strategy of 0.75 M from the corresponding survey may be likely to achieve the management objective for the stock, but it was certainly not *designed* to achieve that specific set of objectives and has a more generic intent. Consequently SG 100 is not met for AI, but SG 80 is met in practice.

	Harvest strategy evaluation			
b	Guide post	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.	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?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS- Y** **AI-Y** **GOA-Y**	**EBS- N (last clause)** **AI-N** **GOA-N**

EBS Stock:
The harvest strategy has been fully tested with a wide range of simulations making alternative assumptions about the key biological processes and model parameters. It is found to be robust to the plausible range of potential life history and fishery processes and relationships. However, no harvest strategy could be found that was clearly able to maintain stocks at “target harvest levels” of B40% under the range of variation in year class strengths observed in the fishery. So the aspect of the 100 guidepost for this PI relating to testing of the harvest strategy is met, but the aspect of the guidepost of 100 for the outcome of the harvest strategy cannot be met by any harvest strategy that would not involve extensive (and completely untested) artificial enhancement of the stock during periods of poor recruitment. The SG80 level is met for this scoring indicator, but the SG100 is not met.

AI Stock:
In the case of AI, the stock has only been assessed and managed separately since 2013. That means information is available for one or two generation times of Pacific cod stock, and stock productivity of adjacent Pacific cod stocks are known to vary substantially on decadal scales. Consequently, it cannot be considered to be fully tested, even though the foundation of the strategy as F = M being at least a sustainable and usually somewhat precautionary strategy has been confirmed with many more stocks globally than in cases where it has been questioned. Moreover, all evidence available to this point indicates that the harvest strategy is not truncating the age composition of the surveyed population, nor reducing incoming recruitment. Consequently, a score is 80 is justified based on the existing evidence.

GOA Stock:
In the case of GOA, the harvest strategy was tested as thoroughly as for EBS. Moreover the strategy has been in place for a comparably long period of time, and there was a growing body of experience that it worked under the ecosystem conditions being encountered – in some cases even being tested further (as was the EBS strategy) as the relevance of additional aspects of the ecosystem background in which the strategy was operating became more apparent. On those grounds a case could be made that as in 1.2.1a, the score for both stocks should be equal and quite high. However, in the case of GOA, the time series of information did include two previous periods when the more southerly Gulf of Alaska had periods of nearly two years of anomalously warm oceanographic conditions, and in both cases, poor recruitment and natural mortality of all ages, particularly juveniles, increased. Testing of the

robustness of the harvest strategy for GOA even included some consideration of those events, so their relevance was acknowledged. With the now strong evidence of global climate change now altering many properties of the ocean, and the polar and subpolar oceans experiencing larger impacts of climate change than the average for lower latitude marine systems, it would have been precautionary to have tested, and as necessary adapted the harvest strategy to deliver the stock objectives under more extreme levels of environmental stress than had been recorded in the multi-decadal historic time series. So, in the case of GOA, testing of the harvest strategy was only partial, and up until faced with the oceanographic conditions of the mid 2010s, where the warm pool was substantially warmer and lasted substantially longer than ever observed before, there was substantial evidence that it was working. The SG80 level was met for this scoring issue, however the SG100 level was not met.

There will be a Recommendation in 1.2.2.b. that is relevant to this scoring

	Harvest strategy monitoring			
c	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	**EBS-Y** **AI-Y** **GOA-Y**		

EBS and AI Stocks:
There is extensive monitoring of the catches of all fisheries, with on-board observers and enforcement both indicating generally high compliance of the fishers, such that the monitored catch is an accurate record of total harvest. There is also a stratified annual survey, and in recent years, two surveys with very good total coverage of the range of stock, providing a fishery-independent time series of stock status from monitoring.

GOA Stock:
Although the survey coverage of Pacific cod in the GOA is not as thorough as in the EBS, with full surveys only two of every three years and station coverage is not as dense as in some surveys, there are several other fishery surveys giving coverage to subsets of the GOA cod catches. Those surveys augment the full groundfish surveys. Moreover, there is intensive observer coverage of the fishery operations, monitoring of fleet distribution, effort levels and port monitoring of catches, and monitoring of many aspects of the physical and biological oceanographic environment. Together these are adequate to determine that the harvest strategy is working.

All stocks meet this scoring issue.

	Harvest strategy review			
d	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			**EBS- Y** **AI-N** **GOA-Y**

EBS Stock:
The full assessment is reviewed annually as part of the NMFS standard processes for stock assessment, with the reviews including NMFS experts, experts from academic or other fisheries science and management agencies, experts chosen independently by the Center for Independent Experts, and some stakeholder engagement. Moreover, there are periodic thorough reviews of the entire assessment structure, including exploration of alternative assumptions for most model relationships and alternative modelling approaches. For EBS Pacific cod, the last such complete review after the 2017 assessment was when 16 alternative model structures were tested.

GOA Stock:
Much the same standards of review as applied in the case of the EBS stock are also applied for the GOA stock. If anything, it could be argued that even a broader range of engagement of various stakeholders occurs through the

various stages of the review of the stock assessment and harvest strategy. Between late 2017 and the final acceptance of the assessment, there were five meetings of the Plan team and/or SSC to review and make choices among options and recommendations for further development, as well as many other interactions among external experts and stock assessment team for this stock.

The SG100 is met for both the EBS and GOA stocks

AI Stock:
The survey-based harvest strategy has only been in place for six years, since the stock was first assessed and managed separately from EBS. With so much of the harvest strategy based on survey data, and the expected variation form year to year in proportion of the stock available to the survey gear, a survey-based evaluation of the harvest strategy would require the strategy to have been in place for at least a full generation time of the stock, ideally more, to ensure a signal in decreasing age structure of the stock could be resolved, Such an evaluation sometime in the early 2020s would be appropriate, however. With no specific review already set, it would be inappropriate to score AI as meeting the SG 100. However, with the stock separated so recently from EBS, and particularly with the decision to make the separation based on a past review of the earlier delineation of EBS, it is inappropriate to say the SG100 level was not met; rather it is premature to evaluate this soon after separating the two stocks.

	Shark finning			
e	Guide post	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?	**N/A**	**N/A**	**N/A**

Cod are not sharks.

	Review of alternative measures			
f	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	**N/A**	**N/A**	**N/A**

Rationale

There is no noteworthy unwanted catch of cod in the directed fishery. The vast majority of cod is retained and landed.

References

Thompson 2018; Thompson and Palsson 2018; Barbeaux et al 2018.

Scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**EBS and GOA stocks ≥80** **AI stock: 60-79**
Information gap indicator	**More information sought (on the AI in particular)**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**EBS: 90** **AI: 80** **GOA: 90**
Condition number (if relevant)	**N/A**

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-N** **AI-N** **GOA-N**
Rationale				

EBS Stock:
The harvest strategy has been tested with a wide range of simulations making alternative assumptions about the key biological processes and model parameters. These assumptions cover several assumptions about natural mortality of young cod which could be prey for other species and natural mortality of mature cod due to poor feeding conditions. The harvest strategy is found to be robust to the plausible range of potential life history and fishery processes and relationships, but no harvest strategy could compensate for periods of weak year-classes that are thought to be related to simply unfavourable oceanographic conditions for age 0-3 Pacific cod. However, no harvest strategy could be found that was clearly able to maintain stocks at or near Bmsy “most of the time” under the range of variation in year class strengths observed in the fishery. So the aspect of the 100 guidepost for this PI relating to testing of the harvest strategy is met, but the aspect of the guidepost of 100 for the outcome of the harvest strategy to keep the stock above Bmsy “most of the time” cannot be met by any harvest strategy that would not involve extensive (and completely untested) artificial enhancement of the stock during periods of poor recruitment. The SG 60 and 80 level were met for this scoring issue, but the SG100 was not met.

GOA Stock:
The expectations for the HCR are a little different from the expectations of the HCR applied to the EBS stock. The large and possibly greater role of oceanographic variation in dynamics of many GOA stocks, particularly Pacific cod, and many of the exploratory analyses and robustness testing analyses conducted were intended to investigate factors like the consequences for the stock and fishery of past warm events. These investigations were considered sufficient by the Plan team and SSC to justify a common *expectation* that the HCR would keep the stock at or fluctuating around the B40% / B35% level where feasible given the oceanographic background and also manage any declines due to transient drops in stock productivity so the SSB during the decline was still large enough to return the stock to the neighbourhood of B40% rapidly when oceanographic conditions and stock productivity returned to more typical conditions.

The SG80 is met for both stocks, but the SG100 only partially met.

AI Stock:
Well defined HCRs are in place, and they ensure that exploitation is reduced whenever the survey estimate of stock biomass decreases. That meets, and likely exceeds SG 80 for key parts of this scoring criterion. However, it is highly likely, but not established, that trends in the annual survey estimates will give indications of when the poorly known PRI for the stock is being approached, and surrogates for Bmsy for this stock are unavailable, so it cannot be known of the stock is fluctuating around or near that value. This part of an 80-scoring benchmark is not met. However, because this lack of a reliable estimate of Bmsy has already been scored once in this assessment, a score of 80 for this criterion is appropriate, since all the parts of the scoring guidelines that are applicable to the circumstances of the assessment are met.

b	HCRs robustness to uncertainty

	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-N**
Rationale				

EBS Stock:

The main features of the harvest control rule for EBS Pacific cod have been discussed above in PI 1.2.1 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 is required to be explored, and the CIE reviewers asked for even more scenarios to be considered. An elaborate set of performance criteria is used to guide final decisions about stock status, before the control rule is applied to the results. Some simulations are explicitly linked to specific parts of the harvest control strategy, whereas other parts of the harvest control strategy are informed by multiple scenarios, and possible different scenarios in differ years, depending on their performance in the assessment (Thompson 2018). Environmental uncertainty is not a parameter in the harvest control strategy, but its manifestation through possible impacts on the stock productivity parameters, which are reconsidered in each assessment, are fully considered.

AI Stock:

The HCR is based on allowing the fishery to harvest 0.75 X M X FB, with Natural Mortality (M) and Fishable Biomass (FB) both based on survey information. The main sources of uncertainty are how fully the survey biomass estimates for the stock reflect the full AI stock, and how accurate and stable over years the estimates of M are for the stock. By basing the estimates of M and FB from the same survey in the survey year closest to opening of the fishery, these uncertainties are taken into account by a) ensuring the M estimates are for the stock actually "seen" by the survey closest in time to the fishery, so even if the estimates of FB increase and decrease from year to year in part due to changes in distribution rather than abundance of the stock, the corresponding estimates of M stay appropriate for the stock as it is distributed; and b) by treating any fish distributed outside the area available to the survey as not part of the fishable biomass, a movement of fish into the area where the commercial fishery operates after the survey is complete, the application of the HCR would reduce the harvest rate on all of the now greater portion of the stock that is available to the fishery, rather that increasing the overall take from the complete stock inside and outside the trawlable grounds. However, until some independent ways to assess the stock inside and outside the fishable grounds are available, testing the true robustness of this harvest strategy will not be feasible. The restriction of the survey to only trawlable bottom in AI means that the survey may underestimate Pcod biomass annually by not sampling the portion of the population in untrawlable habitat, and the proportion of the population not sampled annually could change if the population were to redistribute differently from year to year between trawlable and untrawlable grounds. If such a redistribution is occurring, it would be reflected in the interannual variability in the annual trawl survey estimates in the time series and be captured in the current uncertainty estimates used in the stock assessment. Thus, the incomplete coverage of the trawl survey is accounted for in the assessment. Directed research on possible factors influencing Pcod distribution among different bottom types (possibilities include cohort size, age, oceanographic factors) might be a pathway to reduce assessment uncertainty. However, the current assessment and uncertainty estimates are sufficient to support the current management strategy for the stock. The SG100 level is not met for this scoring issue.

GOA Stock:

The main features of the harvest control rule for GOA 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 the 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 HCRs, whereas other parts of the harvest control strategy the rules that implement it are informed by multiple scenarios. These can be different scenarios in different 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 Schirripa et al. 2009).

However, although the warm event in the GOA between 2014 and 2016 was the longest and warmest ever observed for the stock, there are many reasons why the occurrence of such conditions occurring episodically in the GOA should have been considered a plausible risk, given the incontrovertible evidence of ocean warming due to climate change and the very exposed position of the GOA to impacts of ocean warming. With the extensive testing of the HCR already documenting that stock declines would be inevitable when such event occurred. To fully comply with the 100 Guidepost it is reasonable to have expected that robustness testing and HCR development should have included taking into account oceanographic events more extreme than those in the historical time series, and examining HCRs that would have been precautionary by responding more quickly and more decisively to evidence that the types of ecosystem changes are likely to occur given current modeling of the impacts of global warming on the North Pacific and sub-arctic zones.

Recommendation – Exploration of the costs and benefits of HCRs that respond more rapidly and with more initial restrictions on fisheries, when early evidence of possible “warm events” appears in the oceanographic or ecosystem modelling. The explorations should include the tradeoffs of risks of false alarms and misses in such more “interventionist” rules, the costs of the industry and communities of such alternative rules, and the possibilities of faster payoffs back to the fisheries and communities by allowing somewhat faster increases in harvest once evidence of the oceanographic anomaly has reversed.

The SG80 level has been met for this scoring issue, however the SG100 has not been met.

	HCRs evaluation			
c	Guide post	There is **some evidence** that tools used **or available** to implement HCRs 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 HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-N**
Rationale				

EBS and AI stocks:
The strongest evidence that the HCRs are effective in achieving the exploitation levels required under the HCRs is that stock survived the environmental challenges of the 2000s in a condition to be able to take advantage of more favourable environmental conditions when they returned to the EBS. As a sequence of poor recruitments from the 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. Some very strong year classes 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 (Thompson 2013 and preceding assessments).

During the period of reduction in quota, catch monitoring remained strong enough that the catch and discard figures are considered reliable. Although the CIE Review Panel has called for retrospective analyses to be a routine part of the assessment, full retrospective analyses were not made available to this Review Panel to determine whether there are strong retrospective patterns in the assessments, that would be consistent with increasing amounts of catch not being reported as the quota was reduced. However, a general sense of whether there are retrospective patterns in sequential years' assessments can be gained by comparing a sequence of individual annual assessments (Thompson et al. 2009, 2010, Thompson and Lauth 2011, 2012, Thompson 2013). Strong retrospective patterns did not appear to be present, and the present review panel notes that the assessment staff do agree with the CIE reviewers that there are advantages to including retrospective analyses in each assessment (Thompson 2014, page 247), and considers those analyses would strengthen conclusions on this point.

The available evidence does indicate fairly strongly, however, that not only is the quota setting process effective in setting harvest levels that should reduce exploitation, the fishery compliance with the management plan is high enough that the intended reductions are realized. The management system has been challenged in the late 2000s with a series of the poorest recruitments in the time series and succeeded fully in preventing the stock from declining to a level where recruitment was impaired for reasons of insufficient spawning biomass. As soon as recruitment improved, the stock immediately commenced recovery to above target levels. The effectiveness of the Harvest Control Rule for the AI stock component alone cannot be fully evaluated, since it has only been managed separately in 2014. However, over that period the survey index and Tier 5 assessment do not present evidence to mark stock decline. Moreover, prior to 2014 it was managed under the same harvest control rule and showed even less of a pattern of decline during periods of weak recruitment. Over the period the AI stock component was included with the EBS component for assessing this scoring criterion. Therefore, evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules, meeting the SG 100 level.

GOA Stock:
There had been strong evidence that the HCRs has been effective in achieving the exploitation levels expected under the HCRs. The stock survived through 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 GOA in the second half of 2000s. As a sequence of nine below average to poor recruitments from the late 1990s and early 2000s entered the stock up until 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 did the spawning biomass increase during the subsequent 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 auto-correlated weak recruitment are considered robust, with small confidence limits on the annual biomass estimates.

In the case of the most recent period of anomalous oceanographic conditions in 2014-2016, however, the HCR was unable to keep fishing mortality from increasing to over 0.7 for 2015-2017, well above the OFL (F overfishing level) of 0.4. The quota had been reduced each year consistent with the HCR applied to the fishable biomass projected to be present on Jan 1 of the coming fishing year. However, the natural mortality also increased in this period, so each subsequent assessment estimated F to have increased more than expected when the HCR was applied to the fishable biomass estimated. The stock assessment was lagging a year behind, at least for a portion of the declining stock status, so the HCR was unable to fully manage to achieve the exploitation rate consistent with the harvest strategy. However, that lag has continued as the environmental conditions have ameliorated with the likely chance that the HCR is now performing in an overly restrictive manner. The most recent assessment estimated Fishing Mortality for 2018 to be .184, substantially below the Fabc (the F consistent with the maximum allowable harvest under the harvest strategy) of 0.25. Moreover, as reported in P1 1.2.1, the total biomass of the stock has been showing a marked increase since the shrinking of the warm pool, indicating the objective of protecting stock productivity to be reduced through fishery depletion of the SSB has continued to be achieved.

Consequently, not only has the harvest control rule worked in simulations of Tier 3 stocks in general, it has also been tested three times by anomalies in environmental conditions, each a more extreme anomaly than the preceding ones. The HCR has performed well for this stock during these periods 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 generally effective in achieving the exploitation levels required under

the harvest control rules, meeting the 60 and 80 guideposts. However, because there is some evidence that it does not achieve short term outcomes consistent with the harvest strategy under extreme environmental conditions, it does not meet the SG100 Guidepost.

References

Schirripa et al. 2009; Thompson et al. 2009, 2010, Thompson and Lauth 2011, 2012, Thompson 2013; Thompson 2018; Thompson and Palsson 2018; Barbeaux et al 2018; A'mar and Palsson 2013, A'mar et al. 2012

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**All stocks ≥80**
Information gap	**More information sought (particularly for the AI)**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**EBS: 95** **AI: 85** **GOA: 80**
Condition number (if relevant)	**N/A**

PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guide post	**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 are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-Y**
Rationale				

EBS Stock:

The information used in the annual assessment includes data from catches by all fleet sectors, foreign (in the years for extension of national jurisdiction) and domestic since 1964. Since 1977 domestic catches have been disaggregated by gear type and season, and since 1991 discard data by gear type are also available. Effort data are available by season and gear type, allowing fishery dependent CPUE values to be calculated. Port sampling and in some cases observer sampling also provide annual length and aging structures from the commercial catches.

The annual EBS trawl survey provides fishery independent catch numbers, weights, lengths and ages annually since 1982. Maturity data, stomachs for diet analyses, and other biological data are also collected from the survey catches. 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, including growth rates (Stark 2007; Hurst et al. 2012), reproduction (Narimatsu et al. 2010), maximum age and fecundity (Stark 2007; Ormseth and Norcross 2009), and position in the food web (Aydin and Mueter 2007; Marsh et al. 2012). Stock structure has been investigated using both genetic methods (Cunningham et al 2009), and stable isotope analyses (Gao et al. 2005). 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 is not yet available in primary publications.

In summary, comprehensive information, including information not required for the harvest strategy, is available for assessment of the status of Eastern Bering Sea Pacific Cod. This achieves the SG60, SG80, and SG100 levels.

AI Stock:
Since 2014 the AI Pacific cod stock has been assessed separately from the EBS stock, using a “Tier 5” approach. This approach uses limited data to establish precautionary catch limits. Main pieces of information necessary for applying the harvest strategy are survey-based estimates of age-by-age fishing and natural mortality (Z) within years, an overall estimate of M for the fully recruited portion of the stock, and of incoming recruitment to the fishable ages/sizes of the population, and accurate estimates of total catch and age composition of the commercial catch. Monitoring of fishery catches is sufficiently complete for the total size and age composition of the annual catch to be known with good accuracy and precision. The surveys conducted in the AI have been sufficient to provide the age composition and numbers at age within each individual year with sufficient accuracy and precision for the other requirements of the harvest strategy, even though the survey=based numbers at age cannot be reliably aligned across years because an unknown and likely variable proportion of the stock is in unsurveyable grounds each year. Hence the classification as a Tier 5 stock, with the less information demanding harvest strategy. There is also sufficient information on stock structure, fleet composition, and effort to support the harvest strategy. However, this cannot be considered as a comprehensive range of information, since trends across years in the survey-based

numbers at age may be affected by changes in distribution of the AI Pacific cod by depth and among bottom-types. Consequently, SG80 is reached but not SG100.

GOA Stock:
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 frequency of the GOA trawl survey has been increased from bi-annual to two of every three years and provides fishery independent catch data in numbers and biomass, and length composition and length at age data since 1987. In recent years, consistent with CIE recommendations, information form these surveys has been augmented by information from sablefish and Pacific halibut surveys that cover part of the total range of GOA Pacific cod. These surveys provide data on, maturity at age, stomachs for diet analyses, and other biological data, although at different intensities in difference survey years. Intensity of sampling depends on the research interests of scientists studying Pacific cod, and priorities identified by the Plan Team and SSC for the Pacific Cod Stock assessments.
There have been directed studies of life history parameters for Pacific cod in GOA, including growth rates and maturity (Stark 2007, 2009, DiMaria et al. 2010, Hurst et al. 2012), reproduction (Martinson et al. 2012), age-specific habitat use (Laurel 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 availability in primary publications lags behind available of data to the assessment team.

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.

	Monitoring			
b	Guide Post	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA 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?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-Y**
Rationale				

EBS Stock:
The justification for scoring issue a. applies with equal relevance to scoring issue b. In addition to all the biological information and fishery dependent data on catches discussed above that provide multiple abundance indices, the size of all fleet components is known and updated annually, and the monitoring of fleet operations also allows the spatial distribution of effort to be monitored on very precise space and time scales. There is a good understanding of the

uncertainties associated with the data sources, and the uncertainties are considered in the assessments which trigger the application of the harvest control strategy. The monitoring of multiple indicators, with a high degree of certainty, demonstrates that the information reaches the SG60, SG80, and SG100 levels. Redesign of the Bering Sea observer program should increase the quantification of uncertainties in all catch records and in fleet behaviour, which can improve what is already good performance of the system.

AI Stock:
The justification for scoring issue a. also applies to scoring issue b. With the harvest strategy depending heavily on reliable estimates of the age composition of the population, and the population itself potentially changing its age-specific distribution among trawlable and untrawlable areas of the stock area, at least very frequent, and if at all possible, annual surveys of the trawlable areas of the AI will be necessary to continue to maintain a score of 80 for this scoring criterion. An occasional gap in the annual survey schedule is unlikely to seriously increase risk to the stock at present levels of exploitation. However, any proposals to introduce multi-year gaps or make the survey schedule opportunistic would mean the survey would no longer be highly likely to provide the information needed to support the harvest strategy. The SG60 and 80 level were met for this scoring issue, but the SG100 level was not met.

GOA Stock:
The justification for scoring issue a. applies with equal relevance to scoring issue b.; over 90% of the GOA Pacific cod catches across all gears is landed at shore-based processing pants, and observer coverage and port sampling rates are very high, over 85%. At sea observers have been present in varying levels as well, although in recent years the use of shipboard electronic monitoring is increasing in all fleets, particularly the ones managed by state rather than federal authorities. The electronic monitoring systems are not able to do at sea biological sampling of catches but provide high reliability to overall catch monitoring. Combined with biological sampling of many biological attributes by the shore-side samplers, an extensive flow of information is maintained. 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 considered 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, for the present fishery, all information required by the harvest control rule is monitored with high frequency and with a high degree of certainty. 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. It is noted, however, that there have been proposals to increase the portion of the total catch allocated to the state waters fishery, where, as noted above, monitoring and sampling occurs at lower rates. There is no specific apportionment of catches among fisheries that would automatically necessitate a review of the reliability of catch monitoring of GOA Pacific cod. Nevertheless, to maintain the effectiveness of the harvest management system and the overall credibility of management and information from monitoring, and if the portion of catch taken in state-managed fisheries continues to increase, reviews of the accuracy and precision of monitoring information used in assessment and management and/or increasing the monitoring of catches in state waters to be comparable with monitoring of catches by federally-managed fisheries, is warranted.

	Comprehensiveness of information			
C	Guide Post		There is good information on all other fishery removals from the stock.	
	Met?		**EBS-Y** **AI-Y** **GOA-Y**	
Rationale				

Bycatches of cod in other fisheries in the Bering Sea, Aleutian Islands and Gulf of Alaska for Alaska pollock and various flatfish are fully quantified by on-board observers, dockside monitoring and trip reports, and included in stock assessments. Particularly the very large pollock fishery has a low bycatch of Pacific cod. A coastal fishery managed by the state of Alaska can take Pacific cod, but again all catches are subject to at least dockside monitoring, fully

reported, and included in the assessments. However, since most Pacific cod are taken in offshore fisheries on the shelf and Aleutian Island chain, catches in the state-managed nearshore fishery are usually also low. Consequently, there is high confidence that there is good information on cod removals in other Alaska fisheries, thereby meeting the SG80 level for all stocks.

References

Narimatsu et al. 2010; Stark 2007, 2009; Ormseth and Norcross 2009; Aydin and Mueter 2007; Marsh et al. 2012; Cunningham et al 2009; Gao et al. 2005; DiMaria et al. 2010, Hurst et al. 2012; Martinson et al. 2012; Doyle et al. 2009, Van Kirk et al. 2010, Urban 2012

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**More information sought (for the AI stock in particular)**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	
Condition number (if relevant)	**EBS: 100** **AI: 80** **GOA: 100**

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-Y**
Rationale				

EBS Stock:
The family of models in each assessment explore, and where evidence supports inclusion, the final assessment model takes into account selectivity of the fishery, spatial distribution of the stock relative to fishery and survey catches, changes in weights at age and weights at length, natural mortality across years and cohort, changes in age of maturation and recruitment to the fishery, and fleet targeting behaviours. The assessment process is overseen by a Plan Team with expert membership, which works with the experts actually conducting the assessment to explore suites of models, typically with diverse representations of the stock biology, ecology, and life history, the performance of the fleets, and increasingly, difference scenarios of ocean climate, with sensitivities of the stock population dynamics, distribution and other factors to the ocean environment represented in various ways. The actual assessment team generally explores multiple formulations of several scenarios, meeting iteratively with the Plan team to discuss interim results, revise scenarios as they consider appropriate, and converse on a final assessment model for the stock. Information on the iterations is available for examination outside the Plan team, greatly increasing the transparency of the entire assessment process.,
The single final assessment model used each year rarely includes every possible feature explored as a variable (or variable process) during the full assessment process, but all features considered potentially influential on stock dynamics and for which information is available have been explored and taken into account when supported by evidence. In doing so, major features relative to the biology of the species and nature of the UoA, particularly factors reflecting possible environmental influences on growth, maturation, survivorship, and distribution relative to favoured (or avoid) water mass conditions are considered. Consequently, the SG 100 is fully met

GOA Stock:
The stock is assessed annually, with typically at least five, and sometimes more, experts contributing enough to be listed as authors on the final assessment document. In addition, a Plan Team for the assessment is also selected and interacts with the core assessment team throughout the annual assessment process in ways comparable to EBS.
The assessment is age structured and includes a mix of biological parameters estimated inside and outside the assessment model itself. Those estimated outside the model are usually based on directed study and research on the process or property of concern, and in recent years have included natural mortality, von Bertelanffy growth curve parameters, aging error rate, weight at length, and maturity at length and age. Typically, scenarios with and without these factors are explored during the assessment process, with choices of what factors to include or exclude from further formulations, dependent on both statistical and bio-ecological considerations. Parameters estimated inside the models include variability in growth at age and year, initial fishing mortality, and gear specific selectivity parameters for catches and surveys. Environmental influences on many model parameters and trends in parameters have been explored with the assessors and Plan Teams over the years, and key ones are taken into account in at least some of the formulations examined each year
The core models explored are developed within the extensively tested stock synthesis framework that has been used for nearly two decades, with stocks having life histories comparable to Pacific cod and with parameters fit with maximum likelihood methods. All these aspects of the assessment models explored each year combined make the stock meet the SG100 scoring level, taking account of the major features of the stock biology and the nature of the fisheries on the stock.

AI Stock
As a Tier 5 species, the assessments are not as intensive as for EBS or GOA Pacific cod. The main factors taken into account by the state-space model used on the survey data are the core life history factoras for the stock, and the catch composition of the aggregate catch of the small number of vessels that participate in the fishery. Although this is not a comprehensive list of factors that may be affecting the stock status and fishery performance for AI Pacific cod, the list of factors is fully sufficient to support the Tier 5 Harvest Control Rule. Consequently, the SG 80 is met, but not the SG 100 level for this scoring issue.

	Assessment approach			
b	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	
Rationale				

EBS and GOA
A common justification applies to both EBS and GOA stocks because they have quite similar life histories and the biological basis of the reference points is the same for both stocks. The reference points of B40% as a surrogate for Bmsy and B20% as a PRI have been explored in many analytical and simulation studies for many groundfish stocks of comparable life history to Pacific cod, and for Pacific cod individually. The reference points are generally accepted industry standards for such species, as are the stock synthesis assessment approach used to estimate their numerical values annually. All investigations for these UoAs indicate that the reference points are robust and the B40% may be overly precautionary for the UoAs, perhaps being set slightly higher than the best estimate of Bmsy for stocks with this level of natural mortality.
With the reference points expressed in SSB and F, the assessment estimates of these stock status parameters are directly comparable to the reference points. Details of the annual assessment models used to calculate status of B and F may not be identical to the models used to estimate B0 in the year that the reference points are established or revised, but the B0 and related population parameters are output from the final assessment model each year. No discrepancies have been identified in any recent years that indicate an overall large retrospective problem with the assessment that could degrade the comparability of the annual B and F estimates with the corresponding reference points in place during the management year. The SG100 level is met for the EBS and GOA stocks.

AI Stock
The reference point of F = 0.75 M from surveys is appropriate for a gadoid, in that F = M strategies have been shown to be generally robust for stocks with comparable life histories. Concerns have been expressed about a full F = M harvest strategy being overly aggressive, but the reduction by 25% makes sustainable harvest highly likely (extensive references in core assessment document and discussed in Criterion 1.2.1a). With the annual estimates of both F and age-specific Z coming from the surveys conducted on the portion of the stock available in trawlable bottom, both the reference points and the status of the stock are inherently (even tautologically) possible to estimate, and the estimates are inherently comparable. Both the reference points and the assessment estimates may underestimate the total stock size and corresponding total sustainable harvest from the stock. However, this is part of the rationale for AI cod being managed as a Tier 5 stock, with any errors in estimation of total stock size and allowable harvest very highly likely to be errors in the direction that would enhance sustainability of the fishery and protection of the recruitment of the stock, rather than place it at higher risk. The SG100 level is met for this scoring issue.

	Uncertainty in the assessment			
c	Guide post	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.
	Met?	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-N** **GOA-Y**

Rationale

EBS and GOA Stocks:
Again, the same justification applies to both EBS and GOA. The entire assessment is conducted with many input parameters represented by probability distributions rather than point estimates, and many likelihood estimations are made in both preliminary and final runs. Uncertainties are estimated for the key output parameters of the final assessment run, as well as many preliminary and exploratory runs. Thereafter many of the fisheries management discussions take the assessment estimates of maximum likelihood for biomass and mortality values as their starting point for consultations and decision-making, leaving some participants under the impression that the point estimates are the major outcome of the assessment. However, all probabilistic information is available when management or consultation questions require investigating risk or robustness of alterative actions and are consulted or referred to frequently as the annual management plan develops.
From year to year some assessment parameters may move back and forth between being estimated inside and outside the models. In cases when the parameters are estimated outside the model, the uncertainty in the estimates is generally carried into the model as either representing the parameter as a probability density function to be sampled from simulations within the larger model or as a sigma value as well as the mean parameter estimate, to be combined statistically with other uncertainty estimates on other parameters. The model fitting and parameter estimations within the model are likelihood based, and inherently carries uncertainty forward to the model outputs. Although model outputs such as SSB, Total Biomass, fishing mortality, etc., may be tabulated as point estimates, particularly in summary material, all major uncertainties are fully reporting the assessment tables, and their implications are discussed in interpreting model results and developing advice and other decision-support tools. The SG100 level is met for the EBS and GOA stocks.

AI Stock
The assessment document reports all major sources of uncertainty likely to be important when the assessment results are used in management. The largely survey-based state-space model at the core of the assessment, many of them are not included analytically, focus on information inherent in the survey catch-at-age numbers. However, as a Tier 5 stock, the “assessment” consists of far more than solely the numerical output of complex models, but also includes the narrative context for the results of the state-space model in the body of knowledge about AI Pacific cod and the ecosystem in which it occurs. This means that the SG 80 level is met for this stock, as the uncertainties are considered, including a very cautious rule for estimation of advised harvest. However, this is not done in a probabilistic manner, so SG100 is not met.

	Evaluation of assessment			
d	Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			**EBS-Y** **AI-N** **GOA-Y**

Rationale

EBS and GOA Stocks:
The same justification applies for both EBS and GOA, since the same approaches to model testing for robustness are applied for both assessments. The assessments have 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 2005 alternate hypotheses have been explored, as summarized in Annex 2.1 to Thompson (2018). Every assessment since 2011 has included at least several different formulations and recommendations from the Plan Teams and SSC, and these recommendations are explored. Most recently in the 2018 assessment, six different model formulations were explored for the GOA UoA (with multiple minor variants of several), and sixteen models were explored for EBS (again with some additional minor variants in some cases), with eight considered in depth. In all cases the exact formulation accepted as the basis for advice in the previous year is included as one of the models explored in the subsequent year. (Thompson 2018-EBS; Thompson and Palsson 2018-AI; Barbeaux et. Al 2018-GoA).

Therefore, the score reaches SG100 for the EBS and GOA stocks.

The issue of whether completely different approaches to the assessment have been rigorously explored is difficult to address. The current Stock Synthesis assessment framework is just that; a framework allowing the user substantial flexibility in details of model formulation (Methot and Wetzel 2013). Hence within the overall stock synthesis framework multiple approaches can be explored. Moreover, it has been very thoroughly considered by both NMFS (and other international) experts and by the SSC and found to be among the state of art methods for fisheries stock assessment, as has been accepted by NMFS as a starting point for stock assessments. However, apparently completely different assessment methods, such as ADAPT (Gavaris 1988 - commonly used on the East Coast and in Canada) and XSA (Shepherd 1999 - for many years the default for assessments in ICES, although in recent years practice has diversified there) have not been tried in some time. However, there has been extensive inter-comparison of the performance of stock assessment methods (a few examples include Patterson and Kirkwood (1995), National Research Council (1998), Restrepo et al (2000), Patterson et al (2001), Methot (2009), Schirripa et al (2009)). If flexible assessment methods such as Stock Synthesis are used, and assessments take advantage of their flexibility, which is certainly the case for Bering Sea Pacific cod, the advantages of occasionally testing completely different assessment methods is small.

AI Stocks:
The Tier 5 approach to management of this stock makes it difficult to conclude that the assessment approach has been "tested". The overall F = M approach has been tested generically and at least an F = 0.75 strategy has been found to be robust, although there is not a full consensus that F = 1.0 M is also robust. The state-space model based on survey catches being used as the core analytical basis for the assessment, has limited flexibility to explore scenarios other than reviewing results of hypotheses about variation in recruitment or catches. Consequently, it cannot be resolved conclusively whether or not alternative hypotheses have been rigorously explored. On one hand, the "hypotheses" in a state-space modelling approach are solely statistical / mathematical hypotheses about structures of data sets, and not hypotheses about biological or ecological processes. Alternative hypotheses for the underlying processes have not been explored directly. On the other hand, a wide range of biological and ecological processes could be argued to produce the expected and observed patterns in the numbers in the state-space model, and multiple possible interpretations of the patterns could arise in the meetings of the assessment team and with other interested groups and individuals. The key point is that the highly conservative harvest strategy does not require strong or full resolution among any alternative hypotheses about the underlying processes, for the harvest strategy to provide a good level of protection to the PRI. From either perspective, however, the SG100 level is not fully met for AI.

e	Peer review of assessment			
	Guide post		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		**EBS-Y** **AI-Y** **GOA-Y**	**EBS-Y** **AI-Y** **GOA-Y**
Rationale				

The same rationale applies to EBS and GOA stocks, since both use the same processes. The assessments receive peer review at three levels. The first is internal, in that the 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. The number of such meetings can vary between years, depending on the number and type of issues that arise in developing the annual assessment, but in recent years have rarely been fewer than five and sometimes as many as nine. As the assessment nearly 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, each one receives a thorough and largely external review by the SSC of the NPFMC. 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 in 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) routinely conducts stock assessment reviews using leading international experts in stock assessments for Alaska fisheries. The GOA cod stock assessment was reviewed by three CIE reviewers in 2018 and the Bering Sea and Aleutian Islands stock assessments were most recently reviewed by the CIE in 2016.

In summary, the SG100 is met for this scoring issue for the EBS, AI and GOA stocks.

References

Thompson 2018-EBS; Thompson and Palsson 2018-AI; Barbeaux et. Al 2018-GoA; Methot and Wetzel 2013; Restrepo et al (2000), Patterson et al (2001), Methot (2009), Schirripa et al (2009)

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**More information needed on the AI stock.**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**EBS: 100** **AI: 85** **GOA: 100**
Condition number (if relevant)	

7.3 Principle 2

BSAI ecosystem

General characteristics of the BS and AI ecosystems are described in NRC (1996), the Final Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement (PSEIS) (NOAA 2004) and Final Environmental Impact Statement (EIS) for Essential Fish Habitat (EFH) (NOAA 2005). Ongoing changes in the structure and functioning of these ecosystems is updated annually in Appendix C, Ecosystem Considerations (e.g., Siddon and Zador [ed.] 2018; Zador and Ortiz [ed.]2018). A number of ecosystem models have been developed to better understand the structure and functioning of these ecosystems (Aydin et al. 2003, Aydin and Meuter 2007, Aydin et al. 2007) and there is ongoing development in this area to include the effects of climate change through the Alaska Climate Integrated Modelling Project. The following text is based on those sources.

The BS is a large semi-enclosed, high-latitude body of water comprising 44% continental shelf, 13% continental slope, and 43% deep-water basin. The EBS is one of the most biologically productive areas of the world, supporting approximately 300 species of fish, 150 species of crustaceans and mollusks, 70 species of seabirds, and 29 species of marine mammals in an area of some 785,000 km^2.

The dominant circulation begins with the passage of North Pacific water (the Alaska Stream) into the EBS through the major passes in the AI. There is a net water transport eastward along the north side of the AI and a northward flow at the continental shelf break and at the eastern perimeter of Bristol Bay. Eventually EBS water exits northward through the Bering Strait, or westward and south along the Russian coast, entering the western North Pacific via the Kamchatka Strait. There is a permanent cyclonic gyre around the deep basin in the central Bering Sea. Three oceanographic fronts, the outer shelf, mid-shelf, and inner shelf, follow along the 200, 100, and 50 m bathymetric contours, respectively; resulting in four oceanographic domains along the broad EBS shelf. The inner shelf is one well-mixed layer most of the time as temperature, salinity, and density remain constant with depth in the near-surface mixed-layer, which varies from approximately 10 to 30 m in summer to approximately 30 to 60 m in winter. On the middle shelf, there is a two-layer temperature and salinity structure because of downward mixing of wind and upward mixing due to relatively strong tidal currents. On the outer shelf, a three-layer temperature and salinity structure are formed due to downward mixing by wind, horizontal mixing with oceanic water, and upward mixing from the bottom friction due to relatively strong tidal currents. The vertical physical system also regulates the biological processes that lead to separate cycles of nutrient regeneration.

An unusual physical characteristic of the BS shelf is the annual ice cover. In summer, the ice edge retreats into the Chukchi and Beaufort Seas whereas, in winter, much of the shelf is covered. The sea ice affects exchanges with the atmosphere and inhibits the transfer of freshwater and heat. The creation and melting of the sea ice alter the horizontal and vertical density gradients influencing the mixing and transport of nutrients and organisms within the euphotic zone. The ice edge also serves as both source and sink of freshwater that can affect productivity. Sea ice is also important in influencing bottom temperatures. Thus, the extent of sea ice is related to the distribution and abundance of temperature-sensitive bottom-dwelling species. Unusual weather during the winter of 2017/2018 resulted in an unprecedented near-complete lack of sea ice in the northern Bering Sea which resulted in a near absence of ice-algae to seed primary production. In southeastern Bering Sea, the timing of the spring bloom was late, but otherwise conditions were typical of a low-ice year with above-average water temperatures and complete lack of a cold pool.

The AI are the tip of a submerged volcanic mountain chain that stretches over 1,600 km forming a partial geographic barrier to the exchange of northern Pacific marine waters with EBS waters. The AI continental shelf is narrow compared with the EBS shelf, ranging in width on the north and south sides of the islands from about 4 km or less to 42 to 46 km; the shelf broadens in the eastern portion of the AI arc. Bathymetry changes dramatically over short distance, from the depths of the Aleutian Trench (greater than 7,000 m deep) to sea level. Unlike the soft bottom sediments of the BS, bottom habitats are highly complex, with primarily rough, rocky bottom (rock, boulders, and corals) steep slopes and drop-offs, and few areas of fine sediments. Two distinct bottom-type zones are evident. East of Samalga Pass, the AI rise from shallow continental shelf covered by glacial deposits, whereas west of Samalga, steep rocky slopes to the north and south surround a mostly submerged mountain range resting on the Aleutian ridge.

The Aleutian North Slope Current in the BS, and the Alaska Coastal Current and Alaskan Stream in the North Pacific are the three primary currents in the Aleutian Islands. Both bottom and pelagic habitats are subject to strong currents and tidal movements. The patterns of water density, salinity, and temperature in the Aleutian Islands are very similar to the Gulf of Alaska. Along the edge of the shelf in the low-salinity Alaska Stream protrudes westward. On the south side of the central Aleutian Islands, nearshore surface salinities are higher as the higher salinity EBS surface water occasionally mixes southward through the Aleutian Islands. The narrow shelf west of Samalga Pass allows the Alaskan Stream to approach the islands and is the primary influence for the oceanic marine environment of these

areas. East and west of Samalga Pass, the community structure, diets, and distributions for demersal fish, corals, seabirds, and marine mammals differ. For example, Samalga Pass has a major influence on the population structure of Steller sea lions (Fritz et al. 2013). West of Samalga Pass, cold-water corals and sponge communities are a dominant feature of benthic communities on the steep rocky slopes of the Aleutian Islands. Overall, the Aleutian ecosystem has shown a response to the recent warm years that has similar characteristics to those in the Gulf of Alaska. Both the western and central Aleutians ecoregions have a larger total biomass of pelagic foragers compared to that of apex predators, while in the eastern Aleutians ecoregion the largest biomass alternates between apex predators and pelagic foragers.

GOA ecosystem

General characteristics of GOA ecosystem are described in NRC (2002), the Final Alaska Groundfish Fisheries PSEIS (NOAA 2004); and the Final EIS for EFH (NOAA 2005), and Appendix C, Ecosystem Considerations (Zador and Yasumiishi [ed.] 2018). Ongoing changes in the structure and functioning of the GOA ecosystem is updated annually in Appendix C, Ecosystem Considerations (e.g., Zador and Yasumiishi 2018). Several models to better understand the structure and functioning of the GOA ecosystem have also been developed (Aydin et al. 2007; Gaichas and Francis 2008; Gaichas et al. 2011, 2012). The following text is based on those 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^2) which is less than 25% of that in the eastern Bering Sea. 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 50° 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 frequency and intensity of storms and the seasonal acceleration by fresh water establishes a "conveyor belt," carrying phytoplankton, zooplankton, larvae, juvenile fishes and climate signals north and west along the coast. During the summer, the conveyor belt slows in response to the onset of the North Pacific high-pressure system in the GOA. Exchange between the shelf and the basin may be mediated by frontal instabilities along the shelf break and large eddies passing along the continental slope. A mixture of temperate and subarctic fish species inhabits the GOA, resulting in a large gradient in species composition along the shelf from the eastern to the western GOA. Commercially harvested species are more diverse in the GOA than in the eastern Bering Sea. Primary production is highest on the shelf and in coastal embayments and shows extreme variability with high standing stocks and productivity, and nutrient depletion, in the summer. Nearshore areas serve as important spawning and nursery grounds for juveniles of numerous demersal and pelagic species, including salmon, pollock, cod, crab and over 20 species of flatfishes. The life history of many of these species is closely tied to the cyclonic boundary currents, which transport eggs and larvae and serve as important migratory pathways for juvenile salmon. From 2010 to 2014, the Gulf of Alaska Ecosystem Study sought to examine the physical and biological mechanisms that determine the survival of juvenile groundfish in the GOA. A synthesis of field studies is currently underway.

7.3.1 Primary and secondary species

The composition and amount of primary and secondary, including marine mammals and seabirds, in BSAI and GOA fisheries is collected by The North Pacific Groundfish and Halibut Observer Program operated by the NMFS. In 2017, 100% of the Pacific cod catches taken by motherships and catcher processors using longline, trawl, and pot were observed in the BSAI (Mary Furuness, NMFS Alaska Regional Office, Catch Accounting System, 2018). For catcher vessels using longline, trawl, and pot gear, 9%, 55%, and 6% of the catches, respectively, were observed in 2017. Trawl and pot gears accounted for 90.8 and 8.6% of the catcher vessel catches, respectively. There was a slight increase in observer coverage of the trawl fishery, but a decrease in the pot coverage.

In 2017, 100% of the catcher/processor vessel catch was observed in MSC-certified Pacific cod fisheries in the GOA. Catcher vessels were observed at a level of 6%, 13%, and 4% longline, trawl, and pot gears, respectively. About 12.5% of catch was taken by longline in 2017 with the remainder split about equally between the trawl and pot fisheries (Mary Furuness, NMFS Alaska Regional Office, Catch Accounting System, 2018). Again in 2017, a lower percentage of the catch was observed in the trawl and pot fisheries in the two previous years.

Observer data of non-target species are summarized below split across area and UoAs. These tables include a wide range of fish, seabird, and benthic species. MSC (2014) defines primary species as a species that is caught but is not the target species, that is within scope of the MSC program (i.e., not an amphibian, reptile, bird, or marine mammal), and that has management tools and measures in place. MSC (2014) defines secondary species as a species that is caught but is not the target species and is not considered primary or is out of scope but not an endangered,

threatened, protected (ETP) species[7]. MSC (2014) states that a "main species" is one where the catch of that species by the UoA is 5% or more by weight of the total catch of all species by the UoA or where that species is classified as less resilient and its catch is 2% or more by weight of the total catch of all species by the UoA. Further, "less resilient" is when the productivity of the species indicates that it is intrinsically of low resilience (which can be determined by the productivity part of the Productivity Susceptibility Analysis) or when its resilience has been lowered by anthropogenic or natural changes to its life history. Species representing 0.05% of the total catch or less are considered di minimus and not considered further. Non-ETP out-of-scope species are always considered main secondary. Fish and invertebrate species with Prohibited Species Catch (PSC) limits are considered ETP species.

Primary species

EBS Pacific cod UoAs

Catch data for these UoAs are provided in Tables 15-17. Forty-four managed species are caught in the trawl fishery for Pacific cod in the EBS and thus are considered primary species. However, there are no main primary species. Yellowfin sole, rock sole, flathead sole, Arrowtooth flounder, Alaska plaice, starry flounder, pollock, and yellow Irish lord, Great sculpin and other skates are considered minor primary species.

Some 47 species or species groups are taken in the longline fishery. Of those, only other skates as a group are considered primary and main. Arrowtooth flounder, flathead sole, yellowfin sole, pollock, Alaska skate, Yellow Irish lord, bigmouth sculpin, great sculpin, and other large sculpins are considered minor primary species.

The catch of primary species in the pot fishery is low such that there are no main species and only yellowfin sole, yellow Irish lord, great sculpin, other large sculpins, and octopus are considered minor species.

The jig fishery in the Bering Sea is small with catches of individual species (generally < 10) each totaling <1 t/yr. There are no main or minor primary species. Therefore, a table is not presented.

AI Pacific cod UoAs

About 26 managed species or species groups are caught in the AI trawl fishery for Pacific cod (Table 18). There are no main primary species, but Arrowtooth flounder, Atka mackerel, Flathead sole, Northern rockfish, Pacific Ocean perch, Pollock, rock sole, Yellow Irish lord and other skates are considered minor primary species.

Some 37 managed species or species groups are caught in the longline fisheries (Table 19). Other large sculpins and other skates are both main species, whereas, Alaska plaice, rougheye, northern, dusky and shortraker rockfish, other rockfish, Atka mackerel, arrowtooth flounder, pollock, Kamchatka flounder, North Pacific octopus, yellow Irish lord sculpin are considered minor species.

Twenty managed species or species groups are taken in the AI pot fishery, but none are considered main species (Table 20). Yellow Irish lord, North Pacific octopus and other large sculpins are considered minor primary species.

GOA Pacific cod UoAs

Some 46 managed species are taken in the GOA trawl fishery, however, none of these represent 5% of more of the total catch and therefore there are no main species (Table 21). Nineteen species are considered minor primary: Arrowtooth flounder, Atka mackerel, butter sole, dusky sole, flathead sole, starry flounder, sablefish, spiny dogfish, Pacific Ocean perch, pollock, big skate, rex sole, rock sole, northern rockfish, great sculpin, yellow Irish lord, longnose skate, other skates and North Pacific octopus.

Over 50 manged species or groups are caught in the GOA longline fishery (Table 22). Only other skates are considered main primary species. However, there are 19 minor species plus two minor species groups (North Pacific octopus and other large sculpins). Minor species are: Arrowtooth flounder, Aleutian skate, dusky sole, flathead sole, giant grenadier, sablefish, pollock, big skate, rougheye sole, shortraker sole, rock sole, northern rockfish, thornyhead rockfish, great sculpin, sleeper shark, spiny dogfish, yellow Irish lord, quillback rockfish, longnose skate and yellowfin sole.

[7] An ETP species is one that is recognized by national ETP legislation; a species listed in a binding international agreement (refer to MSC 2014 for the list of relevant binding international agreements); or an out-of-scope species that is listed in the IUCN Red List as vulnerable, endangered, or critically endangered.

The GOA pot fishery has a relatively low bycatch with no main species and only three minor species (Yellow Irish lord sculpin, great sculpin, pollock) and two minor species groups (North Pacific octopus and other large sculpins) (Table 23).

The GOA jig fishery has no main species and only pollock as the sole minor primary species (Table 24).

Several species of squids and Pacific sardines are the major sources of bait for the Pacific cod fisheries, supplemented with some pollock and herring. Three of the four Pacific Cod fisheries (longline, pot and jig) use bait to attract fish. Argentine and East Coast squid are important for the longline and jig fisheries, while Pacific sardines dominated the pot fishery. Additionally, some members have begun to test the use of saury (Pacific saury or Atlantic-sourced mackerel pike). 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.

Between 2012 and 2018, the total harvest of Pacific cod by the UoAs has declined. Associated with that decline has been a decline in the use of bait. Stock status of bait species is often uncertain due either to the short life cycle or highly variable recruitment. The most recent assessment of Pacific sardine estimated stock biomass in July 2018 of 52,065 mt. The overfishing limit associated with that biomass was 11,324 mt. The combined spawning biomass of herring in Southwest Alaska has been relatively stable since 2014 (https://www.adfg.alaska.gov/FedAidPDFs/FDS19-12.pdf. The continued but likely declining use of herring, given the reduced catch of Pacific cod, indicated that the use of bait by the UoAs is unlikely to pose a risk to the species. There are two sources of Illex spp. Commonly used as bait in the Pacific cod longline fishery - Argentine shortfin squid *Illex argentinus* and Northern shortfin squid *Illex illecebrosus*. The Argentine shortfin squid is found in the Southwest Atlantic, predominantly off Argentina, while the Northern shortfin squid is found in the North-western mid-Atlantic. In 2104, the International Union for the Conservation of Nature (IUCN) has assessed the status of the Argentine squid as one of “least concern”. The assessment remains the same as of July 2019. The current quota for shortfin squid is 22,915 MT. A proposed rule is expected soon that would increase the 2019 quota to 24,825 MT (based on a recommendation from the Council’s Scientific and Statistical Committee, https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/5cc1c0a824a694343e60a02a/1556201640568/2_2019+Illex+AP+Info+Doc.pdf).

Secondary species

EBS Pacific cod UoAs

Some 19 taxa are taken as incidental catch and are considered secondary species in the BS trawl fishery for Pacific cod (Table 15). All but Northern fulmar (out of scope and therefore considered a main secondary species) occur at trace levels and are not considered further. Scyphozoan jellyfish are the sole minor secondary species group.

In the BS longline fishery, seven seabird species (Northern fulmar) or groups (albatrosses, alcids, gulls, murres, puffins, and shearwaters) are taken and are considered main secondary species. Three other taxonomic groups are considered minor secondary species – sea stars, sea anemones, and benthic urochordata (Table 16).

The BS pot fishery for Pacific cod takes some 12 taxa as secondary species (Table 17). Three of these are seabirds (Auklets, Northern fulmar, Murres) and are therefore considered main. There is only one secondary minor species, sea stars.

AI Pacific cod UoAs

The AI trawl fishery for Pacific cod takes on 6 taxa as secondary species (Table 18). There is one main secondary species, Northern fulmar. There are no minor secondary species.

Some 16 species or species groups are considered secondary in the AI longline fishery (Table 19). Seven occur at trace levels and are not considered further. Eight of these are seabirds and therefore are considered main secondary species. Sea stars are considered a minor secondary species.

Thirteen taxa, including three seabirds (Auklets, Northern Fulmar and Murres) are taken in the AI pot fishery for Pacific cod (Table 20). In addition to the three seabird taxa, considered main secondary, there are two minor secondary species groups – Scyphozoan jellyfish and sea stars.

GOA Pacific cod UoAs

There are an average of 11 taxa taken in the GOA trawl fishery for Pacific cod that are considered secondary species (Table 21). There are no main species, but the giant grenadier is considered a minor species.

In the GOA longline fishery for Pacific cod, 18 species or groups are taken as secondary species (Table 22). Of these, Northern fulmar and three other seabird taxa are considered main. Sea stars are the only minor secondary species.

Twelve species or species groups are considered secondary bycatch in the GOA pot fishery for Pacific cod (Table 23). Of these, only Norther fulmar and auklets are considered main species. Sea stars and snails are minor secondary species.

Pollock is considered a minor secondary species in the GOA jig fishery.

Table 15 Primary, secondary, PSC, and ETP catch (t) of FMP species taken in the EBS trawl fishery for Pacific cod (2018 data current through September 23).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2]	Target (P1)	NA	72,262.00	66,680.00	72,598.00	68,906.00	58,859.00	67,861.00	90.79%
Alaska plaice	Primary	No	622.65	152.67	39.49	67.47	15.90	179.64	0.24%
Alaskan skate	Primary	No	50.77	15.14	3.34	51.96	106.07	45.46	0.06%
Aleutian skate	Primary	No	0.00	0.00	6.06	0.05	0.00	1.22	0.00%
Arrowtooth flounder	Primary	No	221.44	224.89	310.71	78.62	128.27	192.79	0.26%
Atka mackerel	Primary	No	1.64	10.21	212.48	0.47	3.91	45.74	0.06%
Bairdi tanner crab*	ETP/PSC	Yes	21,616.80	13,406.99	13,199.92	10,885.06	2,590.92	12,339.94	NA
Benthic urochordata	Secondary	No	9.51	4.88	4.09	1.14	0.27	3.98	0.01%
Bering flounder	Primary	No	0.41	0.83	0.00	1.09	0.00	0.47	0.00%
Big skate	Primary	No	4.22	2.23	0.52	19.51	35.10	12.31	0.02%
Bigmouth sculpin	Primary	No	22.70	5.31	12.86	7.80	5.86	10.90	0.01%
Bivalves	Secondary	No	0.06	0.07	0.07	0.05	0.00	0.05	0.00%
Black rockfish	Primary	No	0.79	0.11	3.36	0.00	0.59	0.97	0.00%
Blue king crab*	ETP/PSC	Yes	57.00	0.00	0.00	0.11	0.03	11.43	NA
Brittle star	Secondary	No	0.25	0.31	0.01	1.80	0.02	0.48	0.00%
Butter sole	Primary	No	5.36	12.19	53.12	32.14	34.80	27.52	0.04%
Capelin	Secondary	No	0.03	0.03	0.00	0.00	0.00	0.01	0.00%
Chinook salmon*	ETP/PSC	Yes	819.05	1,297.39	2,578.46	1,823.72	1,318.55	1,567.43	NA
Corals bryozoans	Habitat	No	0.02	0.16	0.14	0.02	0.00	0.07	0.00%
Dover sole	Primary	No	0.07	0.14	0.62	0.00	8.32	1.83	0.00%
Dusky rockfish	Primary	No	0.76	5.23	1.58	0.32	0.13	1.60	0.00%
Eelpouts	Secondary	No	1.75	0.44	4.06	0.00	0.02	1.25	0.00%
English sole	Primary	No	0.00	0.09	0.00	0.33	0.26	0.14	0.00%
Flathead sole	Primary	No	219.66	117.75	167.77	117.99	131.31	150.90	0.20%
Flounder, general	NA	No	0.23	0.00	0.58	6.84	4.80	2.49	0.00%

Giant grenadier	Secondary	No	0.00	0.00	10.56	0.00	0.00	2.11	0.00%
Golden king crab*	ETP/PSC	Yes	0.00	0.00	45.00	3.13	1.19	9.86	NA
Great sculpin	Primary	No	188.34	152.73	255.85	152.30	216.51	193.14	0.26%
Greenland turbot	Primary	No	2.33	3.00	11.39	0.37	3.75	4.17	0.01%
Greenlings	Secondary	No	0.00		0.03	0.05	0.01	0.02	0.00%
Groundfish, general	NA	No	0.00	0.08	0.02	0.10	0.01	0.04	0.00%
Hermit crabs	Secondary	No	0.41	0.15	0.04	0.07	0.00	0.13	0.00%
Invertebrate	NA	No	1.48	1.94	0.24	0.90	0.07	0.92	0.00%
Kamchatka flounder	Primary	No	29.93	9.21	87.85	3.42	4.95	27.07	0.04%
Longnose skate	Primary	No	0.04	0.00	0.00	0.00	0.91	0.19	0.00%
Majestic squid	Primary	No	0.53	0.60	1.66	0.22	0.08	0.62	0.00%
Misc. crabs	Secondary	No	1.52	0.98	0.41	0.66	0.35	0.78	0.00%
Misc. crustaceans	Secondary	No	0.03	0.02	0.02	0.00	0.00	0.01	0.00%
Misc. fish	NA	No	58.41	62.75	90.05	10.94	11.41	46.71	0.06%
Non-chinook salmon*	ETP/PSC	Yes	546.19	337.27	477.34	84.05	1.04	289.18	NA
North Pacific octopus	Primary	No	5.10	5.60	2.64	10.67	13.99	7.60	0.01%
Northern fulmar*^	Secondary	Yes	0.00	0.00	57.00	0.00	0.00	11.40	NA
Northern rockfish	Primary	No	0.56	2.69	2.69	9.49	0.16	3.12	0.00%
Opilio tanner crab*	ETP/PSC	Yes	12,479.39	5,775.45	1,898.96	1,716.89	843.55	4,542.85	NA
Pacific halibut	ETP/PSC	Yes	308.69	273.95	336.37	252.41	259.53	286.19	0.38%
Pacific herring	ETP/PSC	Yes	1.05	3.10	1.97	0.18	2.51	1.76	0.00%
Pacific Ocean perch	Primary	No	0.00	5.06	39.98	11.09	2.08	11.64	0.02%
Pacific sand lance	Secondary	No	0.00	0.02	0.02	0.07	0.01	0.02	0.00%
Pacific sandfish	Secondary	No	0.00	0.02	0.02	0.01	0.03	0.02	0.00%
Pacific sleeper shark	Primary	No	0.05	0.03	0.02	0.05	0.00	0.03	0.00%
Pandalid shrimp	Primary	No	0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Petrale sole	Primary	No	0.00	0.00	0.02	0.00	0.00	0.00	0.00%
Plain sculpin	Primary	No	39.32	32.15	7.28	11.10	4.65	18.90	0.03%
Pollock	Primary	No	5,516.39	2,065.15	2,589.97	1,241.91	2,215.12	2,725.71	3.65%
Polychaete	Secondary	No	0.01	0.00	0.02	0.00	0.00	0.01	0.00%
Red king crab*	ETP/PSC	Yes	586.36	316.73	762.22	757.86	218.41	528.32	NA

Redstripe rockfish	Primary	No	0.00	0.00	0.02	0.00	0.00	0.00	0.00%
Rex sole	Primary	No	25.83	42.29	67.89	15.37	11.02	32.48	0.04%
Rock sole	Primary	No	1,363.29	1,657.00	2,262.03	1,122.77	2,256.89	1,732.40	2.32%
Rockfish, other	Primary	No	0.73	0.00	0.00	0.00	0.00	0.15	0.00%
Rougheye rockfish	Primary	No	0.00	0.00	1.25	0.00	0.00	0.25	0.00%
Sablefish	Primary	No	0.00	0.08	24.83	1.32	2.76	5.80	0.01%
Salmon shark	Primary	No	0.00	0.47	0.00	0.00	0.00	0.09	0.00%
Sculpin, general	Primary	No	3.23	1.62	4.06	3.33	2.03	2.85	0.00%
Sculpin, other large	Primary	No	5.30	9.06	25.72	8.38	2.99	10.29	0.01%
Scyphozoan jellies	Secondary	No	61.65	67.85	12.38	15.85	144.85	60.52	0.08%
Sea anemones	Secondary	No	0.72	0.54	1.33	0.40	0.80	0.76	0.00%
Sea pens, whips	Habitat	Yes	0.00	0.00	0.01	0.01	0.00	0.00	0.00%
Sea star	Secondary	No	99.79	38.76	26.01	29.33	9.74	40.73	0.05%
Shark, other	Primary	No	0.00	0.00	0.00	0.29	0.01	0.06	0.00%
Shortraker rockfish	Primary	No	0.00	0.00	2.98	0.91	0.00	0.78	0.00%
Silvergray rockfish	Primary	No	0.03	0.05	0.03	0.00	0.00	0.02	0.00%
Skate, other	Primary	No	173.70	168.17	262.52	257.09	183.42	208.98	0.28%
Snails	Secondary	No	2.09	0.77	0.31	0.20	0.01	0.68	0.00%
Spiny dogfish	Primary	No	0.00	0.08	0.00	1.26	0.00	0.27	0.00%
Sponges	Habitat	No	5.74	12.94	0.47	0.03	0.01	3.84	0.01%
Starry flounder	Primary	No	16.88	77.11	158.06	85.42	161.57	99.81	0.13%
State-managed rockfish	Primary	No	0.00	1.18	0.60	0.00	0.00	0.36	0.00%
Thornyhead rockfish	Primary	No	0.00	0.00	18.38	0.16	0.08	3.73	0.00%
Tiger rockfish	Primary	No	0.00	0.00	0.03	0.00	0.00	0.01	0.00%
Urchins, dollars, cucumbers	Secondary	No	2.91	4.27	2.41	1.85	1.87	2.66	0.00%
Warty sculpin	Primary	No	8.72	4.06	2.30	1.47	0.00	3.31	0.00%
Whiteblotched skate	Primary	No	0.00	0.00	1.20	0.00	0.03	0.25	0.00%
Yellow Irish lord	Primary	No	40.15	86.32	197.25	52.36	159.73	107.16	0.14%
Yelloweye rockfish	Primary	No	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Yellowfin sole	Primary	No	1,503.59	565.79	312.86	254.57	128.36	553.03	0.74%
Total Catch**			82,892.85	72,590.32	80,242.91	72,852.00	65,136.92	74,743.00	

[1] Small catch taken by "other" gears have been merged proportionally into the trawl, longline, and pot catches.
[2] Catches for 2018 are through October 23, 2018.
"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.
* Number of individuals instead of metric tons
** Does not include species with individual numbers instead of weight
^ BS and AI catch numbers combined.

Table 16 Primary, secondary, PSC, and ETP species (t) taken in the EBS longline fishery for Pacific cod, 2013-2018 (2018 data current through September 23).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2]	Target (P1)	NA	127,271.00	128,217.00	127,937.00	122,768.00	77,808.00	116,800.20	75.95%
Alaska plaice	Primary	No	0.59	0.20	0.37	0.39	0.84	0.48	0.00%
Alaskan skate	Primary	No	920.31	856.14	669.69	847.21	886.54	835.98	0.54%
Albatrosses*^	ETP	Yes	12.00	0.00	0.00	0.00	0.00	2.40	NA
Other alcids*^	Secondary	Yes	0.00	0.00	0.00	0.00	5.00	1.00	NA
Aleutian skate	Primary	No	47.12	40.04	20.22	31.14	23.27	32.36	0.02%
Arrowtooth flounder	Primary	No	549.25	663.43	558.78	508.86	315.17	519.10	0.34%
Atka mackerel	Primary	No	3.08	2.50	4.68	2.82	1.66	2.95	0.00%
Bairdi tanner crab*	ETP/PSC	Yes	20,781.67	22,835.09	18,623.13	16,154.40	7,656.07	17,210.07	NA
Benthic urochordata	Secondary	No	49.34	106.54	11.53	24.85	248.11	88.07	0.06%
Bering flounder	Primary	No	0.09	0.02	0.04	0.00	0.00	0.03	0.00%
Big skate	Primary	No	66.53	62.65	49.34	73.87	30.45	56.57	0.04%
Bigmouth sculpin	Primary	No	255.68	310.48	409.80	556.12	292.14	364.84	0.24%
Birds, unidentified*^	NA	No	78.00	0.00	0.00	0.00	0.00	15.60	NA
Bivalves	Secondary	No	7.35	9.08	5.43	7.57	3.61	6.61	0.00%
Black rockfish	Primary	No	0.02	0.07	0.15	0.08	0.06	0.08	0.00%
Blue king crab*	ETP/PSC	Yes	692.68	528.05	849.63	665.26	539.29	654.98	NA

Brittle stars	Secondary	No	0.48	1.72	0.47	0.46	1.19	0.86	0.00%
Butter sole	Primary	No	4.09	6.28	2.49	5.54	1.08	3.90	0.00%
Chinook salmon*	ETP/PSC	Yes	33.62	42.57	43.51	24.64	60.49	40.97	NA
Corals bryozoans	Secondary	No	3.15	3.05	1.65	3.53	1.13	2.50	0.00%
Dover sole	Primary	No	0.00	0.02	0.00	0.00	0.00	0.00	0.00%
Dusky rockfish	Primary	No	26.68	14.81	10.82	10.82	9.99	14.63	0.01%
Eelpouts	Secondary	No	53.18	95.15	90.72	88.85	51.40	75.86	0.05%
Flathead sole	Primary	No	557.95	484.80	477.79	554.52	412.93	497.60	0.32%
Giant grenadier	Primary	No	153.98	58.99	298.20	226.68	196.95	186.96	0.12%
Golden king crab*	ETP/PSC	Yes	293.70	446.99	116.49	135.31	90.87	216.67	NA
Great sculpin	Primary	No	181.36	177.57	228.20	314.06	337.41	247.72	0.16%
Greenland turbot	Primary	No	15.73	23.82	82.05	154.36	99.09	75.01	0.05%
Greenlings, unidentified	Secondary	No	0.20	0.55	0.63	0.46	0.62	0.49	0.00%
Groundfish, general	NA	No	32.55	68.12	31.89	52.02	32.36	43.39	0.03%
Gulls*^	Secondary	Yes	586.00	941.00	589.00	372.00	511.00	599.80	NA
Harlequin rockfish	Primary	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Hermit crabs	Secondary	No	0.27	0.33	0.22	0.16	0.18	0.23	0.00%
Invertebrate, unidentified	NA	No	21.45	1.98	8.96	9.34	4.25	9.20	0.01%
Kamchatka flounder	Primary	No	46.99	50.27	49.96	40.09	36.86	44.83	0.03%
Kittiwake*^	ETP	Yes	4.00	12.00	5.00	13.00	30.00	12.80	NA
Laysan albatross*^	ETP	Yes	12.00	38.00	12.00	9.00	30.00	20.20	NA
Longnose skate	Primary	No	0.63	0.29	0.24	0.21	0.07	0.29	0.00%
Majestic squid	Primary	No	0.04	0.03	0.00	0.04	0.00	0.02	0.00%
Misc. crabs	NA	No	1.39	1.59	0.84	0.87	0.40	1.02	0.00%
Misc. crustaceans	NA	No	0.06	0.06	0.06	0.02	0.01	0.04	0.00%
Misc. fish	NA	No	75.46	49.74	27.90	32.45	29.87	43.08	0.03%
Murre*^	Secondary	Yes	0.00	0.00	0.00	9.00	0.00	1.80	NA
Non-chinook salmon*	ETP/PSC	Yes	238.32	93.10	182.70	171.37	164.95	170.09	NA
North Pacific octopus	Primary	No	22.49	29.70	43.30	23.99	10.23	25.94	0.02%
Northern fulmar*^	Secondary	Yes	582.00	2,690.00	4,658.00	2,542.00	2,569.00	2,608.20	NA

Northern rockfish	Primary	No	31.66	36.40	26.23	26.50	14.61	27.08	0.02%
Opilio tanner crab*	ETP/PSC	Yes	20,452.73	16,488.33	23,022.77	21,922.52	13,712.22	19,119.72	NA
Pacific halibut	Primary	No	3.19	0.00	0.00	1.16	0.65	1.00	0.00%
Pacific halibut	ETP/PSC	Yes	447.71	307.26	214.35	179.93	123.81	254.61	0.17%
Pacific herring	ETP/PSC	Yes	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Pacific Ocean perch	Primary	No	6.41	5.78	2.22	3.57	2.12	4.02	0.00%
Pacific sleeper shark	Primary	No	36.85	35.48	37.64	28.84	15.05	30.77	0.02%
Petrale sole	Primary	No	0.00	0.00	0.00	0.01	0.00	0.00	0.00%
Plain sculpin	Primary	No	19.67	21.15	26.63	3.56	14.69	17.14	0.01%
Pollock	Primary	No	5,978.45	6,978.45	6,478.00	7,100.20	5,842.07	6,475.43	4.21%
Polychaetes	Secondary	No	0.04	0.09	0.08	0.01	0.00	0.04	0.00%
Puffin*^	Secondary	Yes	0.00	0.00	10.00	0.00	0.00	2.00	NA
Rattail grenadier, unidentified	NA	No	16.41	81.34	0.94	0.29	0.00	19.80	0.01%
Red king crab*	ETP/PSC	Yes	7,862.92	4,014.25	4,256.40	3,241.09	6,807.31	5,236.40	NA
Redbanded rockfish	Primary	No	0.02	0.03	0.00	0.02	0.04	0.02	0.00%
Redstripe rockfish	Primary	No	0.00	0.00	0.00	0.16	0.00	0.03	0.00%
Rex sole	Primary	No	0.11	0.31	0.11	0.05	0.03	0.12	0.00%
Rock sole	Primary	No	52.10	50.12	28.35	31.63	24.08	37.25	0.02%
Rockfish, other	Primary	No	15.07	23.86	9.21	9.97	5.80	12.78	0.01%
Rougheye rockfish	Primary	No	2.31	5.37	3.52	2.71	1.64	3.11	0.00%
Sablefish	Primary	No	3.21	3.90	54.30	42.66	86.01	38.02	0.02%
Salmon shark	Primary	No	0.00	0.00	1.09	0.00	0.41	0.30	0.00%
Sculpin, general	Primary	No	8.70	7.03	4.57	6.12	5.26	6.34	0.00%
Sculpin, other large	Primary	No	763.11	833.81	716.07	685.55	739.91	747.69	0.49%
Scyphozoan jellies	Secondary	No	7.82	9.97	9.49	1.15	12.54	8.19	0.01%
Sea anemones	Secondary	No	247.65	235.70	182.89	154.20	102.66	184.62	0.12%
Sea pens, whips	Habitat	Yes	85.03	62.65	40.58	43.78	17.10	49.83	0.03%
Sea star	Secondary	No	583.57	658.44	571.25	641.16	278.72	546.63	0.36%
Shark, other	NA	No	1.34	1.80	0.26	0.64	0.31	0.87	0.00%
Shearwaters*^	Secondary	Yes	44.00	243.00	2,984.00	1,071.00	584.00	985.20	NA
Shortraker rockfish	Primary	No	13.61	22.76	6.90	10.02	5.70	11.80	0.01%
Short-tailed albatross*^	ETP	Yes	5.00	0.00	0.00	0.00	0.00	1.00	NA

Silvergray rockfish	Primary	No	0.00	0.04	0.00	0.00	0.00	0.01	0.00%
Skate, other	Primary	Yes	20,591.21	22,898.90	24,341.99	25,902.33	23,511.86	23,449.26	15.25%
Snails	Secondary	No	33.98	36.66	47.54	43.55	37.27	39.80	0.03%
Spiny dogfish	Primary	No	15.72	6.88	4.29	7.54	8.75	8.64	0.01%
Sponge, unidentified	Habitat	No	11.99	5.77	3.28	2.30	2.85	5.24	0.00%
Starry flounder	Primary	No	0.58	1.52	0.80	0.58	0.82	0.86	0.00%
State-managed rockfish	Primary	No	0.08	0.04	0.02	0.00	0.01	0.03	0.00%
Stichaeidae	Secondary	No	0.00	0.02	0.00	0.00	0.53	0.11	0.00%
Thornyhead rockfish	Primary	No	4.39	9.52	4.95	7.52	4.60	6.20	0.00%
Urchins, dollars, cucumbers	Secondary	No	1.80	1.34	3.31	0.20	0.15	1.36	0.00%
Vermilion rockfish	Primary	No	0.00	0.00	0.00	0.00	0.45	0.09	0.00%
Warty sculpin	Primary	No	2.07	3.77	5.80	4.96	3.42	4.00	0.00%
Whiteblotched skate	Primary	No	2.46	6.93	1.85	2.01	4.13	3.48	0.00%
Yellow Irish lord	Primary	No	126.34	155.74	101.75	96.46	55.99	107.25	0.07%
Yelloweye rockfish	Primary	No	0.06	0.07	0.91	0.02	0.06	0.22	0.00%
Yellowfin sole	Primary	No	1,861.16	1,820.92	1,496.57	1,385.51	1,962.02	1,705.24	1.11%
Total Catch**			161,344.34	165,666.79	165,451.14	162,766.26	113,721.95	153,790.09	

[1] Small catch taken by "other" gears have been merged proportionally into the trawl, longline, and pot catches.

[2] Catches for 2018 are through October 23, 2018.

“NA” is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

^ BS and AI catch numbers combined.

Table 17 Primary, secondary, PSC, and ETP species catch (t) taken in the EBS pot fishery for Pacific cod, 2014-2018 (2018 data current through September 23).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch

Pacific cod[1, 2]	Target (P1)	NA	39,195.00	37,942.00	47,086.00	46,184.00	36,794.00	41,440.20	97.76%
Alaska plaice	Primary	No	0.02	0.01	0.02	0.02	0.00	0.01	0.00%
Arrowtooth flounder	Primary	No	0.97	0.73	1.46	1.64	0.52	1.06	0.00%
Atka mackerel	Primary	No	6.96	7.91	8.96	2.08	12.64	7.71	0.02%
Auklets*^	Secondary	Yes	35.00	19.00	29.00	36.00	0.00	23.80	NA
Bairdi tanner crab*	ETP/PSC	Yes	565,775.75	610,425.65	296,417.90	325,525.73	240,732.38	407,775.48	NA
Benthic urochordata	Secondary	No	0.00	0.00	0.00	0.00	0.11	0.02	0.00%
Bering flounder	Primary	No	0.00	0.00	0.09	0.01	0.00	0.02	0.00%
Bigmouth sculpin	Primary	No	1.13	3.19	0.68	11.36	1.15	3.50	0.01%
Bivalves, unidentified	Secondary	No	0.46	0.12	1.74	0.05	0.29	0.53	0.00%
Black rockfish	Primary	No	0.72	0.42	1.57	0.54	3.59	1.37	0.00%
Blue king crab*	ETP/PSC	Yes	0.00	2,142.71	3,485.55	31,102.90	4,919.69	8,330.17	NA
Brittle star	Secondary	No	0.00	0.00	0.00	0.23	0.00	0.05	0.00%
Butter sole	Primary	No	0.21	0.17	0.09	0.19	0.23	0.18	0.00%
Corals bryozoans	Habitat	No	0.00	0.01	0.07	0.00	0.05	0.03	0.00%
Dover sole	Primary	No	0.02	0.00	0.00	0.00	0.00	0.00	0.00%
Dusky rockfish	Primary	No	3.07	3.23	1.68	0.48	0.87	1.86	0.00%
Eelpouts	Secondary	No	0.00	0.09	0.84	0.81		0.43	0.00%
English sole	Primary	No	0.00	0.00	0.22	0.00	2.22	0.49	0.00%
Flathead sole	Primary	No	0.11	0.34	1.90	1.49	1.38	1.05	0.00%
Flounder, general	NA	No	0.00	0.00	0.39	2.31	0.84	0.71	0.00%
Golden king crab*	ETP/PSC	Yes	0.00	12.07	0.00	17,818.37	1,870.59	3,940.21	NA
Great sculpin	Primary	No	60.52	67.74	67.73	79.99	52.90	65.78	0.16%
Greenland turbot	Primary	No	0.01	0.12	0.22	0.15	0.01	0.10	0.00%
Greenlings, unidentified	Secondary	No	0.08	0.11	0.53	0.27	0.22	0.24	0.00%
Groundfish, general	NA	No	0.11	0.07	2.47	0.15	0.59	0.68	0.00%
Hermit crabs	Secondary	No	0.16	0.84	0.65	1.86	0.48	0.80	0.00%
Invertebrate, unidentified	NA	No	0.00	0.04	0.00	0.00	0.00	0.01	0.00%
Kamchatka flounder	Primary	No	0.01	0.06	0.09	0.14	0.09	0.08	0.00%
Majestic squid	Primary	No	0.00	0.00	0.11	0.00	0.00	0.02	0.00%
Misc. crabs	NA	No	5.70	4.54	3.39	12.07	6.45	6.43	0.02%

Misc. crustaceans	NA	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Misc. fish	NA	No	16.07	14.23	26.80	2.40	2.82	12.47	0.03%
Murre*^	Secondary	Yes	0.00	0.00	13.00	0.00	0.00	2.60	NA
North Pacific octopus	Primary	No	370.58	361.35	502.77	197.23	87.03	303.79	0.72%
Northern fulmar*^	Secondary	Yes	11.00	197.00	139.00	580.00	51.00	195.60	NA
Northern rockfish	Primary	No	0.41	0.58	0.29	0.06	0.12	0.29	0.00%
Opilio tanner crab*	ETP/PSC	Yes	82,369.29	121,499.33	20,024.92	130,775.39	46,242.91	80,182.37	NA
Pacific halibut	Primary	No	0.02	0.02	0.04	0.04	0.01	0.02	0.00%
Pacific halibut	ETP/PSC	Yes	3.14	3.36	2.68	2.15	0.79	2.43	0.01%
Pacific Ocean perch	Primary	No	0.00	0.06	0.13	0.03	0.17	0.08	0.00%
Pacific sandfish	Secondary	No	0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Plain sculpin	Primary	No	0.12	0.26	0.55	1.44	1.23	0.72	0.00%
Pollock	Primary	No	16.67	33.70	26.67	4.22	4.70	17.19	0.04%
Red king crab*	ETP/PSC	Yes	136,647.51	177,613.85	22,411.29	30,046.42	291,057.02	131,555.22	NA
Redbanded rockfish	Primary	No	0.00	0.00	0.01	0.00	0.00	0.00	0.00%
Redstripe rockfish	Primary	No	0.00	0.00	0.00	0.14	0.00	0.03	0.00%
Rex sole	Primary	No	0.00	0.00	0.00	0.11	0.03	0.03	0.00%
Rock sole	Primary	No	2.17	0.91	4.06	3.00	0.40	2.11	0.00%
Rockfish, other	Primary	No	0.50	0.04	0.01	0.05	0.02	0.13	0.00%
Sablefish	Primary	No	0.00	0.00	0.45	1.99	11.42	2.77	0.01%
Sculpin, general	Primary	No	9.97	2.67	9.03	6.98	4.60	6.65	0.02%
Sculpin, other large	Primary	No	85.03	40.07	55.03	43.87	17.37	48.27	0.11%
Scyphozoan jellies	Secondary	No	16.73	12.26	9.88	31.49	27.42	19.55	0.05%
Sea anemones	Secondary	No	0.11	0.14	0.17	0.59	0.56	0.31	0.00%
Sea star	Secondary	No	16.11	8.65	36.80	87.23	22.09	34.18	0.08%
Shortraker rockfish	Primary	No	0.05	0.00	0.00	0.00	0.00	0.01	0.00%
Silvergray rockfish	Primary	No	0.00	0.00	0.00	0.91	0.12	0.21	0.00%
Skate, other	Primary	No	0.01	0.05	0.01	0.01	0.05	0.02	0.00%
Snails	Secondary	No	9.02	9.61	28.69	24.09	5.26	15.33	0.04%
Sponge	Habitat	No	1.76	0.43	0.09	0.01	0.12	0.48	0.00%
Starry flounder	Primary	No	0.00	0.04	0.28	19.11	0.00	3.89	0.01%

State-managed rockfish	Primary	No	0.11	0.02	0.00	0.06	0.41	0.12	0.00%
Tiger rockfish	Primary	No	0.00	0.00	0.05	0.00	0.00	0.01	0.00%
Urchins, dollars, cucumbers	Secondary	No	0.77	1.05	1.55	0.80	0.27	0.89	0.00%
Warty sculpin	Primary	No	0.05	0.12	0.32	0.23	0.78	0.30	0.00%
Widow rockfish	Primary	No	0.00	0.00	0.00	0.12	0.00	0.02	0.00%
Yellow Irish lord	Primary	No	150.61	125.98	165.66	35.61	77.31	111.03	0.26%
Yelloweye rockfish	Primary	No	0.00	0.18	0.00	0.00	0.00	0.04	0.00%
Yellowfin sole	Primary	No	352.00	315.01	142.08	153.25	396.61	271.79	0.64%
Total Catch**			40,327.29	38,962.52	48,195.05	46,917.04	37,540.36	42,388.54	

[1] Small catch taken by "other" gears have been merged proportionally into the trawl, longline, and pot catches.

[2] Catches for 2018 are through October 23, 2018.

"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

^ BS and AI catch numbers combined.

Table 18 Primary, secondary, PSC, and ETP species catch (t) taken in the AI trawl fishery for Pacific cod, 2014-2018 (2018 data current through October 28)

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2]	Target (P1)	NA	5,715.00	5,968.00	10,654.00	8,530.00	9,051.00	7,983.60	96.30%
Alaskan skate	Primary	No	0.00	0.41	0.02	0.31	1.36	0.42	0.01%
Aleutian skate	Primary	No	0.00	0.00	0.03	0.00	0.00	0.01	0.00%
Arrowtooth flounder	Primary	No	4.94	2.50	6.86	14.70	5.82	6.96	0.08%
Atka mackerel	Primary	No	0.69	7.46	276.08	264.55	0.02	109.76	1.32%
Bairdi tanner crab*	ETP/PSC	Yes	61.25	0.00	0.00	96.00	0.00	31.45	NA
Benthic urochordata	Secondary	No	0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Bigmouth sculpin	Primary	No	0.11	1.36	4.00	3.63	0.25	1.87	0.02%

Butter sole	Primary	No	0.02	0.00	0.00	0.00	0.00	0.00	0.00%
Chinook salmon*	ETP/PSC	Yes	485.35	0.00	775.29	293.54	42.48	319.33	NA
Corals bryozoans	Habitat	No	0.00	0.00	1.20	0.00	0.61	0.36	0.00%
Dusky rockfish	Primary	No	1.19	0.81	4.86	0.30	1.55	1.74	0.02%
Flathead sole	Primary	No	2.25	4.37	13.72	4.51	3.19	5.61	0.07%
Flounder, general	NA	No	0.00	0.00	0.00	0.00	0.76	0.15	0.00%
Great sculpin	Primary	No	1.96	1.31	5.57	1.63	4.29	2.95	0.04%
Groundfish, general	Primary	No	7.20	0.02	0.00	0.00	0.00	1.45	0.02%
Harlequin rockfish	Primary	No	0.00	0.00	0.08	0.00	0.00	0.02	0.00%
Kamchatka flounder	Primary	No	0.16	0.51	0.15	1.42	0.68	0.58	0.01%
Majestic squid	Primary	No	0.10	0.02	0.09	0.11	0.00	0.06	0.00%
Misc. crabs	NA	No	0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Misc. fish	NA	No	2.93	0.00	1.89	0.17	0.83	1.17	0.01%
Non-chinook salmon*	ETP/PSC	Yes	0.00	0.00	8.00	0.00	0.00	1.60	NA
North Pacific octopus	Primary	No	0.06	0.39	0.39	0.41	0.14	0.28	0.00%
Northern fulmar*^	Secondary	Yes	0.00	0.00	57.00	0.00	0.00	11.40	NA
Northern rockfish	Primary	No	14.53	23.65	44.72	6.70	14.23	20.77	0.25%
Opilio tanner crab*	ETP/PSC	Yes	27.43	0.00	0.00	0.00	0.00	5.49	NA
Pacific halibut	ETP/PSC	Yes	20.59	0.00	11.88	11.67	5.93	10.01	0.12%
Pacific Ocean perch	Primary	No	1.44	4.35	7.02	32.88	0.14	9.16	0.11%
Pacific sleeper shark	Primary	No	0.00	0.39	0.00	0.00	0.00	0.08	0.00%
Plain sculpin	Primary	No	0.05	0.00	0.00	0.00	0.00	0.01	0.00%
Pollock	Primary	No	11.17	2.18	11.13	14.27	3.42	8.43	0.10%
Red king crab*	ETP/PSC	Yes	0.46	0.00	0.00	0.00	0.00	0.09	NA
Rex sole	Primary	No	0.31	0.03	0.60	0.32	0.05	0.26	0.00%
Rock sole	Primary	No	101.15	30.78	170.21	146.70	86.77	107.12	1.29%
Rockfish, other	Primary	No	0.07	0.00	0.00	0.00	0.00	0.01	0.00%
Rougheye rockfish	Primary	No	0.00	0.00	0.00	0.17	0.11	0.06	0.00%
Sablefish	Primary	No	0.08	0.00	0.00	0.16	0.00	0.05	0.00%
Salmon shark	Primary	No	0.00	0.00	0.09	0.00	0.00	0.02	0.00%
Sculpin, general	Primary	No	0.30	0.06	0.08	0.00	0.33	0.15	0.00%

Sculpin, other large	Primary	No	1.35	0.02	0.31	0.03	0.00	0.34	0.00%
Scyphozoan jellies	Secondary	No	0.00	0.00	0.10	0.00	4.89	1.00	0.01%
Sea anemones	Secondary	No	0.00	0.00	0.00	0.00	0.03	0.01	0.00%
Sea star	Secondary	No	0.26	0.00	0.38	1.27	0.32	0.45	0.01%
Shortraker rockfish	Primary	No	0.00	0.00	0.01	0.14	0.00	0.03	0.00%
Skate, other	Primary	No	5.88	2.88	12.83	8.30	6.59	7.29	0.09%
Sponges	Habitat	No	0.06	0.00	2.10	0.00	0.07	0.44	0.01%
Starry flounder	Primary	No	0.73	0.00	0.04	0.00	2.96	0.75	0.01%
Thornyhead rockfish	Primary	No	0.00	0.00	0.00	0.00	0.33	0.07	0.00%
Urchins, dollars, cucumbers	Secondary	No	0.04	0.00	0.03	0.02	0.07	0.03	0.00%
Warty sculpin	Primary	No	0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Whiteblotched skate	Primary	No	0.00	0.57	7.61	0.51	0.00	1.74	0.02%
Yellow Irish lord	Primary	No	4.96	1.85	18.05	0.64	0.32	5.17	0.06%
Yelloweye rockfish	Primary	No	0.00	0.00	0.12	0.00	0.00	0.02	0.00%
Yellowfin sole	Primary	No	0.00	0.00	0.00	0.00	0.21	0.04	0.00%
Total Catch**			5,899.58	6,053.92	11,256.25	9,045.53	9,197.27	8,290.51	

[1] Small catch taken by "other" gears have been merged proportionally into the trawl catch and combined longline and pot catch.

[2] Catches for 2018 are through October 23, 2018.

“NA” is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

^ BS and AI catch numbers combined.

Table 19 Primary, secondary, PSC, and ETP species catch (t) taken in the AI longline fishery for Pacific cod, 2014-2018 (2018 data current through October 28).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2, 3]	Target (P1)	NA	439.00	3,087.00	1,710.00	3,728.00	4,812.00	2,755.20	83.39%
Alaskan skate	Primary	No	4.13	14.42	2.63	8.60	20.19	9.99	0.30%

Other albatrosses*^	ETP	Yes	12.00	0.00	0.00	0.00	0.00	2.40	NA
Other alcids*^	Secondary	Yes	0.00	0.00	0.00	0.00	5.00	1.00	NA
Aleutian skate	Primary	No	1.08	3.83	0.30	1.15	1.37	1.55	0.05%
Arrowtooth flounder	Primary	No	0.32	3.58	4.18	22.48	29.08	11.93	0.36%
Atka mackerel	Primary	No	0.51	10.45	0.57	34.23	30.97	15.35	0.46%
Bairdi tanner crab*	ETP/PSC	Yes	0.00	0.00	0.00	5.22	0.46	1.14	NA
Benthic urochordata	Secondary	No	0.00	0.00	0.00	0.00	0.13	0.03	0.00%
Big skate	Primary	No	0.00	0.07	0.00	0.00	0.00	0.01	0.00%
Bigmouth sculpin	Primary	No	0.00	3.94	1.80	0.24	0.51	1.30	0.04%
Birds, unidentified*^	NA	No	78.00	0.00	0.00	0.00	0.00	15.60	NA
Bivalves	Secondary	No	0.00	0.08	0.00	0.00	0.01	0.02	0.00%
Black rockfish	Primary	No	0.00	0.03	0.00	0.03	0.17	0.04	0.00%
Blue king crab*	ETP/PSC	Yes	0.00	0.00	0.00	0.00	0.04	0.01	NA
Chinook salmon*	ETP/PSC	Yes	0.00	0.00	0.00	3.00	8.32	2.26	NA
Corals bryozoans, unidentified	Habitat	No	0.00	4.76	0.00	5.05	6.97	3.36	0.10%
Dusky rockfish	Primary	No	0.52	5.67	1.48	7.45	4.24	3.87	0.12%
Eelpouts	Secondary	No	0.00	0.00	0.00	0.00	0.04	0.01	0.00%
Flathead sole	Primary	No	0.01	0.11	0.36	1.24	3.31	1.01	0.03%
Giant grenadier	Secondary	No	0.00	0.00	0.00	0.00	1.81	0.36	0.01%
Golden king crab*	ETP/PSC	Yes	0.00	30.98	0.00	57.29	12.57	20.17	NA
Great sculpin	Primary	No	0.06	0.16	0.39	0.72	1.76	0.62	0.02%
Greenland turbot	Primary	No	1.26	0.15	0.00	0.00	0.17	0.32	0.01%
Greenlings	Secondary	No	0.00	0.08	0.00	0.10	0.20	0.08	0.00%
Groundfish, general	NA	No	0.01	0.02	0.00	0.00	0.43	0.09	0.00%
Gull*^	Secondary	Yes	586.00	941.00	589.00	372.00	511.00	599.80	NA
Harlequin rockfish	Primary	No	0.00	0.06	0.00	0.10	0.03	0.04	0.00%
Kamchatka flounder	Primary	No	0.79	0.59	0.25	3.70	16.12	4.29	0.13%
Kittiwake*^	ETP	Yes	4.00	12.00	5.00	13.00	30.00	12.80	NA
Laysan albatross*^	ETP	Yes	12.00	38.00	12.00	9.00	30.00	20.20	NA
Longnose skate	Primary	No	0.00	0.17	0.00	0.00	0.00	0.03	0.00%
Misc. crabs	NA	No	0.00	0.00	0.00	0.01	0.00	0.00	0.00%

Misc. fish	NA	No	0.00	0.72	0.00	1.21	1.30	0.65	0.02%
Murre*^	Secondary	Yes	0.00	0.00	0.00	9.00	0.00	1.80	NA
Non-chinook salmon*	ETP/PSC	Yes	0.00	0.00	0.00	0.00	11.75	2.35	NA
North Pacific octopus	Primary	No	6.22	14.33	4.51	6.66	6.71	7.68	0.23%
Northern fulmar*^	Secondary	Yes	582.00	2,690.00	4,658.00	2,542.00	2,569.00	2,608.20	NA
Northern rockfish	Primary	No	1.60	25.22	8.97	24.59	17.56	15.59	0.47%
Opilio tanner crab*	ETP/PSC	Yes	0.00	0.00	0.00	0.00	0.88	0.18	NA
Pacific halibut	ETP/PSC	Yes	0.00	11.68	0.00	7.58	20.12	7.88	0.16%
Pacific herring	ETP/PSC	Yes	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Pacific Ocean perch	Primary	No	0.01	0.18	0.21	0.84	0.39	0.33	0.01%
Pacific sleeper shark	Primary	No	0.00	0.00	0.00	0.11	0.00	0.02	0.00%
Pollock	Primary	No	0.05	5.31	6.03	3.75	2.39	3.51	0.11%
Puffin*^	Secondary	Yes	0.00	0.00	10.00	0.00	0.00	2.00	NA
Red king crab*	ETP/PSC	Yes	0.00	0.00	0.00	0.00	0.40	0.08	NA
Redbanded rockfish	Primary	No	0.00	0.01	0.00	0.02	0.02	0.01	0.00%
Rex sole	Primary	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Rock sole	Primary	No	0.05	0.73	0.22	0.75	1.41	0.63	0.02%
Rockfish, other	NA	No	0.09	16.85	0.01	9.23	7.94	6.82	0.21%
Rougheye rockfish	Primary	No	2.40	16.18	4.67	56.59	25.90	21.15	0.64%
Sablefish	Primary	No	3.04	0.20	0.00	0.93	0.65	0.97	0.03%
Salmon shark	Primary	No	0.00	0.65	0.00	0.00		0.16	0.00%
Sculpin, general	NA	No	0.57	3.58	1.53	4.65	2.13	2.49	0.08%
Sculpin, other large	Primary	Yes	43.30	332.57	64.17	254.50	142.00	167.31	5.06%
Scyphozoan jellies	Secondary	No	0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Sea anemone, unidentified	NA	No	0.00	0.06	0.00	0.06	0.28	0.08	0.00%
Sea pens, whips	Habitat	Yes	0.00	0.02	0.00	0.06	0.01	0.02	0.00%
Sea star	Secondary	No	0.00	3.47	0.00	5.59	5.01	2.81	0.09%
Shearwaters*^	Secondary	Yes	44.00	243.00	2,984.00	1,071.00	584.00	985.20	NA
Shortraker rockfish	Primary	No	0.04	3.38	0.23	3.43	6.82	2.78	0.08%
Short-tailed albatross*^	ETP	Yes	5.00	0.00	0.00	0.00	0.00	1.00	NA
Silvergray rockfish	Primary	No	0.00	0.05	0.00	0.00	0.00	0.01	0.00%

Skate, other	Primary	Yes	25.08	292.18	182.68	310.41	346.24	231.32	7.00%
Snails	Secondary	No	0.00	0.13	0.00	0.09	0.15	0.07	0.00%
Spiny dogfish	Primary	No	0.03	0.18	0.01	0.12	0.20	0.11	0.00%
Sponge, unidentified	Habitat	No	0.00	5.74	0.00	7.36	13.02	5.22	0.16%
State-managed rockfish	Primary	No	0.00	0.34	0.00	0.42	1.86	0.52	0.02%
Thornyhead rockfish	Primary	No	1.79	0.90	0.98	0.83	1.16	1.13	0.03%
Urchins, dollars, cucumbers	Secondary	No	0.00	0.06	0.00	0.12	0.13	0.06	0.00%
Warty sculpin	Primary	No	0.00	0.02	0.00	0.00	0.00	0.00	0.00%
Whiteblotched skate	Primary	No	0.92	3.38	0.08	0.79	1.86	1.41	0.04%
Yellow Irish lord	Primary	No	2.82	25.05	5.27	19.42	16.45	13.80	0.42%
Yelloweye rockfish	Primary	No	0.00	0.00	0.00	0.11	0.00	0.02	0.00%
Yellowfin sole	Primary	No	0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Total Catch**			535.70	3,898.32	2,001.53	4,533.31	5,551.22	3,304.05	

[1] Due to confidentiality issues, the longline and pot catches have been combined.

[2] Small catch taken by "other" gears have been merged proportionally into the trawl catch and combined longline and pot catch.

[3] Catches for 2018 are through October 23, 2018.

"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

^ BS and AI catch numbers combined.

Table 20 Primary, secondary, PSC, and ETP species catch (t) taken in the AI pot fishery for Pacific cod, 2014-2018 (2018 data current through October 28).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2, 3]	Target (P1)	NA	439.00	3,087.00	1,710.00	3,728.00	4,812.00	2,755.20	97.92%
Arrowtooth flounder	Primary	No	0.00	0.00	0.00	0.01	0.02	0.01	0.00%
Atka mackerel	Primary	No	0.00	0.00	0.00	0.06	4.71	0.95	0.03%
Auklets*^	Secondary	Yes	35.00	19.00	29.00	36.00	0.00	23.80	NA

Bairdi tanner crab*	ETP/PSC	Yes	5,976.62	0.00	0.00	14,819.74	22,611.54	8,681.58	NA
Benthic urochordata	Secondary	No	0.00	0.00	0.00	0.00	0.02	0.01	0.00%
Bivalves	Secondary	No	0.02	0.00	0.00	0.00	0.02	0.01	0.00%
Black rockfish	Primary	No	0.11	0.00	0.00	0.00	0.07	0.04	0.00%
Blue king crab*	ETP/PSC	Yes	0.00	0.00	0.00	5,407.36	702.43	1,221.96	NA
Brittle stars	Secondary	No	0.00	0.00	0.00	0.02	0.00	0.01	0.00%
Butter sole	Primary	No	0.03	0.00	0.00	0.00	0.04	0.02	0.00%
Corals bryozoans	Habitat	No	0.00	0.00	0.00	0.00	0.04	0.01	0.00%
Dusky rockfish	Primary	No	0.01	0.00	0.00	0.02	0.19	0.05	0.00%
Eelpouts	Secondary	No	0.00	0.00	0.00	0.07	0.00	0.02	0.00%
Flathead sole	Primary	No	0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Golden king crab*	ETP/PSC	Yes	0.00	0.00	0.00	5,995.61	1,976.22	1,594.37	NA
Great sculpin	Primary	No	0.61	0.00	0.00	0.60	3.22	0.89	0.03%
Greenlings	Secondary	No	0.00	0.00	0.00	0.01	0.04	0.01	0.00%
Groundfish, general	NA	No	0.00	0.00	0.00	0.00	0.02	0.01	0.00%
Hermit crabs	Secondary	No	0.02	0.00	0.00	0.15	0.08	0.05	0.00%
Kamchatka flounder	Primary	No	0.00	0.00	0.00	0.00	0.05	0.01	0.00%
Misc. crabs	NA	No	0.68	0.00	0.00	1.00	1.42	0.62	0.02%
Misc. fish	NA	No	1.34	0.00	0.00	0.15	1.67	0.63	0.02%
Murre*^	Secondary	Yes	0.00	0.00	13.00	0.00	0.00	2.60	NA
North Pacific octopus	Primary	No	1.67	0.00	0.00	23.76	143.50	33.79	1.20%
Northern fulmar*^	Secondary	Yes	11.00	197.00	139.00	580.00	51.00	195.60	NA
Northern rockfish	Primary	No	0.00	0.00	0.00	0.01	0.90	0.18	0.01%
Opilio tanner crab*	ETP/PSC	Yes	953.08	0.00	0.00	14,517.70	6,271.72	4,348.50	NA
Pacific halibut	ETP/PSC	Yes	0.02	0.00	0.00	0.27	0.29	0.12	0.00%
Pollock	Primary	No	0.26	0.00	0.00	0.04	0.25	0.11	0.00%
Red king crab*	ETP/PSC	Yes	170.05	0.00	0.00	1,590.75	39,891.48	8,330.46	NA
Redstripe rockfish	Primary	No	0.00	0.00	0.00	0.01	0.00	0.01	0.00%
Rock sole	Primary	No	0.01	0.00	0.00	0.02	0.13	0.03	0.00%
Rockfish, other	Primary	No	0.01	0.00	0.00	0.00	0.00	0.01	0.00%
Rougheye rockfish	Primary	No	0.00	0.00	0.00	0.00	0.16	0.04	0.00%

Sablefish	Primary	No	0.00	0.00	0.00	0.01	0.11	0.03	0.00%
Sculpin, general	Primary	No	4.79	0.00	0.00	0.00	1.02	1.16	0.04%
Sculpin, other large	Primary	No	1.07	0.00	0.00	0.52	9.36	2.19	0.08%
Scyphozoan jellies	Secondary	No	2.05	0.00	0.00	2.67	3.78	1.70	0.06%
Sea anemones	Secondary	No	0.01	0.00	0.00	0.05	0.08	0.03	0.00%
Sea star	Secondary	No	2.77	0.00	0.00	7.56	2.77	2.62	0.09%
Shortraker rockfish	Primary	No	0.00	0.00	0.00	0.00	0.06	0.01	0.00%
Silvergray rockfish	Primary	No	0.00	0.00	0.00	0.09	0.00	0.02	0.00%
Skate, other	Primary	No	0.00	0.00	0.00	0.00	0.02	0.01	0.00%
Snails	Secondary	No	0.74	0.00	0.00	1.96	1.59	0.86	0.03%
Sponges	Habitat	No	0.07	0.00	0.00	0.00	0.07	0.03	0.00%
State-managed rockfish	Primary	No	0.01	0.00	0.00	0.00	0.31	0.07	0.00%
Urchins, dollars, cucumbers	Secondary	No	0.06	0.00	0.00	0.05	0.12	0.05	0.00%
Warty sculpin	Primary	No	0.00	0.00	0.00	0.00	0.03	0.01	0.00%
Yellow Irish lord	Primary	No	7.15	0.00	0.00	1.16	48.05	11.27	0.40%
Yellowfin sole	Primary	No	0.21	0.00	0.00	0.00	4.21	0.88	0.03%
Total Catch**			462.77	3,087.12	1,710.12	3,768.32	5,040.44	2,813.75	

[1] Due to confidentiality issues, the longline and pot catches have been combined.

[2] Small catch taken by "other" gears have been merged proportionally into the trawl catch and combined longline and pot catch.

[3] Catches for 2018 are through October 23, 2018.

“NA” is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

^ BS and AI catch numbers combined.

Table 21 Primary, secondary, PSC, and ETP species catch (t) taken in the GOA trawl fishery for Pacific cod, 2014-2018 (2018 data current through October 9).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1]	Target (P1)	NA	26,798.00	22,269.00	15,217.00	13,041.00	2,882.00	16,041.40	81.70%
Alaska plaice	Primary	No	0.85	0.00	0.01	0.07	0.06	0.20	0.00%
Alaskan skate	Primary	No	0.15	0.14	1.09	0.00	0.00	0.28	0.00%
Aleutian skate	Primary	No	0.00	0.00	0.00	0.04	0.00	0.01	0.00%
Arrowtooth flounder	Primary	No	1,269.99	1,063.02	1,315.33	418.56	83.73	830.13	4.23%
Atka mackerel	Primary	No	0.21	148.05	9.61	377.53	9.38	108.96	0.55%
Bairdi tanner crab*	ETP/PSC	Yes	12,162.43	1,144.71	699.10	754.11	154.76	2,983.02	NA
Big skate	Primary	No	127.49	247.36	186.28	168.85	12.44	148.48	0.76%
Bigmouth sculpin	Primary	No	2.57	22.97	4.55	12.53	0.00	8.52	0.04%
Bivalves	Secondary	No	0.02	0.14	0.03	0.00	0.00	0.04	0.00%
Butter sole	Primary	No	71.71	53.47	46.00	10.67	3.86	37.14	0.19%
Chinook salmon*	ETP/PSC	Yes	278.21	1,157.92	33.94	2,136.61	400.82	801.50	NA
Corals bryozoans	Habitat	No	0.00	0.00	0.03	0.36	0.00	0.08	0.00%
Dover sole	Primary	No	9.29	15.46	18.38	0.72	0.14	8.80	0.04%
Dusky rockfish	Primary	No	37.85	11.79	50.50	35.75	0.06	27.19	0.14%
English sole	Primary	No	12.27	12.04	16.62	3.44	1.61	9.19	0.05%
Flathead sole	Primary	No	281.43	323.15	314.87	133.19	24.35	215.40	1.10%
Flounder, general	NA	No	0.00	0.24	0.00	1.45	0.11	0.36	0.00%
Giant grenadier	Secondary	No	51.22	43.20	0.00	0.00	0.00	18.88	0.10%
Golden king crab*	ETP/PSC	Yes	0.00	0.00	0.00	2.10	1.88	0.80	NA
Great sculpin	Primary	No	8.19	25.98	11.16	240.54	0.58	57.29	0.29%
Greenland turbot	Primary	No	0.00	23.74	0.00	6.46	0.00	6.04	0.03%
Greenlings, unidentified	Secondary	No	0.10	0.59	0.36	1.32	0.00	0.48	0.00%
Groundfish, general	NA	No	1.19	6.34	0.00	0.00	0.00	1.51	0.01%
Harlequin rockfish	Primary	No	0.47	2.61	2.48	0.01	0.28	1.17	0.01%
Hermit crabs	Secondary	No	0.04	0.03	0.02	0.00	0.00	0.02	0.00%
Kamchatka flounder	Primary	No	0.36	0.72	0.73	11.63	0.00	2.69	0.01%

Longnose skate	Primary	No	26.39	72.97	62.62	31.32	1.79	39.02	0.20%
Majestic squid	Primary	No	0.02	1.39	0.60	0.02	0.00	0.41	0.00%
Misc. crabs	NA	No	0.02	0.07	0.00	0.00	0.00	0.02	0.00%
Misc. fish	NA	No	11.68	19.84	12.32	14.48	0.35	11.74	0.06%
Non-chinook salmon*	ETP/PSC	Yes	0.00	0.42	0.00	113.51	4.73	23.73	NA
North Pacific octopus	Primary	No	16.43	31.27	8.01	0.05	0.00	11.15	0.06%
Northern rockfish	Primary	No	58.57	42.32	58.72	20.24	0.18	36.00	0.18%
Osmerids	Secondary	No	0.00	0.00	0.01	0.00	0.00	0.00	0.00%
Pacific halibut	ETP/PSC	Yes	215.73	481.66	429.39	93.63	6.36	245.35	1.25%
Pacific herring	ETP/PSC	Yes	0.00	0.06	0.00	0.01	0.01	0.02	0.00%
Pacific Ocean perch	Primary	No	14.28	166.46	796.56	75.84	2.55	211.14	1.08%
Pacific sand lance	Secondary	No	0.02	0.00	0.00	0.01	0.00	0.01	0.00%
Pacific sleeper shark	Primary	No	0.00	0.00	1.40	0.00	0.00	0.28	0.00%
Pandalid shrimp	Primary	No	0.00	0.00	0.03	0.00	0.00	0.01	0.00%
Plain sculpin	Primary	No	0.00	0.55	0.83	0.00	0.00	0.28	0.00%
Pollock	Primary	No	1,259.31	828.89	173.39	670.04	52.03	596.73	3.04%
Quillback rockfish	Primary	No	0.00	0.12	0.02	0.00	0.00	0.03	0.00%
Rattail grenadiers	Secondary	No	15.58	0.00	0.00	0.00	0.00	3.12	0.02%
Redbanded rockfish	Primary	No	0.07	0.08	0.00	0.06	0.00	0.04	0.00%
Redstripe rockfish	Primary	No	0.00	0.68	0.00	0.23	0.00	0.18	0.00%
Rex sole	Primary	No	84.69	120.53	169.69	19.03	5.83	79.95	0.41%
Rock sole	Primary	No	717.30	874.93	653.50	781.83	35.24	612.56	3.12%
Rockfish, other	Primary	No	0.00	0.01	1.20	0.00	0.00	0.24	0.00%
Rougheye rockfish	Primary	No	1.56	1.90	0.40	0.08	0.00	0.79	0.00%
Sablefish	Primary	No	26.49	29.46	55.75	24.68	1.99	27.67	0.14%
Salmon shark	Primary	No	0.00	0.00	0.01	0.00	0.45	0.09	0.00%
Sculpin, general	Primary	No	6.05	2.23	10.63	1.73	0.13	4.15	0.02%
Sculpin, other large	Primary	No	14.09	9.65	1.25	0.18	0.00	5.03	0.03%
Scyphozoan jellies	Secondary	No	0.29	2.60	12.66		0.00	3.89	0.02%
Sea anemones	Secondary	No	0.02	0.37	14.61	3.87	0.00	3.77	0.02%
Sea pens, whips	Habitat	Yes	0.00	0.00	0.00	0.02	0.00	0.01	0.00%

Sea star	Secondary	No	4.05	9.25	11.01	3.13	0.42	5.57	0.03%
Shark, other	Primary	No	0.24	0.00	0.00	0.00	0.00	0.05	0.00%
Sharpchin rockfish	Primary	No	0.00	0.00	0.31	0.00	0.00	0.06	0.00%
Shortraker rockfish	Primary	No	0.03	0.95	0.53	0.40	0.00	0.38	0.00%
Silvergray rockfish	Primary	No	0.02	0.16	0.33	0.00	0.00	0.10	0.00%
Skate, other	Primary	No	16.64	52.42	20.84	32.33	0.07	24.46	0.12%
Snails	Secondary	No	0.01	0.10	0.63	2.27	0.01	0.60	0.00%
Spiny dogfish	Primary	No	6.29	8.80	109.84	0.68	0.39	25.20	0.13%
Sponges	Habitat	No	0.00	0.02	0.02	0.05	0.00	0.02	0.00%
Starry flounder	Primary	No	91.89	49.39	7.15	6.21	0.01	30.93	0.16%
State-managed rockfish	Primary	No	3.04	4.93	1.96	58.10	0.00	13.60	0.07%
Thornyhead rockfish	Primary	No	15.23	3.45	2.85	6.73	0.00	5.65	0.03%
Tiger rockfish	Primary	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Urchins, dollars, cucumbers	Secondary	No	0.00	0.31	0.14	0.04	0.00	0.10	0.00%
Whiteblotched skate	Primary	No	0.02	0.00	0.00	0.00	0.00	0.01	0.00%
Widow rockfish	Primary	No	0.00	0.00	0.06	0.00	0.00	0.01	0.00%
Yellow Irish lord	Primary	No	60.95	64.14	132.10	286.42	2.71	109.26	0.56%
Yelloweye rockfish	Primary	No	1.13	2.26	0.34	0.08	0.00	0.76	0.00%
Yellowfin sole	Primary	No	3.48	0.29	0.02	0.37	0.00	0.83	0.00%
Total Catch**			31,345.01	27,154.54	19,946.81	16,598.29	3,129.12	19,635.53	

[1] Catches for 2018 are through October 23, 2018.
"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.
* Number of individuals instead of metric tons
** Does not include species with individual numbers instead of weight

Table 22 Primary, secondary, PSC, and ETP species catch (t) taken in the GOA longline fishery for Pacific cod, 2014-2018 (2018 data current through October 9).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch

Pacific cod[1, 2]	Target (P1)	NA	14,749.00	14,749.00	14,749.00	8,978.00	2,537.00	11,152.40	77.61%
Alaska plaice	Primary	No	0.19	0.19	0.19	0.00	0.00	0.11	0.00%
Alaskan skate	Primary	No	0.75	0.25	0.48	1.14	0.07	0.54	0.00%
Aleutian skate	Primary	No	7.67	3.66	7.98	18.14	2.11	7.91	0.06%
Arrowtooth flounder	Primary	No	51.04	50.34	57.08	69.57	25.75	50.75	0.35%
Atka mackerel	Primary	No	2.05	1.65	1.53	5.33	0.17	2.15	0.01%
Auklets*	Secondary	Yes	6.00	11.00	0.00	0.00	0.00	3.40	NA
Bairdi tanner crab*	ETP/PSC	Yes	238.28	170.05	212.32	61.98	0.00	136.53	NA
Benthic urochordata	Secondary	No	0.08	4.29	0.01	1.50	0.01	1.18	0.01%
Big skate	Primary	No	812.35	560.35	508.85	450.35	91.95	484.77	3.37%
Bigmouth sculpin	Primary	No	2.04	1.23	3.81	4.55	0.05	2.34	0.02%
Bird, unidentified*	NA	No	0.00	5.00	0.00	0.00	164.00	33.80	NA
Bivalves	Secondary	No	1.50	1.29	0.40	1.28	2.45	1.38	0.01%
Black-footed albatross*	ETP	Yes	8.00	0.00	30.00	28.00	0.00	13.20	NA
Bocaccio rockfish	Primary	No	0.00	0.00	0.01	0.00	0.00	0.00	0.00%
Brittle stars	Secondary	No	0.03	0.01	0.01	0.02	0.00	0.02	0.00%
Butter sole	Primary	No	3.75	0.36	0.48	0.13	0.04	0.95	0.01%
Canary rockfish	Primary	No	0.16	0.21	0.32	0.07	0.15	0.18	0.00%
China rockfish	Primary	No	0.00	0.04	0.01	0.02	0.00	0.02	0.00%
Chinook salmon*	ETP/PSC	Yes	0.00	0.00	0.04	0.00	0.00	0.01	NA
Copper rockfish	Primary	No	0.02	0.20	0.12	0.01	0.00	0.07	0.00%
Corals bryozoans	Habitat	No	1.49	1.19	0.40	1.97	1.63	1.34	0.01%
Darkblotched rockfish	Primary	No	0.00	0.00	0.01	0.00	0.00	0.00	0.00%
Dover sole	Primary	No	0.11	0.14	0.53	0.14	0.02	0.19	0.00%
Dusky rockfish	Primary	No	6.62	6.26	15.09	40.13	6.89	15.00	0.10%
Eelpouts	Secondary	No	0.14	0.30	0.06	0.08	0.00	0.12	0.00%
Flathead sole	Primary	No	17.90	15.82	7.65	18.74	5.07	13.03	0.09%
Flounder, general	NA	No	0.05	0.00	0.00	0.00	0.00	0.01	0.00%
Giant grenadier	Secondary	No	129.69	62.51	84.80	18.64	0.13	59.15	0.41%
Golden king crab*	ETP/PSC	Yes	0.00	118.64	0.03	18.13	0.00	27.36	NA
Great sculpin	Primary	No	11.77	21.38	19.18	10.03	3.78	13.23	0.09%

Greenland turbot	Primary	No	0.10	0.76	0.48	0.10	0.00	0.29	0.00%
Greenlings, unidentified	Secondary	No	0.54	0.38	1.62	2.67	0.72	1.19	0.01%
Groundfish, general	NA	No	4.33	2.34	1.24	2.29	3.85	2.81	0.02%
Gull*	Secondary	Yes	50.00	33.00	17.00	58.00	213.00	74.20	NA
Harlequin rockfish	Primary	No	0.05	0.00	0.04	0.63	0.04	0.15	0.00%
Hermit crabs	Secondary	No	0.01	0.00	0.04	0.01	0.00	0.01	0.00%
Invertebrate, unidentified	NA	No	0.25	0.17	1.04	0.23	0.08	0.35	0.00%
Kamchatka flounder	Primary	No	0.29	0.16	0.30	0.17	0.04	0.19	0.00%
Laysan albatross*	ETP	Yes	8.00	0.00	0.00	0.00	0.00	1.60	NA
Longnose skate	Primary	No	443.08	646.00	501.68	374.52	84.99	410.05	2.85%
Misc. crabs	NA	No	0.00	0.01	0.16	0.01	0.00	0.04	0.00%
Misc. crustaceans	NA	No	0.01	0.46	0.00	0.01	0.00	0.10	0.00%
Misc. fish	NA	No	22.75	34.63	44.38	29.23	23.35	30.87	0.21%
Non-chinook salmon*	ETP/PSC	Yes	0.00	6.17	15.60	5.21	0.00	5.40	NA
North Pacific octopus	Primary	No	39.38	25.54	10.06	4.09	6.69	17.15	0.12%
Northern fulmar*	Secondary	Yes	12.00	11.00	25.00	147.00	15.00	42.00	NA
Northern rockfish	Primary	No	9.39	3.18	12.09	27.16	3.91	11.15	0.08%
Opilio tanner crab*	ETP/PSC	Yes	1.93	0.00	1.88	1.83	0.00	1.13	NA
Pacific hake	Primary	No	0.00	0.00	0.04	0.00	0.00	0.01	0.00%
Pacific halibut	ETP/PSC	Yes	245.19	299.38	287.08	207.76	82.17	224.28	1.56%
Pacific Ocean perch	Primary	No	0.10	0.05	0.10	1.31	0.08	0.33	0.00%
Pacific sleeper shark	Primary	No	2.05	38.86	44.01	8.00	12.89	21.16	0.15%
Plain sculpin	Primary	No	0.00	0.16	0.03	0.00	0.00	0.04	0.00%
Pollock	Primary	No	197.99	208.07	120.15	141.27	53.00	144.10	1.00%
Polychaetes	Secondary	No	0.00	0.00	0.01	0.00	0.00	0.00	0.00%
Quillback rockfish	Primary	No	9.56	29.85	38.54	13.00	3.57	18.90	0.13%
Rattail grenadiers	Secondary	No	0.08	0.08	1.18	0.00	0.61	0.39	0.00%
Red king crab*	ETP/PSC	Yes	0.00	8.88	0.06	0.00	0.00	1.79	NA
Red tree coral	Habitat	Yes	0.12	0.54	0.00	0.00	0.00	0.13	0.00%
Redbanded rockfish	Primary	No	1.53	3.24	1.48	3.45	1.02	2.14	0.01%
Redstripe rockfish	Primary	No	0.00	0.02	0.09	0.15	0.00	0.05	0.00%

Rex sole	Primary	No	0.00	0.14	0.02	0.04	0.02	0.04	0.00%
Rock sole	Primary	No	8.66	9.56	13.09	33.65	5.24	14.04	0.10%
Rockfish, other	Primary	No	7.54	7.28	13.03	1.47	5.20	6.90	0.05%
Rosethorn rockfish	Primary	No	0.01	0.04	0.04	0.01	0.02	0.02	0.00%
Rougheye rockfish	Primary	No	4.92	11.24	6.66	16.15	9.56	9.71	0.07%
Sablefish	Primary	No	28.90	48.49	68.04	88.76	60.65	58.97	0.41%
Sculpin, general	Primary	No	0.26	0.75	0.26	0.74	0.05	0.41	0.00%
Sculpin, other large	Primary	No	147.71	128.74	99.64	155.92	53.96	117.19	0.82%
Scyphozoan jellies	Secondary	No	0.00	0.03	0.00	0.00	0.00	0.01	0.00%
Sea anemones	Secondary	No	6.40	4.60	5.01	9.14	2.48	5.52	0.04%
Sea pens, whips	Habitat	Yes	2.87	1.75	0.46	0.57	0.41	1.21	0.01%
Sea star	Secondary	No	151.13	190.49	116.14	61.83	16.72	107.26	0.75%
Shearwaters*	Secondary	Yes	0.00	0.00	0.00	0.00	7.00	1.40	NA
Shortraker rockfish	Primary	No	7.89	9.65	4.78	8.21	10.65	8.24	0.06%
Silvergray rockfish	Primary	No	0.95	1.87	2.00	1.10	0.61	1.31	0.01%
Skate, other	Primary	No	1,049.81	1,088.87	1,044.25	947.29	204.27	866.90	6.03%
Snails	Secondary	No	0.37	0.65	0.20	0.58	0.14	0.39	0.00%
Spiny dogfish	Primary	No	390.79	159.72	268.33	355.75	116.59	258.24	1.80%
Sponges	Habitat	No	0.30	1.21	1.54	2.58	2.29	1.59	0.01%
Starry flounder	Primary	No	0.00	0.01	0.05	0.00	0.00	0.01	0.00%
State-managed rockfish	Primary	No	2.78	4.01	38.60	8.86	3.36	11.52	0.08%
Stichaeidae	Secondary	No	0.00	0.00	0.00	0.30	0.00	0.06	0.00%
Thornyhead rockfish	Primary	No	3.54	5.91	6.86	29.35	2.60	9.65	0.07%
Tiger rockfish	Primary	No	0.52	1.22	0.96	0.58	0.07	0.67	0.00%
Urchins, dollars, cucumbers	Secondary	No	0.10	0.07	0.18	0.03	0.10	0.09	0.00%
Whiteblotched skate	Primary	No	0.00	0.00	0.18	0.74	0.01	0.19	0.00%
Yellow Irish lord	Primary	No	61.39	60.62	41.31	40.40	10.05	42.75	0.30%
Yelloweye rockfish	Primary	No	31.76	42.42	49.94	78.87	22.70	45.14	0.31%
Yellowfin sole	Primary	No	0.80	0.92	0.39	0.67	0.05	0.57	0.00%
Yellowtail rockfish	Primary	No	0.00	0.01	0.01	0.00	0.00	0.00	0.00%
Total Catch**			18,734.40	18,592.80	18,322.80	12,337.51	3,859.08	14,369.32	

[1] The longline and jig catches are combined.

[2] Catches for 2018 are through October 9, 2018.

"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

Table 23 Primary, secondary, PSC, and ETP species catch (t) taken in the GOA pot fishery for Pacific cod, 2014-2018 (2018 data current through October 9).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1]	Target (P1)	NA	19,957.00	20,653.00	19,248.00	13,426.00	2,393.00	15,135.40	90.68%
Arrowtooth flounder	Primary	No	1.99	1.40	4.17	2.72	0.17	2.09	0.01%
Atka mackerel	Primary	No	5.39	6.98	28.00	1.23	0.02	8.33	0.05%
Auklets*	Secondary	Yes	0.00	38.00	0.00	0.00	0.00	7.60	NA
Bairdi tanner crab*	ETP/PSC	Yes	133,200.88	127,682.24	62,725.37	4,078.76	18,138.85	69,165.22	NA
Benthic urochordata	Secondary	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Big skate	Primary	No	0.00	0.28	0.00	0.00	0.00	0.06	0.00%
Bigmouth sculpin	Primary	No	1.89	0.91	11.37	0.42	0.31	2.98	0.02%
Bivalves	Secondary	No	0.12	0.01	0.21	0.00	0.38	0.14	0.00%
Brittle stars	Secondary	No	0.00	0.03	0.02	0.03	0.00	0.02	0.00%
Butter sole	Primary	No	0.22	0.37	0.72	0.76	0.02	0.42	0.00%
Corals bryozoans	Habitat	No	0.01	0.02	0.00	0.00	0.00	0.01	0.00%
Dover sole	Primary	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Dusky rockfish	Primary	No	4.02	5.68	9.35	20.15	0.62	7.96	0.05%
Flathead sole	Primary	No	0.69	0.33	0.39	0.79	0.17	0.47	0.00%
Great sculpin	Primary	No	45.72	48.33	140.06	73.08	14.75	64.39	0.39%
Greenlings, unidentified	Secondary	No	0.77	1.67	2.72	1.83	0.17	1.43	0.01%
Groundfish, general	NA	No	0.17	0.41	1.02	0.62	0.37	0.52	0.00%
Hermit crabs	Secondary	No	0.34	2.73	0.55	0.11	0.09	0.77	0.00%
Invertebrate, unidentified	NA	No	0.22	0.00	0.03	0.00	0.00	0.05	0.00%

Kamchatka flounder	Primary	No	0.00	0.00	0.03	0.00	0.00	0.01	0.00%
Majestic squid	Primary	No	0.00	0.00	0.00	0.11	0.00	0.02	0.00%
Misc. crabs	NA	No	2.87	0.91	0.86	0.79	0.42	1.17	0.01%
Misc. crustaceans	NA	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Misc. fish	NA	No	86.05	53.90	97.48	125.54	6.39	73.87	0.44%
Misc. invertebrates (worms, etc.)	NA	No	0.00	0.01	0.00	0.00	0.00	0.00	0.00%
North Pacific octopus	Primary	No	1,135.94	847.24	343.16	219.07	145.28	538.14	3.22%
Northern fulmar*	Secondary	Yes	0.00	0.00	95.00	0.00	0.00	19.00	NA
Northern rockfish	Primary	No	3.46	1.77	6.92	7.13	0.98	4.05	0.02%
Pacific halibut	ETP/PSC	Yes	10.44	22.28	43.62	14.31	0.92	18.31	0.11%
Pacific Ocean perch	Primary	No	0.29	0.13	0.31	0.12	0.00	0.17	0.00%
Plain sculpin	Primary	No	0.00	0.04	2.39	0.00	0.00	0.48	0.00%
Pollock	Primary	No	40.99	71.50	53.54	17.45	3.33	37.36	0.22%
Quillback rockfish	Primary	No	0.25	0.04	0.03	0.07	0.00	0.08	0.00%
Red king crab*	ETP/PSC	Yes	0.00	0.00	29.66	0.00	0.00	5.93	NA
Redbanded rockfish	Primary	No	0.00	0.00	0.12	0.00	0.00	0.02	0.00%
Redstripe rockfish	Primary	No	0.00	0.00	0.06	0.00	0.00	0.01	0.00%
Rex sole	Primary	No	0.02	0.05	0.01	0.00	0.00	0.02	0.00%
Rock sole	Primary	No	0.36	0.54	0.37	0.37	0.52	0.43	0.00%
Rockfish, other	Primary	No	0.99	0.79	1.15	14.32	0.02	3.45	0.02%
Rougheye rockfish	Primary	No	0.04	0.02	0.00	0.00	0.00	0.01	0.00%
Sablefish	Primary	No	1.82	2.04	8.53	0.16	0.00	2.51	0.02%
Sculpin, general	Primary	No	1.09	1.43	1.21	1.03	0.25	1.00	0.01%
Sculpin, other large	Primary	No	44.90	93.97	65.43	23.12	0.44	45.57	0.27%
Scyphozoan jellies	Secondary	No	0.87	1.43	8.85	0.89	0.00	2.41	0.01%
Sea anemones	Secondary	No	0.32	0.68	1.57	0.33	0.05	0.59	0.00%
Sea pens, whips	Habitat	Yes	0.02	0.09	0.20	0.00	0.00	0.06	0.00%
Sea star	Secondary	No	716.90	1,018.51	764.72	318.82	22.92	568.37	3.41%
Shortraker rockfish	Primary	No	0.00	0.08	0.07	0.00	0.02	0.04	0.00%
Silvergray rockfish	Primary	No	0.00	0.04	0.71	0.00	0.00	0.15	0.00%
Skate, other	Primary	No	0.06	0.00	0.01	0.00	0.00	0.01	0.00%

Snails	Secondary	No	23.48	11.10	13.78	6.76	6.65	12.35	0.07%
Spiny dogfish	Primary	No	2.66	0.09	0.87	0.00	0.31	0.79	0.00%
Sponges	Habitat	No	0.00	0.08	0.03	0.00	0.00	0.02	0.00%
Starry flounder	Primary	No	0.06	0.01	0.04	0.02	0.17	0.06	0.00%
State-managed rockfish	Primary	No	7.77	5.59	6.68	8.54	0.14	5.74	0.03%
Tiger rockfish	Primary	No	0.00	0.01	0.00	0.00	0.01	0.00	0.00%
Urchins, dollars, cucumbers	Secondary	No	1.31	3.83	1.72	4.50	0.29	2.33	0.01%
Warty sculpin	Primary	No	0.00	0.00	0.07	0.00	0.00	0.01	0.00%
Widow rockfish	Primary	No	0.00	0.06	0.00	0.00	0.00	0.01	0.00%
Yellow Irish lord	Primary	No	137.24	155.58	331.49	71.63	11.29	141.45	0.85%
Yelloweye rockfish	Primary	No	2.35	0.68	1.74	5.53	0.15	2.09	0.01%
Yellowfin sole	Primary	No	1.04	1.72	5.75	0.66	4.52	2.74	0.02%
Total Catch**			22,242.21	23,018.42	21,210.21	14,369.01	2,615.13	16,691.00	

[1] Catches for 2018 are through October 23, 2018.
"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.
* Number of individuals instead of metric tons
** Does not include species with individual numbers instead of weight

Table 24 Primary, secondary, PSC, and ETP species (t) taken in the GOA jig fishery for Pacific cod, 2014-2018 (2018 data current through October 9).

Species	Primary, Secondary, ETP, or Habitat	Main?	2014	2015	2016	2017	2018	Five-Year Average	% of Total Average Catch
Pacific cod[1, 2]	Target (P1)	NA	14,749.00	13,054.00	8,153.00	8,978.00	2,537.00	9,494.20	99.73%
Aleutian skate	Primary		0.00	0.00	0.02	0.00	0.00	0.00	0.00%
Arrowtooth flounder	Primary		0.32	0.00	0.04	0.00	0.00	0.07	0.00%
Atka mackerel	Primary		0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Big skate	Primary		0.01	0.00	0.34	0.06	0.00	0.08	0.00%
Butter sole	Primary		0.00	0.01	0.00	0.00	0.00	0.00	0.00%
Dusky rockfish	Primary		0.86	3.83	4.46	0.11	0.13	1.88	0.02%

Longnose skate	Primary		0.02	0.00	0.26	0.01	0.00	0.06	0.00%
North Pacific octopus	Primary		0.03	0.05	0.01	0.00	0.00	0.02	0.00%
Northern rockfish	Primary		0.05	0.00	0.02	0.00	0.00	0.02	0.00%
Pacific halibut	Primary		0.57	1.11	0.52	0.06	0.01	0.46	0.00%
Pacific Ocean perch	Primary		0.09	0.00	0.05	0.00	0.08	0.04	0.00%
Pollock	Primary		16.08	27.89	67.19	1.89	0.12	22.64	0.24%
Quillback rockfish	Primary		0.00	0.00	0.16	0.03	0.04	0.05	0.00%
Redstripe rockfish	Primary		0.00	0.00	0.00	0.01	0.00	0.00	0.00%
Rock sole	Primary		0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Rougheye rockfish	Primary		0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Shortraker rockfish	Primary		0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Silvergray rockfish	Primary		0.00	0.00	0.05	0.03	0.13	0.04	0.00%
Tiger rockfish	Primary		0.00	0.00	0.00	0.00	0.01	0.00	0.00%
Yelloweye rockfish	Primary		0.01	0.03	0.37	0.01	0.06	0.09	0.00%
Yellowfin sole	Primary		0.01	0.00	0.00	0.00	0.00	0.00	0.00%
Yellowtail rockfish	Primary		0.05	0.00	0.00	0.00	0.01	0.01	0.00%
Total Catch**			14,767.14	13,086.93	8,226.50	8,980.20	2,537.60	9,519.67	

[1] The longline and jig catches are combined.

[2] Catches for 2018 are through October 9, 2018.

"NA" is used in place of Primary, Secondary, ETP, or Habitat when the species caught was non-specific or unidentifiable.

* Number of individuals instead of metric tons

** Does not include species with individual numbers instead of weight

Seabirds

Some 71 species of seabirds occur over waters off Alaska and could potentially be affected by direct and indirect interactions with these UoAs. Thirty-eight of these species regularly breed in Alaska and occur in the 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 (https://www.fws.gov/alaska/pages/migratory-birds/seabirds). The most recent US Fish and Wildlife surveys (Dragoo et al. 2017) on seabird population trends in Alaska Maritime National Wildlife Refuge monitored sites indicated that state-wide 13% of species showed increasing population trends, 56% were stable and 31% declined between 2007 and 2016 (compared to just 13% of species exhibiting declining trends between 2006 and 2015). Recent declining population trends likely are a consequence of poor localized food conditions, which also may have contributed to the large seabird die off during the winter of 2015-2016 (Dragoo et al. 2017).

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. NOAA Fisheries' Alaska Region Catch Accounting System manages Alaska fisheries' catch data, using information gathered via the North Pacific Observer Program. "Observers identify each bird in their sample to the most accurate species or species group that they can. Species identification is verified for bird specimens collected through an AFSC-managed necropsy program. This program provides birds collected by observers from bycatch and ship strikes to a vendor to necropsy and verify the species identification" (Eich et al., 2018). Seabird bycatch estimates are updated annually.

Most of the seabirds taken in Pacific cod fisheries in the BSAI result from interactions with demersal longline gear. Overall, the number of seabirds taken in demersal longline gear in 2017 fell back to the 2015 numbers after an increase in 2016 due to increases in the numbers of Northern fulmars and shearwaters taken (Table 25). Although the bycatch was reduced, as in previous years, the bycatch was dominated by Northern Fulmars followed by Shearwaters. Relatively few seabirds were taken in 2017 in other gears, although there was an increase in the number of Northern Fulmars taken in pots.

Seabird bycatch in Pacific cod fisheries in the GOA is low, as in previous years, and in 2017 was dominated by Black-footed Albatross, Northern Fulmars, and gulls (Table 22). No seabirds were recorded as bycatch on the pot fishery. There was an increase in the bycatch of Black-footed Albatross and gulls in the trawl fishery and of Northern Fulmars in the longline fishery, although in both cases the number taken were low.

The U.S. West Coast and Alaska Trawl Fisheries Seabird Cable Strike Mitigation Workshop was held on 7-8 November 2017 at the NOAA Fisheries West Coast Region in Seattle, Washington. The workshop was hosted by a Steering Committee consisting of members from NOAA's Northwest Fisheries Science Center, Alaska Fisheries Science Center, and the Alaska Regional Office. The goal of the workshop was to identify effective, practical mitigation measures to reduce seabird cable strike mortality in the catcher-processor west coast hake and Alaska trawl fisheries (Jannot et al. 2018).

Table 25 Estimated seabird bycatch in Alaska by Pacific cod fisheries by area and gear type, 2013 through 2017. From Eich et al. (2018)

Target	Species/Species	2013	2014	2015	2016	2017	Ann Avg
BSAI demersal longline	Unidentified	0	12	0	0	0	2
	Short-tailed Albatross	0	5	0	0	0	1
	Laysan Albatross	4	12	38	12	9	15
	Black-footed	0	0	0	0	0	0
	Northern Fulmar	2,501	582	2,690	4,658	2,542	2595
	Shearwaters	135	44	243	2,984	1,071	895
	Gulls	413	586	941	589	372	580
	Kittiwakes	3	4	12	5	13	7
	Murres	0	0	0	0	9	2
	Puffins	0	0	0	10	0	2
	Auklets	0	0	0	0	0	0
	Unidentified Birds	263	78	151	277	247	203
	Total	3,319	1,323	4,075	8,535	4,263	4,303
BSAI Trawl	Laysan Albatross	0	0	0	0	0	0
	Northern Fulmar	0	0	0	57	0	11
	Gulls	0	0	0	0	0	0
	Total	0	0	0	57	0	11

Target	Species/Species	2013	2014	2015	2016	2017	Ann Avg
BSAI Pot	Northern Fulmar	20	11	197	139	580	189
	Murres	0	0	0	13	0	3
	Auklets	0	35	19	29	36	24
	Unidentified Birds	0	0	0	0	0	0
	Total	20	46	216	181	616	216
GOA Trawl	Black-footed	385	228	343	171	422	221
	Northern Fulmar	108	0	36	19	64	199
	Shearwaters	0	0	5	20	0	11
	Gulls	35	8	111	90	250	178
	Cormorants	0	0	28	0	0	3
	Unidentified Birds	0	0	28	19	0	17
	Total	625	260	573	363	736	687
GOA Pot	Northern Fulmar	0	0	0	95	0	45
	Shearwaters	57	0	0	0	0	5
	Gulls	0	0	0	0	0	5
	Auklets	0	0	38	0	0	3
	Other Alcids	0	39	0	0	0	4
	Total	57	39	38	95	0	62
GOA Demersal longline	Unidentified	0	0	0	0	0	1
	Laysan Albatross	0	0	8	0	0	2
	Black-footed	0	0	8	0	30	7
	Northern Fulmar	19	8	12	11	25	15
	Gulls	25	27	50	33	17	30
	Auklets	0	0	6	11	0	5
	Unidentified Birds	33	7	0	5	0	9
	Total	77	42	84	60	72	67

Northern fulmar

Northern Fulmar are taken in all of the BSAI and GOA Pacific cod fisheries for an average of 3,054 birds per year during the period 2013 and 2017 (Table 25). When compared to estimates of the total population size in Alaska of 2.6-4.2 million pairs or about 6 million birds (Birdlife International 2019), observed fisheries account for an annual mortality of << 0.1%". Therefore, the impact of all UoAs is negligible.

Sharks

Sharks are a primary species, though not main, in the all UoAs because they are a managed stock complex. Therefore, shark finning must be considered. According to NOAA, shark finning in the United States has been prohibited since 2000. "The Shark Finning Prohibition Act of 2000 amended the Magnuson-Stevens Act to prohibit any person under U.S. jurisdiction from engaging in the finning of sharks, possessing shark fins aboard a fishing vessel without the corresponding carcass, and landing shark fins without the corresponding carcass. On January 4, 2011, the Shark Conservation Act of 2010 was signed into law, amending the High Seas Driftnet Fishing Moratorium Protection Act and the Magnuson-Stevens Act. The Shark Conservation Act required that all sharks in the United States, with one exception, be brought to shore with their fins naturally attached" (NOAA Fisheries, 2019).

Cumulative impacts on primary and secondary species

The MSC Fisheries Certification Requirements (MSC 2014) require consideration of the cumulative impact on primary and secondary species. That is, in a full assessment, these UoAs would need to consider of other MSC UoAs[8]. If a main primary species is below its point where recruitment would be impaired (PRI), there needs to be evidence of recovery or an effective strategy in place between all MSC UoAs that categorize the species as main. If a main secondary species is below its biologically based limit and the catch of that species is "considerable"[9], there needs to be evidence of recovery or an effective strategy in place between all MSC UoAs that have considerable catch of the species.

The relevant MSC UoAs are BSAI pollock; GOA flatfish; BSAI Pacific flatfish; GOA Pacific cod; BSAI Atka mackerel; BSAI Pacific Ocean perch and northern rockfish; and GOA northern rockfish, Pacific Ocean perch, and dusky rockfish. Table 26 shows the breakdown of main primary and main secondary species for those UoAs.

Table 26 Main primary and secondary species for the relevant MSC UoAs. (The UoAs assessed in this report are shaded in gray.)

MSC UoAs	Main primary species	Main secondary species
BSAI Atka mackerel	None	Crested, parakeet, and whiskered auklet; northern fulmar; short-tailed and sooty shearwater; fork-tailed storm petrel
BSAI flatfish	Pacific cod, pollock	Crested, parakeet, and whiskered auklet; glaucous, glaucous-winged, and arctic herring gull; northern fulmar; common and thick-billed murre; short-tailed and sooty shearwater
BSAI Pacific cod	BS longline: Other skate BS jig: None BS pot: None BS trawl: None AI longline: Other large sculpin, other skate AI jig: None AI pot: None AI trawl: None	BS longline: Glaucous, glaucous-winged, and arctic herring gull; northern fulmar; common and thick-billed murre; horned and tufted puffin and rhinoceros auklet; short-tailed and sooty shearwater BS jig: None BS pot: Crested, parakeet, and whiskered auklet; common and thick-billed murre; northern fulmar BS trawl: Northern fulmar AI longline: Glaucous, glaucous-winged, and arctic herring gull; northern fulmar; common and thick-billed murre; horned and tufted puffin and rhinoceros auklet; short-tailed and sooty shearwater AI jig: None AI pot: Crested, parakeet, and whiskered auklet; common and thick-billed murre; northern fulmar AI trawl: Northern fulmar
BSAI Pacific Ocean perch and northern rockfish	None	Crested, parakeet, and whiskered auklet; northern fulmar; short-tailed and sooty shearwater
BSAI pollock	None	Pelagic and red-faced cormorant; glaucous, glaucous-winged, and arctic herring gull; northern fulmar; common and thick-billed murre; short-tailed and sooty shearwater
GOA flatfish	Pacific cod	Northern fulmar
GOA northern rockfish, Pacific Ocean perch, and dusky rockfish	None	Northern fulmar

[8] MSC (2014) defines "MSC UoAs" as "those UoAs that are in assessment or certified at the time the UoA announces its assessment or reassessment on the MSC website."
[9] MSC (2014) defines "considerable" catch as "those where main secondary species comprise more than 10% of the catch by weight of the UoA."

GOA Pacific cod	Longline: None Jig: None Pot: None Trawl: None	Longline: Crested, parakeet, and whiskered auklet; glaucous, glaucous-winged, and arctic herring gull; northern fulmar; short-tailed and sooty shearwater Jig: None Pot: Crested, parakeet, and whiskered auklet; northern fulmar Trawl: None
GOA pollock	None	None

ETP species

ETP species do interact with these UoAs. Table 27 lists these species and the management measures that require their protection. Table 28 provides interaction data and relevant catch limit information for the ETP species encountered by the UoAs for the most recent 5-year period for which there is observer information. In the case of marine mammals, this period covers 2012 to 2016.

The ESA was established in 1973 and carries out the provisions in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The ESA aims to conserve endangered and threatened fish, wildlife, and plant species and is administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's NMFS. Regarding fishing activities, the USFWS allows a certain level of "incidental take" (IT) of a listed species in cases where "an action may adversely affect a species but not jeopardize its continued existence" (USFWS, 2017).

CITES is a multilateral treaty established to protect endangered plants and animals. It was drafted at a meeting of members of the International Union for Conservation of Nature (IUCN) and became effective in 1975. Each CITES-protected species is assigned an appendix, which specifies the extent of the threat and the trade controls applied to that species. CITES Appendix I, the highest level, includes the species that are threatened with extinction and are, or may be, affected by trade.

The Marine Mammal Protection Act (MMPA) was enacted in 1972 in response to increasing concerns that human activity was causing significant declines in some marine mammal populations. All marine mammals in U.S. waters are protected by the MMPA, which is implemented by NMFS, USFWS, and the Marine Mammal Commission. Required by the MMPA, NMFS publishes its List of Fisheries (LOF), which classifies commercial fisheries into one of three categories (I, II, and III) based on the level of incidental marine mammal mortality or serious injury that occurs. Category I and II mean there are "frequent interactions" and "occasional interactions", respectively. Category III means there is a "remote likelihood of/no known interactions". The classification dictates whether fishers are subject to actions, such as observer coverage and take-reduction plan requirements.

The MMPA limits the number of each marine mammal species that can be killed as part of fishing activities. This is the potential biological removal (PBR) level, which is defined as "the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population" (https://www.fisheries.noaa.gov/insight/glossary-marine-mammal-protection-act-definitions).

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral agreement that was introduced in 2004. There are currently 13 member countries, and while the United States is not one of them, the MSC requirements state that ACAP shall be considered, nonetheless. ACAP currently covers 31 species of albatrosses, petrels, and shearwaters.

The IUCN Red List of Threatened Species was introduced in 1994 with the goal of providing information and analyses on the status, trends, and threats to species in order to inform and catalyze conservation action.

Table 27 The protection measures and status (where relevant) of the ETP species encountered by these Pacific cod UoAs. Sources: https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables, https://www.afsc.noaa.gov/publications/AFSC-TM/NOAA-TM-AFSC-354.pdf, https://www.fisheries.noaa.gov/find-species, https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A0FS, https://www.iucnredlist.org/species/22694497/132556442, https://www.iucnredlist.org/species/22694502/132557429, https://www.iucnredlist.org/species/3590/45224953, https://www.iucnredlist.org/species/15106/45228501, https://acap.aq/en/acap-species/307-acap-species-list/file

Species	UoAs	Protection Measure and Status	

		NOAA PSC	ESA	MMPA	ACAP	CITES Appx. I	IUCN Red List
Marine mammals							
Dall's porpoise (Alaska)	BSAI, GOA: Longline			LOF			
Harbor seal (Alaska)	GOA: Trawl			LOF			
Killer whale, NE Pacific	BSAI, GOA: Longline						
Northern elephant seal (North Pacific)	BSAI: trawl			LOF			
Northern fur seal (eastern Pacific)	BSAI: Longline			LOF			Vulnerable
Ringed seal (Alaska)	BSAI: Longline		Threatened	LOF			
Spotted seal (Alaska)	BSAI: Longline			LOF			
Steller sea lion (western US)	BSAI, GOA: Longline, trawl		Endangered	LOF			Endangered
Fish and crustaceans							
Bairdi tanner crab	All	X					
Chinook salmon	All	X					
Golden king crab	All	X					
Herring	All	X					
Non-chinook salmon	All	X					
Opilio tanner crab	All	X					
Pacific halibut	All	X					
Red king crab	BSAI	X					
Chinook – Upper, lower Columbia River	All		Endangered				
Chinook – Snake River, fall and spring	All		Endangered				
Chinook – Upper Willamette River	All		Endangered				
Seabirds							
Red-legged kittiwake							Vulnerable
Black-legged kittiwake							Vulnerable
Black-footed albatross					X		
Laysan albatross					X		
Short-tailed albatross	All		Endangered		X		Vulnerable
Steller's eider	All		Threatened				Vulnerable
Spectacled eider	BSAI		Threatened				Least Concern

Table 28 ETP species encountered by the UoAs, the catch limits set for these species, and the level of impact the fishery has on each species. For marine mammals' data are for the period 2012 to 2016. Sources: observer data, https://www.afsc.noaa.gov/publications/AFSC-TM/NOAA-TM-AFSC-354.pdf, https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock.

Species	National and/or International Limits			
	Yes/No (and Type)	Annual Limit	UoA: Average catch	UoAs within Limit?
Marine mammals				
Dall's porpoise (Alaska)	Yes (PBR)	Undetermined	BSAI: 0 GOA: 0	Yes
Harbor seal (Alaska)	Yes (PBR)	***	BSAI: 0.6	Yes
Northern elephant seal (North Pacific)	Yes (PBR)	4,882	BSAI: 0	Yes
Northern fur seal (eastern Pacific)	Yes (PBR)	11,602	BSAI: 0	Yes
Ringed seal (Alaska)	Yes (PBR)	5,100	BSAI: 0 [2010-2014]	Yes
Spotted seal (Alaska)	Yes (PBR)	12,697	BSAI: 0.3 [2011-2015]	Yes
Steller sea lion (western US)[2]	Yes (PBR)	326	BSAI: 5.7 GOA: 0	Yes
Fish and crustaceans				
Bairdi tanner crab	Yes (PSC)	BSAI: 3,350,000	BSAI: 273,590 (2018) GOA: 18,295 (2018)	Yes
Chinook salmon	Yes (PSC)	BSAI: GOA: 3,600 CV, 3,900 CP	BSAI: 11,170(2018) GOA: 401 (2018)	Yes
Golden king crab	Yes (PSC)	BSAI: No limit	BSAI: 3,956 (2018) GOA: 2 (2018)	Yes
Herring	Yes (PSC)	BSAI: 1830 tons	BSAI: 2.5 tons (2018) GOA: 0 tons (2018)	Yes
Non-chinook salmon	Yes (PSC)	BSAI: no limit GOA: no limit	BSAI: 179 (2018) GOA: 5 (2018)	BSAI: Yes GOA: Yes
Opilio tanner crab	Yes (PSC)	BSAI: 9,120,539	BSAI: 67,082 (2018) GOA: 0 (2018)	Yes
Pacific halibut	Yes (PSC)	BSAI: 3510 tons GOA: 1706 tons trawl, 257 tons longline	BSAI: 410 tons (2018) GOA: 106 tons (2018)	Yes
Red king crab	Yes (PSC)	BSAI: 97,000	BSAI: 337,973 (2018) GOA: 6 (2018)	No
Chinook – Upper, lower Columbia River	No			
Chinook – Snake River, fall and spring	No			
Chinook – Upper Willamette River	No			
Seabirds				
Short-tailed albatross	YES (USFW BiOp)	6 per 2-yr	All: 0	Yes
Steller's eider	Yes (USFW)	Subsistence use only	All: 0	Yes
Spectacled eider	No	none	All: 0	N/A
Red-legged kittiwake	No			N/A

Black-legged Kittiwake	No			N/A
Laysan albatross	No			N/A
Black-footed albatross				N/A

Notes:
"Catch" means fatal interaction (i.e., mortally wounded or killed by gear or fatal removal from gear)
Year = most recent year (2015 or after) with data
* Catch in number of individuals unless stated otherwise; used most recent year with data

Marine mammals

Dall's porpoise

Dall's porpoise (*Phocoenoides dalli*) is throughout the North Pacific Ocean (Figure 3). The most recent stock assessment (2015) estimated the Alaskan stock population to be 417,000 (Muto et al. 2018). According to the 2018 LOF, the BSAI Pacific cod longline UoA is a Category II, meaning they have occasional interactions with this stock. Various human impacts (e.g., fishing) have known effects on the species. With regards to fishing, trawls, longlines, and gillnets have been linked to mortalities. The PBR for the stock is undetermined since the data are too old to produce a reliable number. However, the UoA had no observed interaction in 2015 (Table 27). Therefore, it likely has a negligible impact on the population.

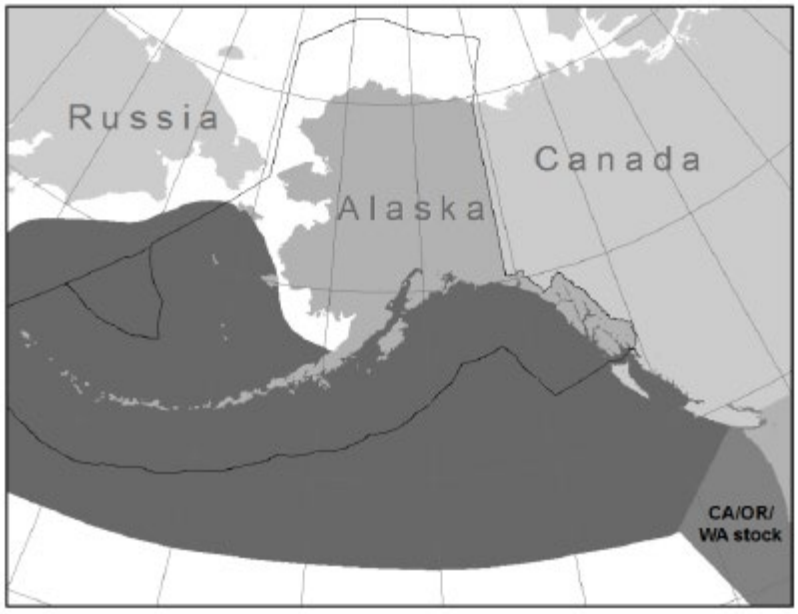

Figure 3 Approximate distribution for Dall's porpoise in Alaskan waters (dark gray). Source: Muto et al. 2018

Harbor seal

The harbor seal (*Phoca vitulina richardii*) has a wide distribution, inhabiting coastal and estuarine waters from Baja California to the Bering Sea. "In 2010, NMFS and their co-management partners, the Alaska Native Harbor Seal Commission, identified 12 separate stocks of harbor seals based largely on genetic structure; this represents a significant increase in the number of harbor seal stocks from the three stocks (Bering Sea, Gulf of Alaska, Southeast Alaska) previously recognized" (Muto et al. 2018). Figure 4 shows all stocks in Alaskan waters.

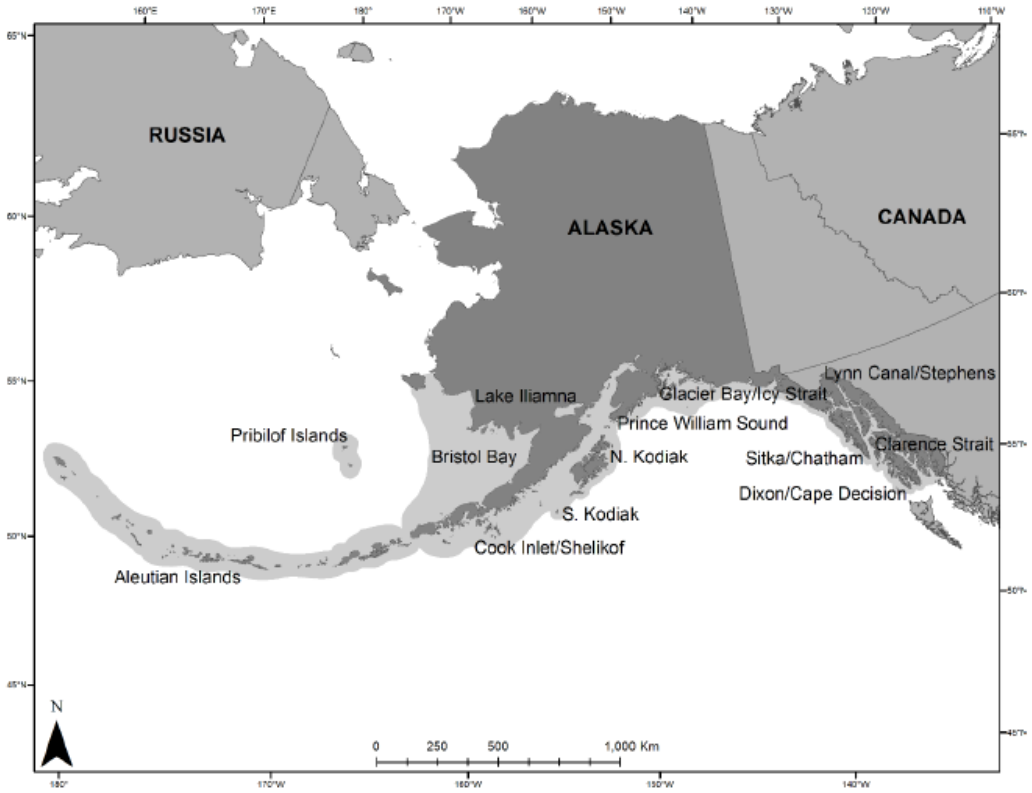

Figure 4 Approximate distribution of the harbor seal stocks in Alaskan waters (light gray). Source: Muto et al. 2018

For reporting purposes, the observer data and 2018 LOF use the overarching “Alaska stock” label. Therefore, the assessment team has chosen to mention population estimates and PBRs for all stocks (Table 29). According to the 2018 LOF, the GOA Pacific cod pot UoA is a Category III with regard to interactions with these stocks. Various human impacts (e.g., fishing) have known effects on the species. Gillnets have been linked to mortalities. The UoA had no observed interaction in 2015 (Table 28). Therefore, it likely has a negligible impact on the population.

Table 29 Most recent stock assessment, population estimate, and PBR for all Alaska stocks.

Stock	Last Stock Assessment	Population Estimate	PBR
Aleutian Islands	2011	6,431	173
Bristol Bay	2011	32,350	1,182
Clarence Strait	2011	31,634	1,222
Cook Inlet/ Shelikof Strait	2011	27,386	770
Dixon/Cape Decision	2011	18,105	703
Glacier Bay/Icy Strait	2011	7,210	169
Lynn Canal/Stephens Passage	2011	9,478	155
North Kodiak	2011	8,321	298
Pribilof Islands	2011	232	7
Prince William Sound	2011	29,889	838
Sitka/Chatham Strait	2011	14,855	555
South Kodiak	2011	19,199	314

Killer whale

The GOA, AI, and BS transient stock’s distribution is shown in Figure 5. The most recent stock assessment (2016) estimated the Alaska resident population at 587 (Muto et al. 2018). According to the 2018 LOF, the BSAI Pacific cod longline UoA is a Category II with regard to interactions with this killer whale stock. Various human impacts (e.g., fishing, vessel strikes) have known effects on the species. Trawls, longlines, and pots have been linked to mortalities.

The PBR for this stock is 5.87, and the UoA had no observed interactions in 2015 (Table 27). Therefore, it likely has a negligible impact on the population.

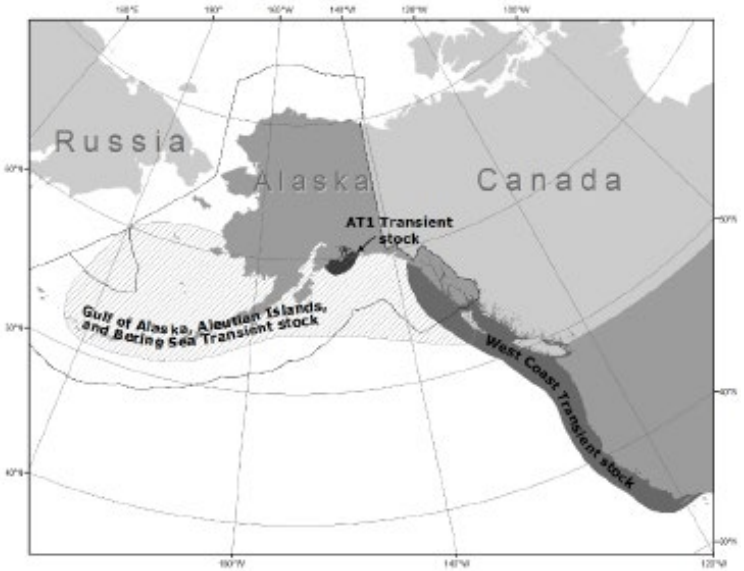

Figure 5 Approximate distribution of the GOA, AI, and BS transient killer whale population (light gray shaded area). Source: Muto et al. 2018

Northern fur seal

The northern fur seal (*Callorhinus ursinus*) ranges from southern California to the Bering Sea and west to the Okhotsk Sea and Honshu Island, Japan (Figure 6). In the summer, most of the worldwide population breed on the Pribilof Islands. The eastern Pacific stock is significantly larger than the California stock, making up nearly 99% of the total population (Gelatt et al., 2015).

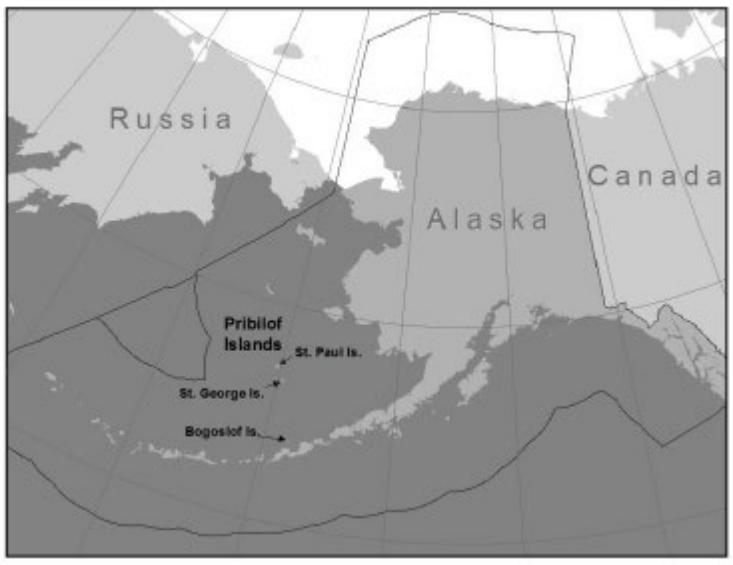

Figure 6 Approximate distribution of northern fur seals in the eastern North Pacific (dark gray shaded area). Source: Muto et al. 2018

Using the estimated number of pups on Sea Lion Rock, St. Paul, St. George, and Bogoslof Islands (i.e., rookery locations) and multiplying by an expansion factor of 4.47, the most recent stock assessment (2017) estimated the eastern Pacific stock population at 637,561 (Muto et al. 2018). The 2018 LOF classified the BSAI Pacific cod longline UoA as a Category II with regard to the northern fur seal. Various human impacts (e.g., marine debris, fishing) have known effects on fur seals. With regards to fishing, interactions with gillnet and trawl gear can cause entanglement deaths. The PBR for this stock is 11,602, and the UoA had two observed interactions in 2015 (Table 28). Therefore, it likely has a negligible impact on the population.

Ringed seal

The ringed seal (*Pusa hispida hispida*) is found seasonally in all ice-covered areas in the Northern Hemisphere (Figure 7). Genetic studies have differentiated five subspecies of ringed seals: *P. h. hispida* in the Arctic Ocean and Bering Sea; *P. h. ochotensis* in the Sea of Okhotsk and northern Sea of Japan; *P. h. botnica* in the northern Baltic Sea; *P. h. lagodensis* in Lake Ladoga, Russia; and *P. h. saimensis* in Lake Saimaa, Finland (Rice 1998, Amano et al. 2002).

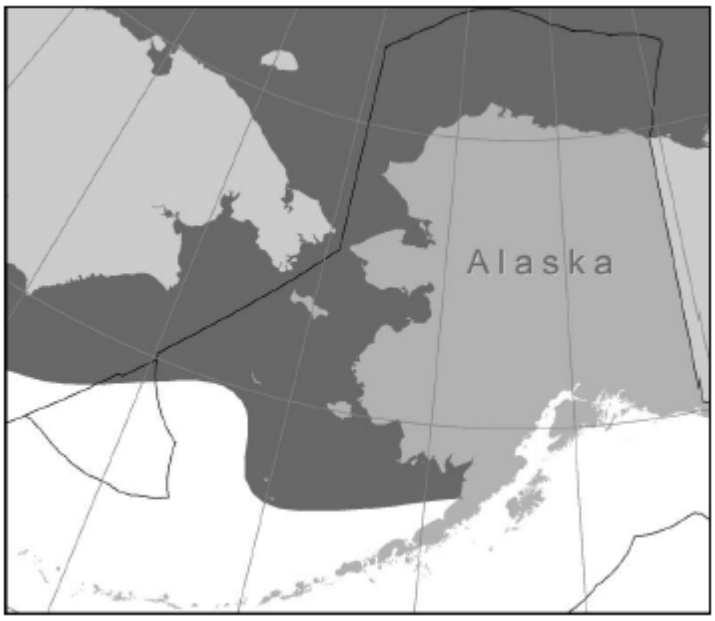

Figure 7 Approximate winter distribution of the ringed seal (dark gray shaded areas). Source: Muto et al. 2018

There is not a reliable population estimate for the entire Alaska stock though research programs have developed new survey methods, resulting in partial abundance estimates. Data collected from the U.S. portion of the Bering Sea in 2012 calculated an abundance estimate of about 170,000 ringed seals, but this estimate does not account for availability bias. Therefore, the actual population of ringed seals in the U.S. portion of the Bering Sea is likely much larger – by a factor of two or more (Muto et al. 2018). According to the 2018 LOF, the BSAI Pacific cod longline UoA and trawl UoA are a Category II and Category III, respectively. With regards to fishing, these gears have been linked to mortalities. The PBR for ringed seals in U.S. portion of the Bering Sea is 5,100. A PBR for the entire stock cannot be estimated reliably since the stock-wide population is unknown. These UoAs had no observed interaction in 2015 (Table 28). Therefore, they likely have a negligible impact on the population.

Steller sea lion

The Steller sea lion (*Eumetopias jubatus*) is found along the North Pacific Rim from northern Japan to California (Figure 8). The most recent stock assessment (2016) estimated the Steller sea lion western U.S. stock population at 53,303, which includes pups and non-pups (Muto et al. 2018). Data collected through 2016 show strong evidence that that the western stock population in Alaska was at its lowest in 2002 and 2003 and have increased at over 2% per year between 2003 and 2016. However, the stock is still classified as endangered on the ESA list and IUCN Red List. According to the 2018 LOF, the BSAI Pacific cod trawl UoA and the GOA Pacific cod trawl and longline UoAs are Category III. Fishing gear entanglement has been linked to mortalities. The PBR for this stock is 320. While the BSAI Pacific cod longline UoA was not listed in the 2018 LOF as having interactions with Steller sea lions, the UoA did have two observed interactions in 2015 (Table 28). The BSAI and GOA Pacific cod trawl UoAs had no observed interactions in 2015, and the GOA Pacific cod longline UoA had one observed interaction in 2015 (Table 28). Therefore, the UoAs likely have a negligible impact on the population.

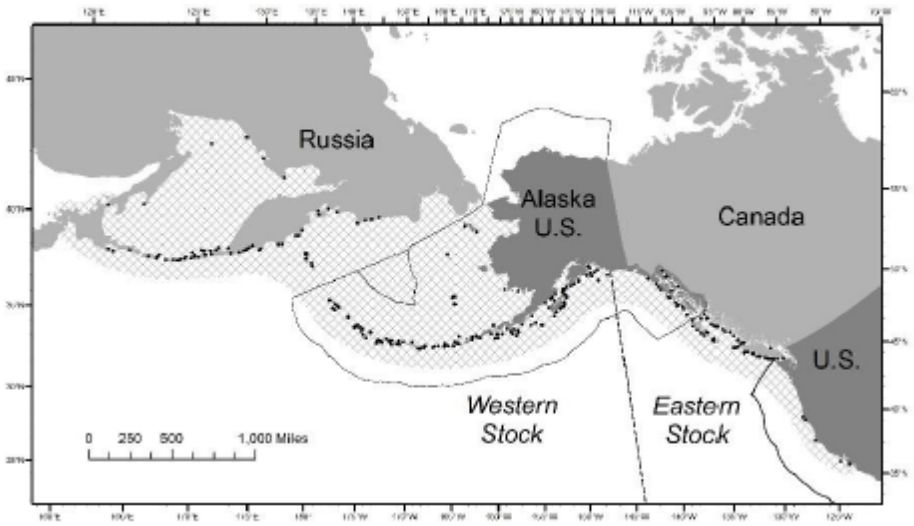

Figure 8 Approximate distribution (cross-hatched area) and major U.S. haulouts and rookeries (black dots) of the Steller sea lion (both eastern and western U.S. stocks). Source: Muto et al. 2018

Critical habitat has been designated (50 CFR 226.202 on Aug. 27, 1993) for Steller sea lions as a 20-nm buffer around all major haul-outs and rookeries, as well as associated terrestrial, air, and aquatic zones, and three large offshore foraging areas. No-entry zones around rookeries (50 CFR 223.202) have also been designated. A suite of fishery management measures has been designed to minimize competition between fishing and the endangered population of Steller sea lions in critical habitat areas. A recovery plan was developed for Steller sea lions in 1992 with a revised recovery plan (NFMS 2008) being issued in 2008.

"The 1988 amendments [to the MMPA] also required the Secretary to implement emergency regulations to prevent further taking of Steller sea lions if more than 1,350 were taken during a calendar year. In addition, NMFS may place observers on Category I and II vessels to 1) obtain reliable estimates of incidental serious injury and mortality of marine mammals; 2) determine the reliability of reports submitted by vessel owners and operators; 3) identify changes in fishing methods or technology that may decrease incidental serious injury or mortality if necessary; 4) collect biological samples that may otherwise be unobtainable for scientific studies; and 5) record data on bycatch and discard levels of all species" (NMFS 2008).

Fish and crustaceans

As discussed above, these "prohibited species" have PSC limits, which are measures to limit the incidental catch of these species in these UoAs. While not ETP species under the MSC definition, they have been designated as "prohibited species" in FMPs so they are considered ETP in this assessment.

Three ESA-threatened salmon stocks (five runs) that migrate to Alaskan waters include Lower Columbia River Chinook salmon, upper Willamette River Chinook salmon, and Upper Columbia River Chinook, spring, Snake River fall, and Snake River spring/summer runs. Coded-wire tag recoveries from salmon bycatch in the BSAI groundfish fisheries, including the UoAs, between 2013-2017 revealed that none or few wild Chinook from the endangered stocks are taken (Balsiger 2018). Most (97%) of the CWT recoveries are from hatchery salmon.

NMFS conducted a review in 2010 and early 2011 of 27 of the 28 currently listed Pacific salmonid ESUs/DPSs of West Coast Pacific salmon. Based on this evaluation, no change in the listing status of the three stocks migrating to Alaskan waters was recommended (Ford [ed] 2011). Given the small number of Chinook estimated to have been taken in the Pollock fishery, the BSAI pollock fishery is highly unlikely to pose a threat to ESA-listed salmon ESUs in the Pacific Northwest. In April 2019, NMFS announced a 5-year review of 28 species listed under the Endangered Species Act of 1973, as amended (ESA). The listed species comprise 17 evolutionarily significant units (ESUs) of Pacific salmon (*Oncorhynchus spp.*) (https://www.federalregister.gov/documents/2019/10/04/2019-21666/endangered-and-threatened-species-initiation-of-5-year-reviews-for-28-listed-species-of-pacific).

Seabirds

Seven species of seabirds listed as threatened, vulnerable or endangered are in the BSAI (Table 27). The Short-tailed Albatross (*Phoebastria albatrus*) 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 can be seen in the Gulf of Alaska, along the Aleutian Islands, and in the Bering Sea. The world population is currently estimated to be about

1700 birds and is increasing. Recently, the USFWS advised that up to six Short-tailed Albatross could be reported to be taken every two years incidental to the groundfish fisheries off Alaska. This incidental take limit is in addition to the take limit established in 1998 for the Pacific halibut hook-and-line fishery off Alaska—two short-tailed albatrosses in a two year period (https://alaskafisheries.noaa.gov/node/52755). The endangered short-tailed albatross has not been taken since 2014 in a Pacific cod fishery in the BSAI and GOA (Eich et al. 2018). Therefore, the threat to the recovery of this species is negligible.

Eiders

In 1997, the Alaska-breeding population of Steller's eiders (*Polysticta stelleri*) was listed as threatened under the Endangered Species Act (ESA) based on: abandonment of significant portions of their former nesting range in Alaska and a reduction in the number of Steller's eiders nesting in Alaska (particularly the Yukon-Kuskokwim (Y-K) Delta (http://www.fws.gov/alaska/fisheries/endangered/pdf/Stei_Gen_Factsheet_03-04-14.pdf). This species is declining in abundance and is listed as Vulnerable by the IUCN. Population sizes are only imprecisely known, but about 370,000 individuals overwinter in the North Pacific. The threatened Alaska breeding population is thought to include 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 not to interact with Pacifc cod UoAs as none have been recorded by the AFSC seabird bycatch program through 2017.

The breeding population of spectacled eiders (Somateria fischeri) on the Y-K Delta declined by over 96% between the 1970s and the 1990s. The causes of this steep decline remain unknown, but its magnitude prompted the U.S. Fish and Wildlife Service to list the species as threatened under the Endangered Species Act in 1993 (http://www.fws.gov/alaska/fisheries/endangered/species/spectacled_eider.htm). Spectacled eiders breed along the central coast of the Y-K Delta, the arctic coastal of Alaska, and the arctic coastal plain of Russia. An average of about 5,000-6,000 individuals nest on the Y-K Delta today. Lead poisoning, predation and illegal harvest are listed as the major threats by the recovery team. They over winter in an area south of St. Lawrence Island, but none were taken in BSAI cod fishery during the period 2012 to 2017.

Black-footed albatross

The Black-footed Albatross nests for the most part on remote beaches in the Hawaiian Archipelago during the northern winter and spring, and then forages widely across North Pacific waters as far as Alaska and the Bering Sea (Figure 9). It feeds mainly on squid and on the eggs of flying-fish, although it often follows ships and trawlers, picking up offal left in their wake.

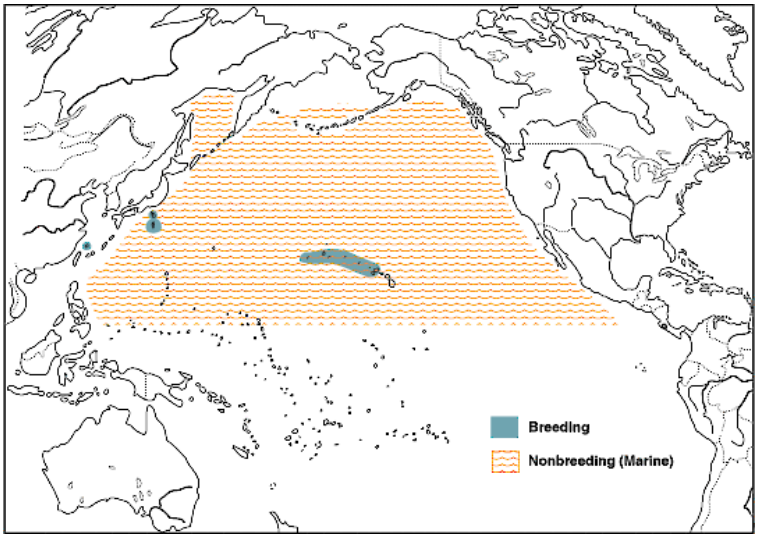

Figure 9 Approximate distribution (cross-hatched area) and major U.S. haulouts and rookeries (black dots) of the Black-footed albatross. Source: Muto et al. 2018

Black-footed and Laysan albatrosses are sister taxa and share breeding sites. Black-footed albatrosses are less abundant than Laysans, with a worldwide abundance estimated at about 278,000 individuals (including 58,000

breeding pairs), with an apparent decrease between 1992 and 2004. The most recent breeding season population is estimated to 69,404 pairs, equivalent to 138,808 breeding individuals (Arata et al. 2009, ACAP 2012) and the IUCN listed the species as increasing. Mortalities of Black-footed albatross in Pacific cod fisheries in the BSAI are rare and those in the GOA average less than 250 birds per year. Therefore, the UoAs are highly unlikely to pose a threat to this species.

Laysan albatross

The Laysan albatross (*Phoebastria immutabilis*) breeds on tropical/subtropical islands across the North Pacific Ocean (Figure 10). The Northwestern Hawaiian Islands support >95% of the global breeding population, which in 2009, was estimated to be 591,000 breeding pairs (ACAP 2010). During the period 2013 to 2017, Laysan Albatross were taken only in the BSAI in the demersal longline UoA at an average of 19 birds per year. Therefore, it can be concluded that the impact on this species of all Pacific cod UoAs is negligible.

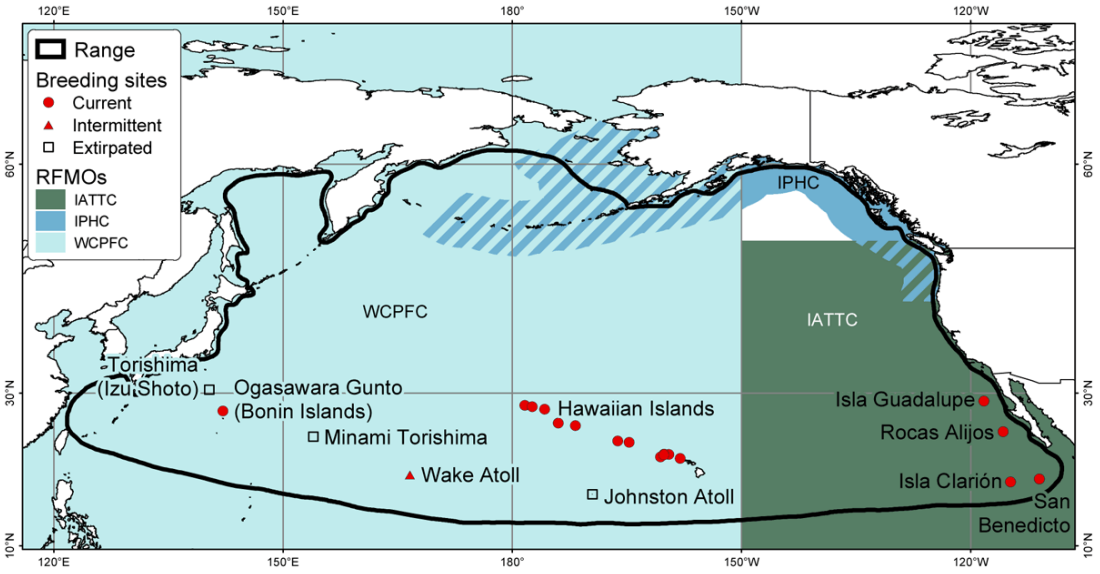

Figure 10 Estimated range and breeding sites for the Laysan albatross inferred primarily from shipboard surveys, band recoveries, and tracking. Source: ACAP, 2010

Kittiwake

There are two kittiwake species under this grouping: black-legged kittiwake (*Rissa tridactyla*) and red-legged kittiwake (*R.* brevirostris). The global population of the black-legged kittiwake is estimated at 14,600,000-15,700,000 (Wetlands International 2016). The North Pacific portion of the population declined rapidly in the 1990s but has since recovered (Descamps et al. 2017). The global population of the red-legged kittiwake is estimated at 279,600 mature individuals, with >82% found in the Pribilof Islands. The red-legged kittiwake breeding colonies appear to be stable or increasing in the number of mature individuals (Birdlife International 2019b). Therefore, based on this evidence, it is likely that the red-legged kittiwake no longer meets the threshold for “vulnerable”. Kittiwakes are rarely taken in Pacific cod fisheries (Table 25). Therefore, these UoAs have a negligible impact on these species.

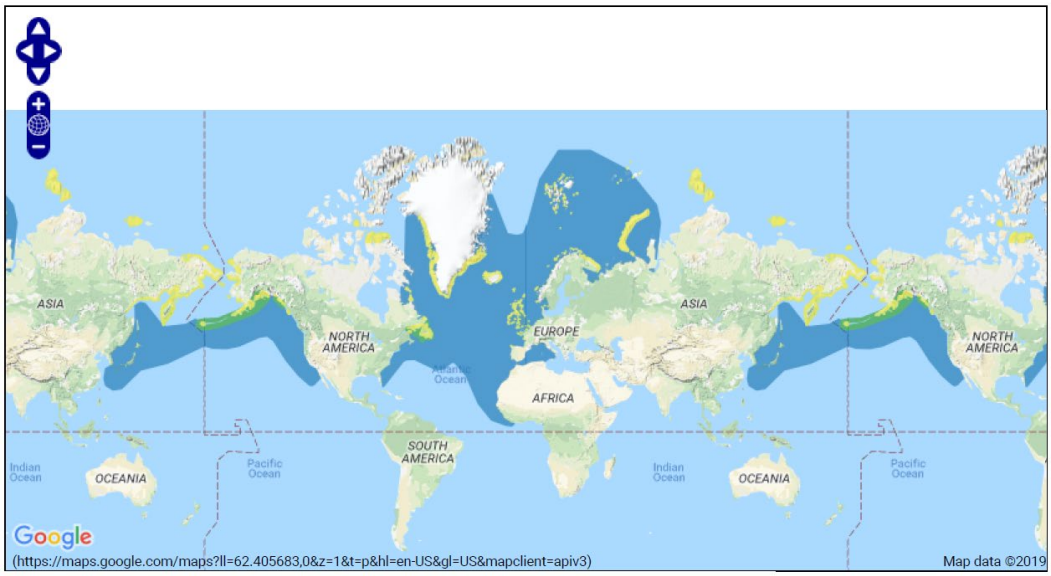

Figure 11 The range (in blue) and breeding areas (in yellow) of the black-legged kittiwake. Source: BirdLife International 2019a

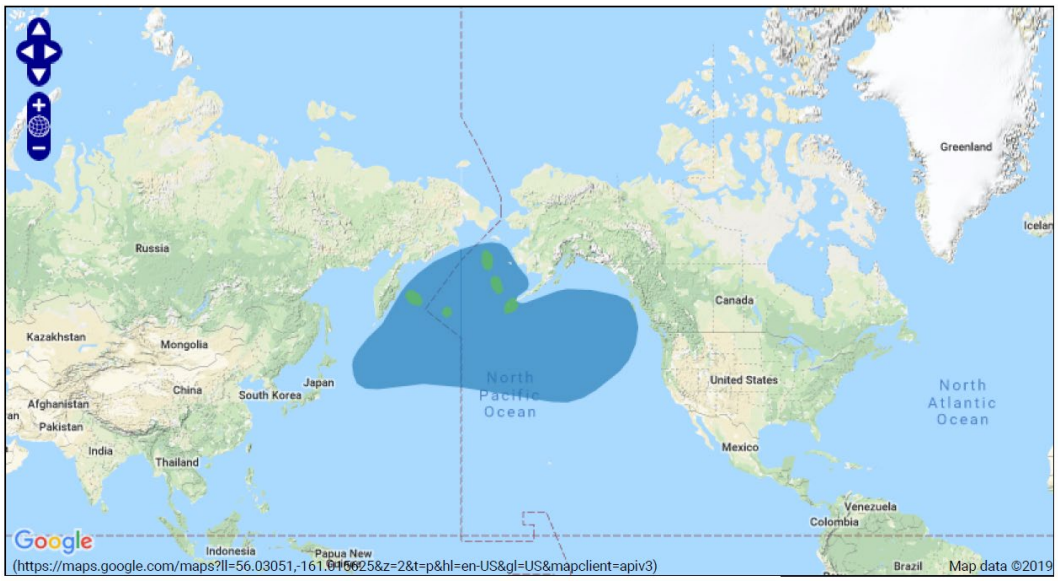

Figure 12 The range (in blue) and breeding areas (in yellow) of the red-legged kittiwake. Source: BirdLife International 2019b

Seabird management and information

NOAA Fisheries has several current regulations and measures in place to reduce and/or avoid seabird bycatch (https://www.fisheries.noaa.gov/alaska/bycatch/seabird-bycatch-alaska), though most are focused on longline gear. The regulations cover recordkeeping and reporting requirements, gear limitation, and specifications of seabird-avoidance gear for vessels based on the season, gear and the type of gear used. Requirements of vessels to report seabirds incidentally taken to the Observer Program are also outlined in the regulations.

Cumulative impacts

The MSC Fisheries Certification Requirements (MSC 2014) require consideration of the cumulative impact on ETP species. That is, where there are national and/or international limits for ETP species, the combined effects of the MSC UoAs on the population/stock are considered.

Habitats

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 (NPFMC 2018, 2019). In 2005, NOAA published the Final EIS for EFH in Alaska which identified EFH for fisheries managed by the NPFMC, recommending an approach to identify Habitat Area of Particular Concern (HAPC) and specifying an objective to minimize to the extent practicable, the possible adverse effects of fishing on EFH (NOAA 2005). As a result, all FMPs now include a description and identification of EFH, adverse impacts, and actions to conserve and enhance habitat. 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 five years, coinciding with the EFH five-year review or may be initiated at any time by the NPFMC. Current HAPCs in BSAI and GOA are mapped here: https://alaskafisheries.noaa.gov/sites/default/files/hapc_ak.pdf.

For the purposes of an MSC assessment, the main habitats are those that are commonly encountered and the vulnerable marine ecosystems (VMEs). The commonly encountered habitats in the BSAI and GOA areas vary from deep, rocky bottoms to shallow rises or banks. With regard to VMEs, NMFS and the NPFMC have designated EFHs and HAPCs within the UoAs' fishing areas.

The following HAPCs have been designated in the BSAI management area: 1) Bowers Ridge Habitat Conservation Zone (Bowers Ridge and Ulm Plateau; bottom contact gear prohibited), 2) Alaska Seamount Habitat Protection Area (Bowers Seamount, mobile bottom contact gear prohibited), 3) skate egg concentration areas, and 4) four areas designated as the Aleutian Islands Coral Habitat Protection Areas where no contact with the bottom is permitted. Details of these areas are provided on the NPFMC website (http://www.npfmc.org/habitat-protections/habitat-areas-of-particular-concern-hapc/) and the BSAI FMP (NPFMC 2014). NOAA's Deep-Sea Coral Research and Technology Program is 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.

In 2010, NMFS conducted a five-year review of EHF (https://alaskafisheries.noaa.gov/habitat/efh-review). The 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). In 2015, NMFS and the NPFMC initiated another five-year review, which will utilize improved modeling techniques to understand and quantify better the fisheries' impacts to EFH (Simpson et al. 2017). In April 2016, the SSC recommended that new methods and criteria be developed to evaluate whether the effects of fishing on EFH are more than minimal and not temporary. Criteria were developed by NMFS and reviewed by the Council and its advisory committees in 2016, and the stock assessment authors in 2017. In April 2017, based on the analysis with the FE model, the Council concurred with the Plan Team consensus that the effects of fishing on EFH do not currently meet the threshold of more than minimal and not temporary, and mitigation action was not needed at this time. While these analyses found no indication that continued fishing activities at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term, the Council acknowledges that scientific uncertainty remains regarding the consequences of habitat alteration for the sustained productivity of managed species. Consequently, the Council has adopted, and NMFS has implemented management measures designed to reduce adverse impacts to habitat and a program of continued research to better understand long-term effects (Sigler et al. 2017).

Bering Sea

The eastern Bering Sea (EBS) sediments are a mixture of mud (clay and silt), sand, and gravel. Sand and silt are the primary components over most of the seafloor, with sand predominating in waters <60 m deep. The proportions of finer-grade sediments increase with increasing depth and distance from shore. This grading is particularly noticeable on the southeastern Bering Sea continental shelf in Bristol Bay and immediately westward. Generally, nearshore sediments in the east and southeast on the inner shelf (0 to 50 m depth) are sandy gravel and gravelly sand. These give way to plain sand farther offshore and west. On the middle shelf (50 to 100 m), sand gives way to muddy sand and sandy mud, which continues over much of the outer shelf (100 to 200 m) to the start of the continental slope. Sediments on the central and northeastern shelf (including Norton Sound) are not as extensively mapped, and although sand appears dominant, there are concentrations of silt both in shallow nearshore waters and in deep areas near the shelf slope due to the large input of fluvial silt from the Yukon River and northerly current. Recently, the Eastern Bering Sea sediment database has been assembled to provide a consistent and comprehensive resource for research on seafloor habitats of the EBS shelf and the best current description of fine-scale habitats in the ecosystem (Richwine et al. 2018).

Habitat Management - In June 2007, the NPFMC adopted precautionary measures to conserve benthic fish habitat in the Bering Sea by "freezing the footprint" of bottom trawling by limiting trawl effort only to those areas more recently trawled. Implemented in 2008, the measures prohibit bottom trawling in a deep slope and basin area (47,000 nm^2) and three habitat conservation areas around St. Matthew Island, St. Lawrence Island, and an area encompassing Nunivak Island-Etolin Strait-Kuskokwim Bay. In 2008, the Council also established the Northern Bering Sea Research Area that includes the shelf waters to the north of St. Matthew Island (85,000 nm^2) and is closed to bottom trawling (Figure 13).

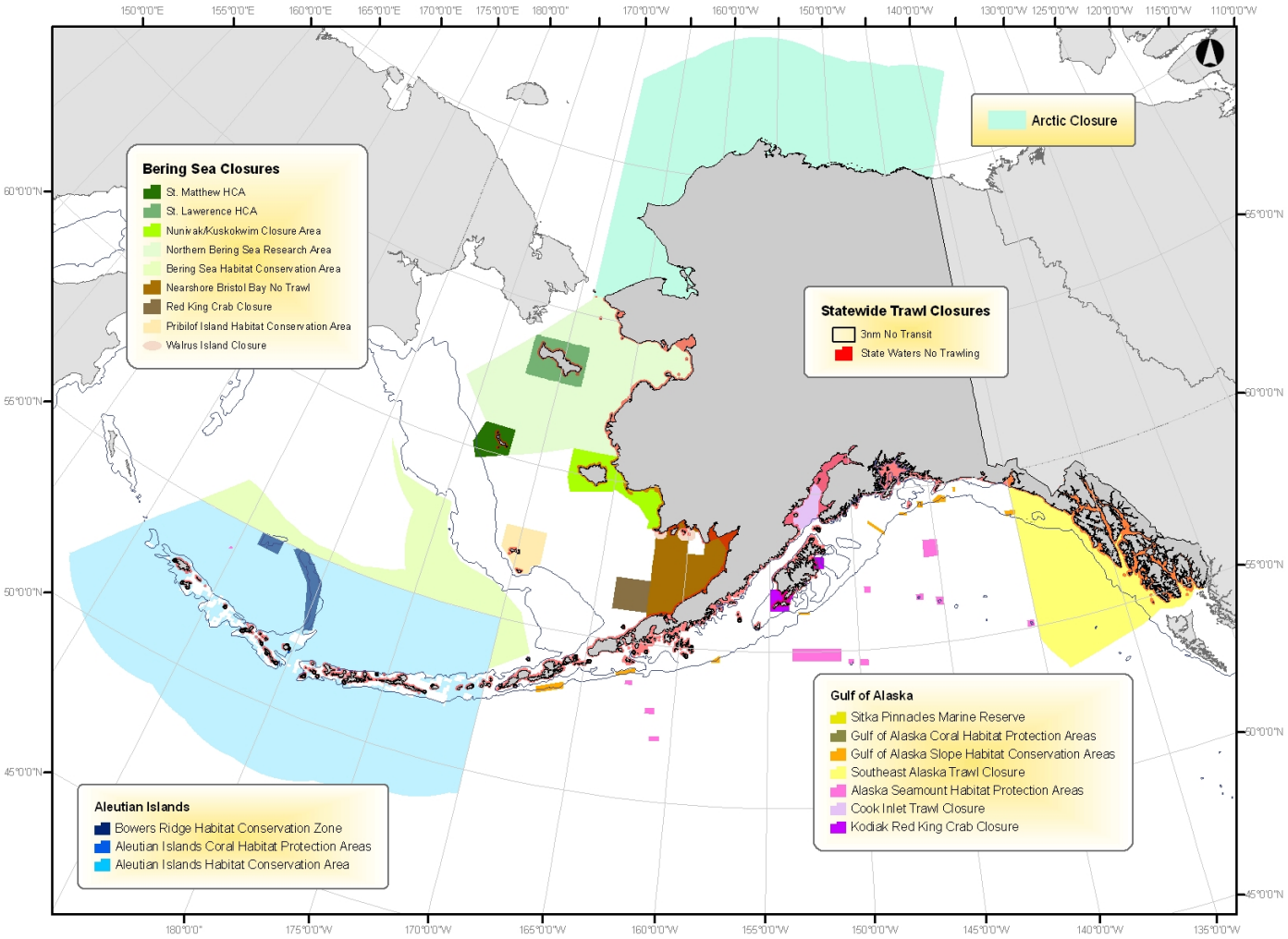

Figure 13 Closed areas in the BSAI and GOA (from https://www.npfmc.org/habitat-protections/).

In 2006/2007, the NPFMC requested information from the AFSC on the Pribilof, Pervenets, and Zhemchug canyons for consideration as HAPC designation. The NPFMC postponed taking action at that time, as scientific information was not available to establish the dependence of managed species on habitat features of the canyons, under the EFH mandate. The NPFMC has received proposals to preserve the Pribilof and Zhemchug canyons as candidates for management measures to provide EFH protection for deep-sea corals, sponges, and other benthic habitat important to FMP-managed species.

In 2013, the NPFMC reviewed new information from the Alaska Fisheries Science Center and a discussion paper prepared by NPFMC staff. The NPFMC has adopted a Bering Sea Canyons motion to evaluate further whether and how to protect deep-sea coral in the Pribilof Canyon (http://www.npfmc.org/bering-sea-canyons/). The April 2014 motion acknowledged the need to determine whether and how the NPFMC should recommend amendment of the BSAI Groundfish and Crab FMPs to protect known, significant concentrations of deep-sea corals in the Pribilof Canyon and the adjacent slope from fishing impacts under the appropriate authorities of the Magnuson-Stevens Act. Consistent with the NPFMC's adopted policy for incorporating the ecosystem approach to fisheries management and the authorities of the Magnuson-Stevens Act, the NPFMC initiated action to investigate where and how to protect coral in these areas.

According to an October 2015 motion, "scientific evidence does not suggest there is a risk to the deep-sea corals

present in the Pribilof and Zhemchug canyons and adjacent slope areas under current management. This conclusion is based on both the coral abundance model developed by NMFS and the recent stereo camera survey. The evidence shows low occurrence and density of deep- sea corals, lack of substrate to support corals, and low vulnerability of existing deep-sea corals in these areas to fishery impacts." This motion was issued following the review of survey data presented in Rooper et al. (2015).

The most recent 5-year review of Essential Fish Habitat (EFH) took place in 2016 using a new Fishing Effects (FE) model to assess the impacts of fishing activities on EFH. This model replaces the previously used Long-term Effects Index model. Using this new model for the period 2003 to 2016 provided estimates of between 3.0% and 6.7% of flatfish EFH impacted by flatfish fisheries in the BS (http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/EFH/EFH_FE_output_BS_locked.xlsx). In April 2017, based on the analysis with the FE model, the Council concurred with the Plan Team consensus that the effects of fishing on EFH do not currently meet the threshold of more than minimal and not temporary, and mitigation action is not needed at this time (NMFS 2017).

Aleutian Islands

The Aleutian Islands are the tip of a submerged volcanic mountain chain that stretches over 1,600 km forming a partial geographic barrier to the exchange of northern Pacific marine waters with eastern Bering Sea waters. The Aleutian Islands continental shelf is narrow compared with the eastern Bering Sea shelf, ranging in width on the north and south sides of the islands from about 4 km or less to 42 to 46 km; the shelf broadens in the eastern portion of the Aleutian Islands arc. Bathymetry changes dramatically over short distance, from the depths of the Aleutian Trench (greater than 7,000 m deep) to sea level. Unlike the soft bottom sediments of the Bering Sea, bottom habitats are highly complex, with primarily rough, rocky bottom (rock, boulders, and corals) steep slopes and drop-offs, and few areas of fine sediments. Two distinct bottom-type zones are evident. East of Samalga Pass, the Aleutian Islands rise from shallow continental shelf covered by glacial deposits, whereas west of Samalga, steep rocky slopes to the north and south surround a mostly submerged mountain range resting on the Aleutian ridge.

Zimmerman et al. (2018) recently analyzed 2.1 million bathymetric soundings and 25,000 verbal surficial sediment descriptions to provide the largest single source of bathymetry and sediment information over 1,900 km of the Aleutian Islands. Although Aleutian hydrographic survey coverage can be accepted as adequate, it is still sparse. There is a significant gap in hydrographic survey data in the central Aleutians surrounding part of Atka Island, most of Amlia Island, and western Seguam Pass (Zimmerman et al. 2018).

In February 2005, the NPFMC adopted several new closure areas to conserve EFH. To minimize the effects of fishing on EFH and more specifically to address concerns about the impacts of bottom trawling on benthic habitat (particularly on coral communities) in the Aleutian Islands, the NPFMC took action to prohibit all bottom trawling in the Aleutian Islands, except in small discrete "open" areas. Over 95% of the management area is closed to bottom trawling (277,100 nm^2). Additionally, six Habitat Conservation Zones with especially high-density coral and sponge habitat were closed to all bottom-contact fishing gear (longlines, pots, trawls). These "coral garden" areas, which total 110 nm^2, are essentially marine reserves. To improve monitoring and enforcement of the Aleutian Island closures, a vessel monitoring system is required for all fishing vessels in the Aleutian Islands management area.

Additionally, the NPFMC adopted several new HAPCs. The Alaska Seamount Habitat Protection Area encompasses all 16 seamounts in federal waters off Alaska, named on NOAA charts, of which one occurs in the Aleutian Islands (Bowers). Bottom-contact fishing is prohibited in this HAPC. The Aleutian Islands Coral Habitat Protection Area designates six areas where submersible observations of high-density coral have been made. All bottom-contact gear (longlines, trawls, pots, dinglebar gear) is prohibited in these areas. Additionally, the relatively unexplored Bowers Ridge is also identified as a HAPC. As a precautionary measure, the NPFMC prohibited mobile fishing gear that contacts the bottom within this 5,286 nm^2 area.

The reduction in Pacific cod habitat during the period January 2003 – November 2016 averaged 1.9%, with a range of 1.2% – 2.7%. The most recent value (1.4%) is close to the minimum for the time series. It may therefore be concluded that less than 10% of the core essential habitat is affected by commercial fishing for Pacific cod.

GOA

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 (148° W) and Cape Fairweather (138° 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.

In February 2005, bottom trawling for all groundfish species was prohibited in 10 designated areas along the continental shelf of the GOA. The GOA Slope Habitat Conservation Areas, which are thought to contain high relief bottom and coral communities, total 2,086 nm^2. Additionally, the NPFMC adopted several new HAPCs. The Alaska Seamount Habitat Protection Area encompasses all 16 seamounts in federal waters off Alaska, named on NOAA charts, 15 of which are in the GOA (Brown, Chirkikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, and Welker). Bottom-contact fishing is prohibited in all of these HAPCs, an area which totals 5,329 nm^2.

In Southeast Alaska, three sites with large aggregations (“thickets”) of long-lived Primnoa coral are also identified as HAPCs. These sites in the vicinity of Cape Ommaney and Fairweather grounds total 67 nm^2. The GOA Coral Habitat Protection Area designates five zones within these sites where submersible observations have been made, totaling 13.5 nm^2. All bottom-contact gear (longlines, trawls, pots, dinglebar gear, etc.) is prohibited in this area. Refer to Figure 13.

The habitat reduction within the GOA Pacific Cod core essential area of cod habitat is shown in Figure 14. Fishing impacts on GOA Pacific cod are generally <2% habitat reduction. Although the overall picture is one of low impact on habitat, there are small localized areas of higher habitat reduction (>25%) corresponding to fishing grounds surrounding Kodiak Island and in the Shumagin Islands. The most intense loss of habitat appears to be the fishing grounds found in Barnabus and Chiniak gullies and a longer but less intense stretch in the southern and central Shelikof Strait. Overall impacts in the GOA Pacific cod core EFH area are low. The average percent habitat reduction for the GOA between January 2003 and September 2016 was 1.8%, with a maximum of 2.2% in April and May 2010.

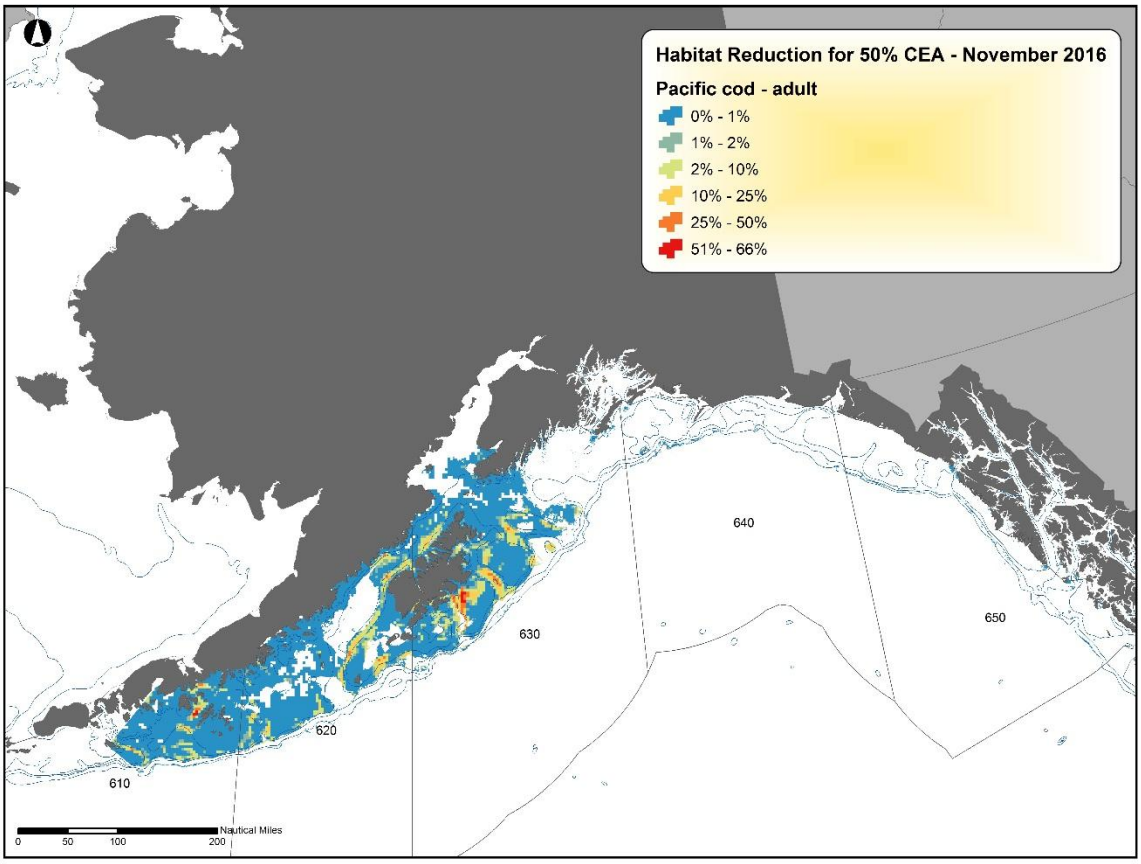

Figure 14 Cumulative habitat reduction for November 2016 in the Gulf of Alaska Pacific cod core essential area.

The following HAPCs have been designated in the BSAI management area: 1) Bowers Ridge Habitat Conservation Zone (Bowers Ridge and Ulm Plateau; bottom contact gear prohibited), 2) Alaska Seamount Habitat Protection Area (Bowers Seamount, mobile bottom contact gear prohibited), 3) skate egg concentration areas, and 4) four areas designated as the Aleutian Islands Coral Habitat Protection Areas where no contact with the bottom is permitted. Details of these areas are provided on the NPFMC website (http://www.npfmc.org/habitat-protections/habitat-areas-of-particular-concern-hapc/) and the BSAI FMP (NPFMC 2018). NOAA's Deep-Sea Coral Research and Technology Program is 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.

Habitat recovery

"Various studies (e.g., Collie et al. 2000, Hiddink et al. 2006, Kaiser et al. 2006) show that recovery rates are slowest within stable, muddy or structurally complex habitats when compared to sandy sediment communities that show little change after two to three bottom trawl passes a year. Less abundant, more vulnerable long-lived species are likely to recover more slowly. It can take an organism anywhere from a few months to many decades to recover (Kaiser et al. 2006, Hill et al. 2011).

Cumulative habitat management

The MSC Fisheries Certification Requirements (MSC 2014) require cumulative management of VMEs. That is, these UoAs need to consider what other MSC UoAs as well as non-MSC fisheries have done to protect VMEs. These UoAs need to comply with its management requirements as well as protection measures put in place by other MSC UoAs/non-MSC fisheries. Since the other MSC UoAs and non-MSC fisheries are all under the same management as these UoAs, it is assumed that they are all following the closed area requirements. However, once more information is collected, this topic will be revisited.

Ecosystem

The NPFMC has been committed to the development and implementation of ecosystem-based management (EBM) for some time. The principles and goals of EBM are described in the BSAI FMP (NPFMC 2018) and the GOA FMP (NPFMC 2019). The NPFMC Ecosystem Committee provides advice to the NPFMC on ecosystem issues in the North Pacific in the light of national ecosystem discussions and suggests new ways for the NPFMC to engage in EBM. The current status and objectives of the NPFMC EBM are described at http://www.npfmc.org/wp-content/PDFdocuments/membership/EcosystemCommittee/EBFMstatus.pdf. The NPFMC has developed an Aleutian Islands Fishery Ecosystem Plan (http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/AIFEP/AIFEP12_07.pdf). The Plan is a strategic policy and planning document intended to be an educational tool and resource that can provide the NPFMC with both an "early warning system" and an ecosystem context for fishery management decisions affecting the Aleutian Islands area.

The NPFMC has initiated the development of a Bering Sea Fishery Ecosystem Plan (http://www.npfmc.org/bsfep/) to provide a synthesis of ecosystem information relevant to fisheries and help managers consider the ecosystem perspective in fishery decision making. In 2006, the NPFMC signed a Memorandum of Understanding with 10 federal agencies and four state agencies to create the Alaska Marine Ecosystem Forum (AMEF) (http://www.npfmc.org/alaska-marine-ecosystem-forum/). The AMEF seeks to improve coordination and cooperative understanding between the agencies on issues of shared responsibilities related to the marine ecosystems off Alaska's coast. There is no known plan for a GOA Fishery Ecosystem Plan.

Table 30 Scoring elements

UoAs	Component	Scoring elements	Designation	Data-deficient
BSAI	Primary	None		
GOA	Primary	None		
BSAI	Secondary	Northern fulmar	Main	No
BSAI and GOA	ETP	Bairdi tanner crab	Main	No
BSAI and GOA	ETP	Chinook salmon	Main	No

BSAI and GOA	ETP	Golden king crab	Main	No
BSAI and GOA	ETP	Herring	Main	No
BSAI and GOA	ETP	Non-chinook salmon	Main	No
BSAI and GOA	ETP	Opilio tanner crab	Main	No
BSAI and GOA	ETP	Pacific halibut	Main	No
BSAI	ETP	Red king crab	Main	No
BSAI and GOA	ETP	Dall's porpoise (Alaska)	Main	No
BSAI	ETP	Harbor seal (Alaska)	Main	No
BSAI	ETP	Northern fur seal (eastern Pacific)	Main	No
BSAI and GOA	ETP	Steller sea lion (western US)	Main	No
BSAI and GOA	ETP	Short-tailed albatross	Main	No
BSAI and GOA	Habitat	Rocky bottom	Main (commonly encountered)	No
BSAI and GOA	Habitat	Muddy bottom	Main (commonly encountered)	No
BSAI and GOA	Habitat	Sandy bottom	Main (commonly encountered)	No
BSAI and GOA	Habitat	Gravelly bottom	Main (commonly encountered)	No
BSAI and GOA	Habitat	Corals	Main (VME)	No
BSAI	Habitat	Sea pens and whips	Main (VME)	No
BSAI and GOA	Habitat	Sponges	Main (VME)	No
BSAI	Ecosystem	BSAI	Main	No
GOA	Ecosystem	GOA	Main	No

7.3.2 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	**All UoAs – Yes**	**All UoAs – Yes**	**BSAI trawl – Yes** **BSAI longline – No** **BSAI pot – Yes** **BSAI jig – Yes** **GOA All UoAs - Yes**
Rationale				

BSAI trawl - There are no main species, thus the SG100 is met.
BSAI longline - Other skates are a main species group in this fishery. This is a complex of species with a combined ABC for the BSAI of about 39,000 t in 2018 (Ormseth 2018). The catch from longline fishery has been rather steady over the past five years at an average of about 23,400 t. It is highly likely that the complex is above PRI. Individual species within the group are not assessed. Therefore, it is not possible to have a high degree of confidence the species are above PRI and are fluctuating around a level consistent with MSY. There are no main species for the AI longline. The SG100 is not met.
BSAI pot - There are no main species, thus the SG100 is met.
BS jig - There are no main species, thus the SG100 is met.

GOA trawl - There are no main species, thus the SG100 is met.
GOA longline – Other skates are a main species in the UoA. Several species in the genus Bathyraja are managed as a group. The ABC for this group in 2018 was 1919 t, and the complex is not overfished (Ormseth 2017). Nevertheless, as individual species are not assessed it is not possible to state with high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY. SG80 is met, but the SG 100 is not.
GOA pot - There are no main species, thus the SG100 is met.

b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is

				evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
	Met?			**BSAI trawl – No** **BSAI longline – No** **BSAI pot – No** **BSAI jig – Yes** **GOA trawl – Yes** **GOA longline – No** **GOA pot – No** **GOA jig - Yes**

Rationale

The status of minor species with respect to the likelihood of being above PRI is indicated in Table 31 where the average catch of minor species is compared to the ABC for each species or species group. Where individual species are not assessed separately the SG100 level is not met.

Table 31 Average catch from all gears compared to the ABC for the stock or stock complex.
Source: https://www.fisheries.noaa.gov/alaska/population-assessments/2018-north-pacific-groundfish-stock-assessments#bering-sea-and-aleutian-islands-stock-assessments

Area	Minor species	5-yr Avg catch all gears (t)	ABC (t)	Overfished
BS/AI	Yellowfin sole (BSAI)	2592	277,000	no
	Rock sole (BSAI)	1673	143,000	no
	Flathead sole (BSAI)	625	66,773	no
	Pollock (BSAI)	9,977	2,163,000	no
	Arrowtooth flounder (BSAI)	868	65,932	no
	Alaska plaice (BSAI)	271	34,590	no
	Bigmouth sculpin	323	34,367	
	Great sculpin (BSAI)	475	49,319	
	Yellow Irish lord (BSAI)	343	34328	
	Octopus, complex (BSAI)	351	2,589	
	Atka Mackerel (BSAI)	203	92000	no
	Kamchatka flounder (BSAI)	74	8,800	no
	Rock sole (BSAI)	1673	143,199	no
	Northern rockfish (BSAI)	60	12,947	no
	Pacific Ocean perch (BSAI)	27	42,735	no
	Skates, other			
GOA	Arrowtooth flounder	896	150,945	no
	Atka mackerel	81	4,700	
	Sablefish	75	11,849	no
	Pacific Ocean perch	143	29,236	no
	Pollock	877	161,492	no
	Big skate	649	5,086	no
	Longnose skate	367	4,274	no
	Flathead sole	244	35,266	no
	Rock sole	757	16,802 N	no
			21,424 S	no
	Northern rockfish	54	3,685	no
	Spiny dogfish	174	4,087	no
	Yellow Irish lord	257	3180	
	Octopus, complex	636	4,878	no
	Other large sculpins	308	5,591	no
	Great sculpin	108	1484	

BS trawl – 8 of the 9 minor species (yellowfin sole, rock sole, flathead sole, Arrowtooth flounder, Alaska plaice, pollock, and Yellow Irish lord, Great sculpin) catches are a small fraction of the recommend ABC indicating that they are highly likely to be above PRI. This cannot be said for Starry Flounder. Other skates are managed as a species complex and therefore conclusion regarding individual species are not possible. AI trawl – there are 9 minor species or species complexes. All but the other large skate complex meets that 100 level as catches are low relative to the recommended ABCs. As 8 (9 in the AI) of the 10 minor species or groups met the 100 level, a score of 90 is awarded.

BS longline – 8 of 9 minor species (Arrowtooth flounder, flathead flounder, yellowfin sole, pollock, Alaska skate, Yellow Irish lord, bigmouth sculpin, great sculpin) catches are a small fraction of the recommend ABC indicating that they are highly likely to be above PRI. The ninth minor species, other large sculpins are managed as a complex and therefore conclusions about individual species are not possible. In the AI, there are 12 species or species complexes. The seven species (Alaska skate, Atka mackerel, Arrowtooth flounder, pollock, Kamchatka flounder, yellow Irish Lord) all meet the SG100 level. This cannot be said for rougheye, northern, dusky and shortraker rockfish and for other rockfish and the octopus complex. Overall, a score of 90 is awarded for the BSAI longline.
BSAI pot – there are five minor species or groups. The SG100 level is met for yellowfin sole, yellow Irish lord, and great sculpin, but not for other large sculpins and the octopus complex. Therefore, a score of 90 is given.
BSAI jig – no minor species, SG100 met.

GOA trawl – there are 19 minor species (see Table 28). In 14 of these, catches are a small fraction of the recommend ABC indicating that they are highly likely to be above PRI. This cannot be said for the octopus and other skate complexes or for butter sole, dusky sole, starry sole. Therefore, a score of 95 is given.
GOA longline – there are 19 minor species and two species complexes – octopus and other large sculpins. Eleven of the 19 met the 100 level as catches of these species are small relative to the recommended ABC. Therefore, a score of 90 is given.
GOA pot – there are five minor species or groups. The catches of pollock, yellow Irish lord and great sculpin are a small fraction of the recommend ABC indicating that they are highly likely to be above PRI. This cannot be said for the octopus and other large sculpin complexes. A score of 90 is given.
GOA jig – pollock is the only minor species. Catches are a small fraction of the recommend ABC indicating that they are highly likely to be above PRI. Therefore, a score of 100 is given.

References

https://www.fisheries.noaa.gov/alaska/population-assessments/2017-north-pacific-groundfish-stock-assessments#gulf-of-alaska-stock-assessments

Ormseth, O. A. 2018; Ormseth, O. A. 2017

Spies, I., D. Nichol, K, Aydin, T.T. TenBrink. 2017

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI Trawl – 90** **BSAI Longline – 90** **BSAI Pot – 90** **BSAI Jig – 100** **GOA Trawl – 95** **GOA Longline – 90** **GOA Pot – 90** **GOA Jig - 100**
Condition number (if relevant)	**N/A**

PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
All primary species or species complexes >0.05% of the Pacific cod catch are assessed. Estimated Overfishing Levels and Acceptable Biological Catch levels for these species and complexes are reviewed annually or for some complexes biennially. These measures are expected to maintain main primary species at levels which are highly likely to be within biologically based limits. FMPs have been developed for each species or species complex that constitutes a strategy for managing main retained species. The SG60 and SG80 are met. The SG100 is not met as some primary species are not assessed individually.

b	Management strategy evaluation			
	Guide post	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 measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
Catch limits specified within FMPs are considered likely to work based on extensive experience with such limits in the BSAI, GOA and elsewhere. Annual estimates of the catch composition of primary species from the Observer Program demonstrate that there is an objective basis for confidence that the partial strategy will work. As in previous years, 100% of the Pacific cod catches taken by motherships and catcher processors using longline, trawl, and pot were observed in the BSAI in 2017 (Mary Furuness, NMFS Alaska Regional Office, Catch Accounting System, 2018). The catch of the jig fishery is small and therefore does not require observers. In the GOA, for catcher vessels using longline, trawl, and pot gear, 9%, 55%, and 6% of the catches, respectively, were observed in 2017. As trawl and pot gears accounted for 90.8 and 8.6% of the catcher vessel catches, respectively, these observer levels are sufficient to provide an objective basis for confidence that the management strategy will work. Application of the control rules tested in other BSAI and GOA fisheries supports high confidence that the strategy will work. The SG60, SG80 and SG100 levels are met.

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is**

				achieving its overall objective as set out in scoring issue (a).
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs –Yes** **GOA UoAs –Yes**
Rationale				

All UoAs
Application of annual catch limits and accountability measures by the NMFS and the NPFMC as required under the Magnuson-Stevens Act provide evidence of successful implementation of the strategy. There has been an overall decline and continued reduction in the levels of primary species catch in the Pacific cod fishery providing evidence that the partial strategy and the full strategy is being implemented successfully. The SG80 and SG100 levels are met.

	Shark finning			
d	Guide post	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?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
Shark finning in the United States has been prohibited since 2000. "The Shark Finning Prohibition Act of 2000 amended the Magnuson-Stevens Act to prohibit any person under U.S. jurisdiction from engaging in the finning of sharks, possessing shark fins aboard a fishing vessel without the corresponding carcass, and landing shark fins without the corresponding carcass. On January 4, 2011, the Shark Conservation Act of 2010 was signed into law, amending the High Seas Driftnet Fishing Moratorium Protection Act and the Magnuson-Stevens Act. The Shark Conservation Act required that all sharks in the United States, with one exception, be brought to shore with their fins naturally attached." Few (mainly salmon sharks) to no sharks were taken in the UoAs over the past 5 years. Observer coverage is generally high, and no shark finning has been reported. Therefore, there is a high degree of certainty that shark finning is not taking place. The SG100 is met.

	Review of alternative measures			
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
The species composition and level of bycatch in all managed fisheries is reviewed annually though the Observer Program data and individual stocks assessments. This provides a means for regular review of the effectiveness of measures to minimize UoA-related mortality. The SG60 and SG80 are met. There is annual review of potential effectiveness and practicality of alternative measures to minimize UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate. Therefore, the SG100 is met.

References

Ianelli, J.N., S. Kotwicki, T. Honkalehto, A. McCarthy, S. Stienessen, K. Holsman, E. Siddon, and B. Fissel. 2018. NMFS 2018

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 95** **GOA UoAs – 95**
Condition number (if relevant)	**N/A**

2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
Qualitative and quantitative information from the Observer Program on the main primary species in the Pacific cod fisheries are collected and analyzed annually. Landings records provide further quantitative information on the amount of main species taken in the fisheries. All components of the cod fishery excepting the very small jig fishery is observed. As in previous years, 100% of the Pacific cod catches taken by motherships and catcher processors using longline, trawl, and pot were observed in the BSAI in 2017 (Mary Furuness, NMFS Alaska Regional Office, Catch Accounting System, 2018). In the GOA, for catcher vessels using longline, trawl, and pot gear, 9%, 55%, and 6% of the catches, respectively, were observed in 2017. As trawl and pot gears accounted for 90.8 and 8.6% of the catcher vessel catches, respectively, these observer levels are sufficient to provide an quantitative basis for confidence as to the impact of the fishery on main primary species status.The SG60 and SG80 levels are met. Some of the primary 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. Therefore, the SG100 level is not completely met.

b	Information adequacy for assessment of impact on minor primary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
Although many primary species are represented in the bycatch of Pacific cod UoAs, most are minor species. Many of these occur at trace levels (< 0.05%) of the total catch. Impact on all primary species is known (i.e., the catch data lists all species caught and the number/weight of each). There is quantitative information to estimate the impact of the UoA on minor primary single species with respect to status, but not for individual species within species complexes such as octopus, sculpins and skates.

For the BSAI UoAs there are about 19 minor primary species including 4 species complexes for which individual ABCs are not available against which to judge PRI. Thus in 15 of the 19 annual ABCs are estimated against which to judge species status. As species complexes do not report individual species the 100 level is not met.

The UoAs in the GOA also take some 19 minor primary species including three complexes (other flatfish, octopus and other skates). Therefore, in 16 of the 19 cases annual ABCs are estimated against which to judge species status. As species complexes do not report individual species the 100 level is not met.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**

Rationale

All UoAs

Information on the biomass and species composition of the catch from the Observer Program is adequate to support measures to manage main primary species (see 2.3.2a above). Combined with resource surveys, annual stock assessments, and conservation measures listed in the FMP, these data support a partial strategy to manage main primary species. The SG60 and SG80 levels are met. As noted above in 2.3.2b, the SG100 level is not completely met, as not all species in the bycatch have individually determined limits with which to assess outcome status.

References

Ianelli, J.N., S. Kotwicki, T. Honkalehto, A. McCarthy, S. Stienessen, K. Holsman, E. Siddon, and B. Fissel. 2018. https://www.fisheries.noaa.gov/webdam/download/87442184

NMFS 2018

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs: 80** **GOA UoAs: 80**
Condition number (if relevant)	**N/A**

PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
	Main secondary species stock status			
a	Guide post	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

Seabirds taken by the UoAs are out-of-scope and are therefore considered as main secondary species.

BSAI trawl – Northern fulmar is the only main species occasional taken in this fishery, with an average of only 11 birds per year (Table 25).
BSAI longline – this UoA is responsible for most of the seabird bycatch (Table 25). Northern fulmars, shearwaters, and gulls are the most frequently caught. Murres and puffins are rarely taken.
BSAI pot – like the trawl fishery, this UoA takes few seabirds. Northern fulmars are the most commonly taken follow by auklets and the occasional murre.

GOA trawl – Northern fulmars and gulls are the mostly taken, followed by a few shearwaters and cormorants (Table 25).
GOA longline – Although a larger diversity of seabirds is taken by the UoA, relatively few birds are taken. Gulls and Northern fulmars are the most common bycatch, but less the 30 birds are taken from each annually.
GOA pot – An average of 45 Norther fulmars are taken by the UoA, followed by a handful of other species.

Except for Northern fulmar, small numbers of birds are taken each year by the UoAs. When compared to estimates of the total population size in Alaska of 2.6-4.2 million pairs or about 6 million birds (Birdlife International 2019), the UoAs fishery account for an annual mortality of << 0.1%". Therefore, the impact of all UoAs on the Northern fulmars is negligible. The bycatch of gulls is not separately into species, but the number are generally small. Given the level of bycatch gulls are highly likely to be above biological limits. After the Northern Fulmar, shearwaters are the most frequently bycatch group. Several species overlap the distribution of the UoAs – the sooty shearwater (over 8,000,000), short-tailed (listed as extremely large) and pink footed (~60,000). Given the size of these population relative to the level of bycatch by these UoAs, main secondary species are highly likely to be above biologically based

limits. The bycatch of other seabird groups is typically less than several dozen birds per year. Therefore, the team concludes that these groups are highly likely to be above biologically based limits. Thus, the SG60 and 80 are met for all UoAs. Although the bycatches are low, many of the birds taken are not currently reported to the species level. Thus, it cannot be concluded that there is a high degree of certainty that main secondary species are above biologically based limits. The SG100 is not met.

	Minor secondary species stock status			
b	Guide post			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			**BSAI UoAs – Yes** **GOA UoAs – Yes**

Rationale

All UoAs
Most secondary species are taken at trace levels in the UoAs. In the BS trawl fishery Scyphozoan jellyfish are the only minor secondary species, whereas in the longline fishery, sea stars, sea anemones, and benthic urochodata are minor secondary species and in the pot fishery, sea stars once again are minor species. There are no minor species in the AI trawl fishery, and in the AI longline and pot fisheries, sea stars and Scyphozoan jellyfish are the only secondary minor species. In the GOA UoAs, Giant grenadier, sea stars and snails are minor secondary species. Grenadiers are assessed as a group of species. The most recent assessment indicated an ABC of 75,274 t in 2016 for the GOA. Given that the catch of Giant Grenadier has average only 18 t and that none have been reported caught in the past several years, it seems highly likely that the species is above biologically based limits. Therefore, a score of 100 is given. Trends in relative abundance of motile epifauna (e.eg., sea stars, brittle stars, snails and other echinoderms) and Scyphozoan jellyfish are regularly monitored in trawl surveys and reported in the Ecosystem SAFE reports (Siddon and Zador 2018). In the BS, the relative abundance of sea stars, an indicator group, have fluctuated without trend since the early 1990s. Structural epifauna (including anemones) and Scyphozoan jellies have varied without trend since 2011. Similar time series of relative abundance of these groups is evident in the AI and GOA as well (Zador and Ortiz 2018, Zador and Yasumiishi 2018). These relative abundance data coupled with the low catches of these taxa, indicate that these minor secondary species are highly likely to be above biologically based limits. A score of 100 is given.

References

http://www.birdlife.org/worldwide/
Siddon and Zador 2018
Zador and Ortiz 2018
Zadora ns Yasumiishi 2018

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 90** **GOA UoAs – 90**
Condition number (if relevant)	**N/A**

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs

The Council has adopted measures to minimize bycatch in groundfish fisheries, including pollock, in the BSAI and the GOA (NPFMC 2018, 2019). Observer Program data make it possible to enforce bycatch quotas for the non-groundfish species. There are regulations and measures to reduce and/or avoid seabird bycatch (Ganz et al. 2017). The regulations cover recordkeeping and reporting requirements, gear limitation, and specifications of seabird-avoidance gear for vessels based on the season, gear, and the type of gear used. Requirements of vessels to report seabirds incidentally taken to the Observer Program are also outlined in the regulations. These regulations and measures can be considered a strategy for managing main and minor secondary species.
The SG60, SG80, and SG100 levels are met for all gear types.

b	Management strategy evaluation			
	Guide post	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
Catch limits specified within the FMPs are considered likely to work based on extensive experience with such limits in the BSAI, GOA and elsewhere. Annual estimates of the catch composition of secondary species bycatch from the Observer Program indicate that there is an objective basis for confidence that the partial strategy will work. Application of the bycatch reduction measures in the BSAI and GOA fisheries supports high confidence that the strategy will work. There are no overfished stocks attributed to the cod fishery and no overfishing has been identified for BSAI and GOA stocks in Alaska, providing an objective basis that the strategy works. The SG60 and SG80 are met. Seabird bycatch estimates for these UoAs show a continued low rate of bycatch (Eich et al. 2018). Therefore, it can be concluded that the measures are likely to work. SG60 and SG80 are met. Measures have been in place and are evaluated annually providing evidence that testing support high confidence that the management strategy will work based on information from the UoAs. Therefore, the SG100 is met.

c	Management strategy implementation			
	Guide		There is **some evidence** that the measures/partial strategy	There is **clear evidence** that the partial strategy/strategy is

	post		is being **implemented successfully**.	being **implemented successfully and is achieving its objective as set out in scoring issue (a).**
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
The catches of secondary species in the BSAI have declined over since 2011, while those in the GOA have been roughly stable at a low-level providing evidence that the strategy to reduce the catch of unwanted species is being successfully implemented and achieving its objective. The BSAI and GOA cod fisheries continue to be listed as a category II (BSAI longline) and III (all other areas and gear) on the NOAA List of Fisheries, indicating that for both UoAs interactions with marine mammals are occasional to remote (https://www.fisheries.noaa.gov/action/list-fisheries-2019). Seabird bycatch estimates for these UoAs show a continued low rate of bycatch (Eich et al. 2018). Taken together, it can be concluded that there is clear evidence the strategy is being successfully implemented and achieving its objective. Therefore, the SC60, SG80 and SG100 levels are met.

d	Shark finning			
	Guide post	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?	**N/A**	**N/A**	**N/A**
Rationale				

There are no secondary shark species in these UoAs; therefore, this SI is not scored.

e	Review of alternative measures to minimise mortality of unwanted catch			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
The UoAs have reviewed alternative measures to minimize unwanted catch, but not all secondary species have been considered on a biennial basis. NOAA regularly reviews mitigation measures to reduce seabird bycatch. Therefore, all UoAs meet SG60 and SG80 but not SG100.

References

Ganz, et al. 2017.

Eich, A.M., J. Roberts, and S.M. Fitzgerald. 2018

NPFMC 2018a; 2018b
NPFMC 2019

raft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 95** **GOA UoAs – 95**
Condition number (if relevant)	**N/A**

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
The NPFMC has adopted measures to minimize the bycatch of secondary species in groundfish fisheries, including Pacific cod, in the BSAI and the GOA (NPFMC 2018 and 2019). Alaska management seeks to avoid stocks going below species limit reference points, where defined. The Observer Program data provide high-quality quantitative estimates of total groundfish catch and non-groundfish bycatch by species that are counted against TACs annually (e.g., https://www.fisheries.noaa.gov/alaska/fisheries-observers/north-pacific-observer-program). The Observer Program data make it possible to enforce bycatch limits. Together, these measures constitute a strategy for managing and minimizing bycatch of main secondary species and are adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
The SG60, SG80, and SG100 levels are met for all gear types.

b	Information adequacy for assessment of impacts on minor secondary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
Information on the biomass and species composition of the catch from the Observer Program is adequate to support measures to manage minor secondary species. Combined with resource surveys, annual stock assessments, and conservation measures listed in the FMP, these data support a partial strategy to manage minor secondary species. The SG100 level is not completely met, as not all species in the bycatch are individually reported to assess outcome status. Therefore, SG100 is not met.

c	Information adequacy for management strategy

	Guide post	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
Information on the biomass and species composition of the catch from the Observer Program and resource surveys is adequate to support measures to manage main secondary species (Ganz et al. 2017). 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. The SG60 and SG80 levels are met. The SG100 level is not completely met as not all species in the bycatch catch are reported individually to assess outcome status.

References

Ganz et al. 2017; NPFMC 2018;2018b.

North Pacific Fishery Management Council 2019a.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 90** **GOA UoAs – 90**
Condition number (if relevant)	**N/A**

PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guide post	Where national and/or international requirements set limits for ETP species, the **effects of the UoA** on the population/ stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population /stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs
Under the ESA, Endangered and threatened species are protected. Federal agencies may be allowed limited takes and nonfederal individuals, agencies, or organizations may have limited take through special permits. 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.

BSAI UoAs
ETP species are Dall's porpoise, killer whale, northern elephant seal, northern fur seal, ringed seal, spotted seal, Steller sea lion, Bairdi tanner crab, chinook salmon, golden king crab, non-chinook salmon, Opilio tanner crab, Pacific halibut, Pacific herring, and red king crab.

GOA UoAs
ETP species are Dall's porpoise, harbor seal, killer whale, Steller sea lion, Bairdi tanner crab, chinook salmon, golden king crab, non-chinook salmon, Opilio tanner crab, Pacific halibut, and Pacific herring.

Marine mammals
All marine mammals have set limits (i.e., PBRs). The UoA*s are* well below each of the marine mammals' PBRs. These species all have extensive ranges – some the entire North Pacific and others even larger. Therefore, most of these species have been divided into smaller stocks or populations for management purposes. Although there can be some uncertainly as to which stock may have been impacted, the UoA*s* have extremely low rates of interaction with each of the marine mammals such that it can be said that it is a high degree of certainty that all MSC UoAs are cumulatively within national limits. Therefore, the marine mammal scoring element meets SG60, SG80 and SG100.

Fish and crustaceans

While these prohibited species have limits, not all are hard limits, so this SI covers only those species with hard limits: Bairdi tanner crab, Opilio tanner crab, Pacific halibut, Pacific herring, and red king crab. The UoAs' 2018 catches of each of these species were well below their PSC limits. Therefore, they likely have a negligible impact on these populations.

Three stocks of Chinook salmon are listed as endangered under the ESA. Few of each stock are take in Pacific cod UoAs each year (Balsiger 2018). There are no specific national limits on fishery bycatch. NMFS conducted a review in 2010 and early 2011 of 27 of the 28 currently listed Pacific salmonid ESUs/DPSs of West Coast Pacific salmon. Based on this evaluation, no change in the listing status of the three stocks migrating to Alaskan waters was recommended (Ford [ed] 2011). Given the small number of Chinook estimated to have been taken in the Pacific cod fisheries, the UoAs are highly unlikely to pose a threat to ESA-listed salmon ESUs in the Pacific Northwest.
Catches of the nine prohibited species were within limits (Table 25), where identified, except for red king crab, where 337,973 where reported in the BSAI compared to a limit of 97,000. The SI meets the SG80 level.

Seabirds
Three species of seabirds listed as threatened or endangered in the BSAI and two for the GOA (Table 25). The Short-tailed Albatross (*Phoebastria albatrus*) is a long-lived species with a low reproductive rate and is listed as endangered.

The world population is currently estimated to be about 1700 birds and is increasing. Recently, the USFWS advised that up to six Short-tailed Albatross could be reported to be taken every two years incidental to the groundfish fisheries off Alaska. This incidental take limit is in addition to the take limit established in 1998 for the Pacific halibut hook-and-line fishery off Alaska—two short-tailed albatrosses in a two year period (https://alaskafisheries.noaa.gov/node/52755). The endangered short-tailed albatross has not been taken since 2014 in a Pacific cod fishery in the BSAI and GOA (Eich et al. 2018). Therefore, the threat to the recovery of this species by Pacific cod UoAs is negligible.

In 1997, the Alaska-breeding population of Steller's eiders (*Polysticta stelleri*) was listed as threatened under the Endangered Species Act (ESA). This species is declining in abundance and is listed as Vulnerable by the IUCN. Population sizes are only imprecisely known, but about 370,000 individuals overwinter in the North Pacific. Based on Observer Program data this species appears not to interact with Pacific cod UoAs as none have been recorded by the AFSC seabird bycatch program through 2017. The threat to the recovery of this species by Pacific cod UoAs is negligible.

The breeding population of spectacled eiders (Somateria fischeri) on the Yukon-Kuskokwim (Y-K) Delta declined by over 96% between the 1970s and the 1990s. The causes of this steep decline remain unknown, but its magnitude prompted the U.S. Fish and Wildlife Service to list the species as threatened under the Endangered Species Act in 1993 (http://www.fws.gov/alaska/fisheries/endangered/species/spectacled_eider.htm). They over winter in an area south of St. Lawrence Island, but none were taken in BSAI pollock fishery during the period 2012 to 2017. Given their range they are unlikely to eb encountered in the GOA. The threat to the recovery of this species by Pacific cod UoAs is negligible.

Overall:
The UoAs' catch numbers for all of these ETP species are relatively low so SG60 is met for all scoring elements. Based on catch data from the MSC UoAs, it is highly likely that all MSC UoAs' combined effects are within these limits so SG80 is met for all scoring elements.

	Direct effects			
b	Guide post	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

BSAI UoAs
Marine mammals
Most marine mammal populations do not have long-term trend data, but since only the ringed seal and Steller sea lion are listed on the ESA and therefore needing recovery, they are the only species considered in this SI.

- Ringed seal – The current population trend is unknown; however, observer coverage show that the UoAs have little or no fatal interactions with ringed seals in recent years. When there has been an interaction, the UoAs have been well below the species' PBR.
- Steller sea lion – Data collected through 2017 show strong evidence that that the western stock population in Alaska was at its lowest in 2002 and has increased at over 2% per year between 2002 and 2017. Catch data and observer coverage show that the UoAs have little or no fatal interactions with Steller sea lions in recent years. When there has been an interaction, the UoAs have been well below the species' PBR.

Given the extremely low rates of interaction, there is a high likelihood that the direct effects of the UoAs are not hindering recovery. The marine mammal scoring element meets SG60 and SG80.

Fish and crustaceans

Three stocks of Chinook salmon are listed as endangered under the ESA. Few of each stock are take in Pacific cod UoAs each year (Balsiger 2018). There are no specific national limits on fishery bycatch. The most recent review concluded that no change in the listing status of the three stocks migrating to Alaskan waters was needed (Ford [ed] 2011). Given the small number of Chinook estimated to have been taken in the Pacific cod fisheries, the UoAs are highly unlikely to pose a threat to ESA-listed salmon ESUs in the Pacific Northwest. Thus, there is a high degree of

confidence that there are no significant detrimental direct effects of the UoAs on these ETP species, meeting the SG100 level None of the other fish or crustacean species are ESA listed, so this scoring element is not considered.

The most recent assessment of Pacific halibut indicates that the estimated female spawning biomass (SB) stabilized near 190 million pounds (~86,200 t) in 2011 and the stock is estimated to have increased gradually to 2016. It is estimated that the stock is currently at 43% of unfished levels. The probability that the stock is below the SB30% level is estimated to be 11%, with less than a 1% chance that the stock is below SB20%. The low bycatch of halibut from the UoAs coupled with the most recent stock assessment indicates a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species. A score of 100 is given.

The most recent assessments of crab stocks are found at https://www.npfmc.org/fishery-management-plan-team/bsai-crab-plan-team/#currentcrab. Opilio and Bairdi tanner crab biomasses appear to be increasing in recent years. Red and Golden crab stocks are not overfished. Therefore, there seems a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species. A score of 100 is given.

Seabirds

Most of the seabirds taken in Pacific cod fisheries in the BSAI result from interactions with demersal longline gear. Overall, the number of seabirds taken in demersal longline gear in 2017 fell back to the 2015 numbers after an increase in 2016 due to increases in the numbers of Northern fulmars and Shearwaters taken (Table 25). Relatively few seabirds were taken in 2017 in other gears. Seabird bycatch in Pacific cod fisheries in the GOA is low, as in previous years, and in 2017 was dominated by Black-footed Albatross, Northern Fulmars, and gulls (Table 25). No seabirds were recorded as bycatch on the pot fishery. There was an increase in the bycatch of Black-footed Albatross and gulls in the trawl fishery and of Northern Fulmars in the longline fishery, although in both cases the number taken were low. Relative to best estimates of population size (Table 25), there is a high degree of confidence that there are no significant detrimental direct effects of the UoA on the ETP seabirds taken. Thereforjikie, SG60, SG80 and SG100 levels are met.

	Indirect effects			
c	Guide post		Indirect effects have been considered for the UoA and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA on ETP species.
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**
Rationale				

All UoAs

Marine mammals

Indirect effects of the UoAs on most marine mammals that interacted with Pacific cod fisheries are not considered likely as Pacific cod is not a major source of food. Indirect effects of competition with the cod fishery on foraging success of the depleted Pribilof population of northern fur seals has been considered and thought to be unlikely to have unacceptable impacts, as Pacific cod is not an important prey of this species (NMFS 2007). 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). Although indirect effects are highly likely not to create unacceptable impacts meeting the SG80 level, indirect effects are difficult to measure and thus some uncertainty remains regarding indirect effect on ETP species. Therefore, the SG100 level is not met.

Fish and crustaceans

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 for all gear types. The SG100 level is not met.

Indirect effects of the UoAs are not anticipated based on the nature of the fisheries and the biology of prohibited species, nevertheless they have not been investigated explicitly and therefore the SG100 level is not met.

Seabirds

Indirect effects of the trawl fishery on short-tailed albatross has been considered (e.g., Zador and Fritzgerald 2008, Zador et al. 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). Although indirect effects have not been explicitly studied in the other ETP species, feeding on waste from the UoAs is common to all listed ETP species. By analogy, given the level of the bycatch of those species relative to population size, it can be concluded that the UoAs are highly likely to not create unacceptable impacts, thereby meeting the SG80 level. However, there remains uncertainty regarding indirect effect on ETP seabird species. Therefore, the SG100 level is not met.

Balsiger 2018
Bernard, D.D.R., Jeffries, S.J., Knapp, D.G., and Trites, D.A.W. 2011.
NMFS 2007
NMFS 2014
STEWART, I. & A. HICKS 2018
Zador, S.G., Punt, A.E. & Parrish, J.K. (2008)
Zador, S. G., and S. M. Fitzgerald. 2008.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 85** **GOA UoAs - 85**
Condition number (if relevant)	**N/A**

PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are **measures** in place that minimise the UoA-related 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 UoA'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 UoA'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?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs
There is a strategy in place to manage the UoAs' impacts on ETP species. This strategy is designed to minimize ETP species mortality by the UoAs and is highly likely to achieve national and international requirements and to ensure the UoAs do not hinder recovery. The BSAI and GOA FMPs outline how it manages interactions with ETP species and works to limit such interactions, including measures that have established conservation zones and have implemented gear restrictions and time/area closures to reduce bycatch of ETP species. The BSAI and GOA FMPs also state that the UoAs shall follow the numerous requirements laid out by the ESA and MMPA. Therefore, SG60 and SG80 are met. There arguably is a comprehensive strategy in place to limit marine mammal and short-tailed albatross bycatch below nationally set limits. There are no specific limits on other listed species, but management measures are clearly designed to reduce bycatch of those species. Therefore, the SG100 level is met.

b	Management strategy in place (alternative)			
	Guide post	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	**N/A**	**N/A**	**N/A**
Rationale				

Not applicable since there are national and international requirements in place for most ETP species. Therefore, all ETP species are assessed under SI a since either SI a or b is scored.

c	Management strategy evaluation			
	Guide post	The measures are **considered likely** to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar	There is an **objective basis for confidence** that the measures/strategy will work, based on **information** directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a **quantitative analysis** supports **high**

		fisheries/species).		**confidence** that the strategy will work.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**

Rationale

All UoAs
There is an objective basis for confidence that the strategy will work. The UoAs have had little or no bycatch of the marine mammal and ESA-listed Chinook salmon, and there is a reduced level of seabird bycatch, showing that the strategy has worked and will likely continue to work. Further, the strategy is based on information directly about the fishery and the ETP species involved. Measures, such as gear modifications and area closures, are done with the UoAs and species in mind to ensure intended bycatch minimization and/or recovery goals are met. Therefore, SG60 and SG80 are met. Furthermore, the comprehensive strategy, which is based on information directly from the fisheries, is supported by quantitative analysis of annual data generated from resource surveys and the Observer Program. Therefore, the SG100 level is met.

	Management strategy implementation			
d	Guide post		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and **is achieving its objective as set out in scoring issue (a) or (b).**
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**

Rationale

All UoAs
Overall, the UoAs continue to have minimal interaction with ETP species. There is clear evidence that the strategy to minimize mortalities of ETP marine mammal species and ESA-listed Chinook salmon is being successfully implemented based on annual reports and analysis of Observer data from the cod fishery (e.g. Muto et al. 2018, Balsiger 2018). Seabird bycatch numbers exhibit large interannual fluctuations but remain low compared to the period before bycatch reduction measures were introduced. No short-tailed albatross have been taken recently. Thus, there is clear evidence that the strategy is being implemented successfully and is achieving its objective. The SG80 and SG100 levels are met.

	Review of alternative measures to minimize mortality of ETP species			
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – No** **GOA UoAs – No**

Rationale

All UoAs
The Council has regular meetings throughout the year where they discuss management measures. Information from the Observer Program on ETP species interactions with UoAs are analysed and reported on each year. A specific biennial review is not undertaken and therefore the SG100 level is not met.

References

Balsiger 2018

Muto et al. 2018.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score**

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 95** **GOA UoAs - 95**
Condition number (if relevant)	
	N/A

PI 2.3.3 – ETP species information

PI 2.3.3		Relevant information is collected to support the management of UoA 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	Information adequacy for assessment of impacts			
	Guide post	Qualitative information is **adequate to estimate** the UoA related mortality on ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA:** Qualitative information is **adequate to estimate productivity and susceptibility** attributes for ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA:** Some quantitative information is **adequate to assess productivity and susceptibility attributes** for ETP species.	Quantitative information is available to assess with a high degree of certainty the **magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status** of ETP species.
	Met?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**
Rationale				

All UoAs

There is qualitative and quantitative information being collected annually to estimate fishery related mortality of ETP species. This information comes from annual estimates of bycatch from the Observer Program collected from the Pacific cod fisheries in the BSAI and GOA. Although the jig fishery is not observed, it is small and not expected to impact ETP species. Data on the mortalities of ETP seabirds is known to be within limits identified in recovery plans (see Seabirds). Similarly, recorded mortalities of marine mammals are rare and well below PBRs estimated in annual population assessments. ESA-listed Chinook salmon stocks rarely are taken as bycatch in Pacific cod fisheries. Therefore, along with independent estimates of population status, the Observer information is sufficient to quantitatively estimate outcome status with a high degree of certainly. The SG60, SG80, and SG100 levels are met for all gear types expected to interact with ETP species (i.e., pot, longline and trawl). Jig is not known to interact.

b	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **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?	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI Longline – No** **BSAI Trawl – No** **BSAI Pot - No** **BSAI Jig - Yes** **GOA Longline – No** **GOA Trawl – No** **GOA Pot – No**

				GOA Jig - Yes

Rationale

All UoAs
Information collected by the Observer Program on ETP species that interact with the cod fishery, coupled with population assessment of those ETP species, is adequate determine impacts and to assess the level of threat the fishery might pose. Although the jig fishery is not observed, it is small and not expected to impact ETP species. The information collected is accurate and verifiable with respect to direct impacts, although this cannot be stated with confidence for all impacts (i.e., including indirect effect on fur seals and sealions). The SG60, SG80 and SG100 levels are met for jig (based on no interaction with ETP species), but the SG100 level is not met for the pot, longline, and trawl fisheries.

References

Rooper CN, Zimmermann M, Prescott M, Hermann A (2014); Rooper, et al. 2016; Siddon, E. and Zador, S. [ed.] 2018;

Sigler, M.F., C.N. Rooper, G.R. Hoff, R.P.

Draft scoring range	
Information gap indicator	**More information sought**

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Overall Performance Indicator scores added from Client and Peer Review Draft Report	
Overall Performance Indicator score	**BSAI Longline – 90** **BSAI Trawl – 90** **BSAI Pot - 90** **BSAI Jig - 100** **GOA Longline – 90** **GOA Trawl – 90** **GOA Pot – 90** **GOA Jig - 100**
Condition number (if relevant)	
	N/A

PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	**All UoAs – Yes**	**All UoAs – Yes**	**BSAI Trawl – No** **BSAI Longline, – Yes** **BSAI Pot – Yes** **BSAI Jig - Yes** **GOA Trawl – No** **GOA Longline - Yes** **GOA Pot - Yes** **GOA Jig – Yes**
Rationale				

BSAI
The Environmental Impact Statement on EHF provided estimates of impact of the gear used in the BSAI Pacific cod fishery which indicated that the fishery was highly unlikely to result in serious or irreversible harm to habitat structure (NMFS 2005, 2010. Simpson et al. 2017). Research has been done to assess fishing impacts in Bering sea canyons (Rooper et al. 2015). For the period 2004-2012, 0.25% of the Pacific cod caught using trawl gear came from Zemchug Canyon while only 0.07% was from Pribilof Canyon. Longline gear took 1.76% for Zemchug and 0.43% for Pribilof and pot gear took 0.32% in Pribilof and none in Zemchug Canyon (Rooper et al. 2016). Thus, the BS Pacific cod fishery is not expected to have serious or irreversible impact on these sensitive habitats. Given the nature of the gear and the small amount of fish taken by this gear, the jig fishery was not considered a risk to bottom habitat. Therefore, the SG100 is met for this gear. The SG60 and SG80 levels are met for trawl, pot, and longline gear. The SG100 level is met for longline, pot and jig gear types. Although Pacific cod catch in the Bering Sea canyons is a small proportion of the total Pacific cod catch, evidence is not available to conclude that the fishery is highly unlikely to reduce habitat structure and function. The SG100 level is not met for trawls, as there are few empirical studies of the longer-term impact of the trawling for Pacific cod on bottom structure. Given the soft bottom in the BS, long-term significant effects are not anticipated, but the impact of trawling may be greater on the hard and complex bottom in the AI.

GOA
The Environmental Impact Statement on 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, Simpson et al. 2017). 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.

Based on available information, it appears that the commonly encountered habitats would include mud, sand, gravel, and rock. Several studies show stable, muddy or structurally complex habitats recover more slowly than sandy sediment. However, the commonly encountered habitats in this area all recover within 5-20 years. Therefore, it is highly unlikely that serious or irreversible harm is occurring. SG60 and SG80 are met. SG100 is not met since there is not clear evidence available at this time.

b	VME habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	**All UoAs – Yes**	**All UoAs – Yes**	**BSAI Trawl – No** **BSAI Longline, – No** **BSAI Pot – No** **BSAI Jig – Yes** **GOA Trawl - No** **GOA Longline - No** **GOA Pot - No** **GOA Jig – Yes**
Rationale				

BSAI – All UoAs
The VMEs for these UoAs are the designated EFHs, HAPCs, and other closed areas are corals, sponges, and sea pens and sea whips combined based on Sigler et al. (2015) and Rooper et al. (2014). The team considered that damage to the habitat that leaves at least 80% of its structure and function with no impact, or recoverable to 80% within 5-20 years if fishing on the habitat were to cease entirely, would demonstrate that serious or irreversible harm has not occurred.

The most recent 5-year review of EFH took place in 2016 using a new Fishing Effects (FE) model to assess the impacts of fishing activities on EFH. This model replaces the previously used Long-term Effects Index (LEI) model. Using this new model over the period 2003 to 2016, it is estimated that 4.9% of Pacific cod EFH in the BS is impacted by Pacific cod fisheries (http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/EFH/EFH_FE_output_BS_locked.xlsx) and that 1.9% of Pacific cod EFH in the Aleutian Island is impacted by fisheries for Pacific cod (http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/EFH/EFH_FE_output_AI_locked.xlsx). Using data from 2008-2010, Amoroso et al. (2018) found that the bottom trawling footprint varied markedly among regions globally. In the Eastern Bering Sea only 7% of the area of region accounted for 90% of trawling activity and only 1.8% in the Aleutian Islands.

Corals – the distribution of corals is well understood based on photographic data and from predictive habitat models of the BS with correct classification of presence/absence of 93%. Low densities of coral were consistent with the lack of hard substrates. Corals are rarely encountered in the NMFS bottom trawl survey in the BS and therefore trends in CPUE are not presented in the Ecosystem Considerations SAFE (Siddon and Zador 2018). Photographs showed infrequent damage to Isididae corals; damage was not observed in other genera. The apparent impacts on coral fall substantially short of the 20% threshold for considering damage as serious or irreversible. Corals were most abundant in Pribilof Canyon and westward. Given these results and the fact that only a small fraction of the cod fishery occurs in the Pribilof canyons, and that the spatial footprint of the fishery relative to the size of the Bering Sea is very limited, data indicate that it is highly unlikely that the cod fishery would reduce corals to the point of serious harm, meeting the SG80. Although Sigler et al. (2015) and Rooper et al. (2014) present some evidence that the cod fishery is highly unlikely to reduce corals to the point of serious or irreversible harm, however confirming evidence will be needed to achieve the SG100 level.

In the AI (Zador and Ortiz 2108), Gorgonian corals occur in about 20-40% of bottom trawl survey tows. Abundance of coral in all areas has declined since about 1991-1993 surveys and is at generally low levels in all areas, but the frequency of occurrence has remained steady. Hydrocoral frequency of occurrence and abundance has decreased in the western and central AI over recent surveys, but the 2018 results indicate recent stability at low levels. Soft corals occur in relatively few tows, except in the eastern Aleutian Islands where they occur in about 20% of tows. Although fishing effort overall in the AI has increased since 2014, the trawlable shelf area in the AI is a minor part of the sea floor landscape, as most is quite rocky and steep.

Sponges – sponges are more widely distributed than corals in the BS with correct classification of presence/absence of 75%. Relative CPUE of sponges from NMFS bottom trawl surveys shows evidence of a cyclic pattern and has decreased since 2013 to among the lowest values observed since the early 1990s (Siddon and Zador 2018). Although interactions with sponges were widespread, only about 3% showed evidence of damage. The apparent impacts on

sponges fall substantially short of the 20% threshold for considering damage as serious or irreversible. Thus, it is highly unlikely that the cod fishery would reduce sponges to the point of serious harm meeting the SG80. Confirming evidence will be needed to achieve the SG100 level.
Sponges are caught in most tows (>80%) in the AI west of the southern BS (Zador and Ortiz 2018). In recent years, the abundance of sponges in the western and central AI and the frequency of occurrence have been declining but with the 2018 results may be stabilizing. Although fishing effort overall in the AI has increased since 2014, the trawlable shelf area in the Aleutians in a minor part of the sea floor landscape, as most is quite rocky and steep.

Sea Whips – sea whips are widely distributed in the BS with correct classification of presence/absence of 90%. Relative CPUE of sea whips from NMFS bottom trawl surveys exhibits large interannual variation but has been relatively high since about 2003 (Siddon and Zador 2018). Although interactions were widespread only 9% of individuals showed damage, and the spatial footprint of the fishery relative to the size of the Bering Sea is very limited. The apparent impacts on sea whips fall substantially short of the 20% threshold for considering damage as serious or irreversible. Data indicate that it is highly unlikely that the cod fishery would reduce corals to the point of serious harm meeting the SG80. Again, confirming evidence will be needed to achieve the SG100 level. A score of 90 is given.

Sea whips and sea pens are not common in the AI and their relative abundance in research bottom trawl surveys has been uniformly low over the time series (Zador and Ortiz 2018).

GOA – All UoAs

The most recent 5-year review of EFH took place in 2016 using a new Fishing Effects (FE) model to assess the impacts of fishing activities on EFH. This model replaces the Long-term Effects Index (LEI) model. Using this new model over the period 2003 to 2016, it is estimated that 1.8% of Pacific cod EFH in the GOA is impacted by Pacific cod fisheries (http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/EFH/EFH_FE_output_GOA_locked.xlsx).

The catch of structural epifauna (sea pens/whips, sponges, anemones, corals, and tunicate) in the GOA has varied little but trended upward through 2016. In 2017, the catch dropped down to level equivalent to the period of 2011 to 2013 (Zador and Yasumiishi 2018). Sea anemones comprise the majority of the structural epifauna catch and they are primarily caught in the flatfish, Pacific cod, and Sablefish fisheries. The catch of assorted invertebrates in the GOA has been variable but has shown little trend. Sea stars dominate the assorted invertebrate catch, accounting for more than 90% of the total assorted invertebrate catch in each year. Sea stars are caught primarily in the Pacific cod fishery. These data and EFH 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, but confirming evidence will be needed for the trawl, longline and pot fisheries to meet the SG100 level.

	Minor habitat status			
c	Guide post			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			**BSAI trawl – No** **BSAI longline – No** **BSAI pot – No** **BSAI jig - Yes** **GOA trawl- No** **GOA longline – No** **GOA pot – No** **GOA jig - Yes**
Rationale				

Based on the scale of habitat description in the BSAI and GOA and level of bottom contact, it cannot be concluded that there is evidence that trawl, longline, and pot fisheries are highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm. However, given the nature of the small jig fishery in the GOA, this UoA scores at the SG100 level.

References

Amoroso, R. O., et al. 2018.
McConnaughey, et al. 2009; NMFS. 2005; NMFS. 2010; NMFS. 2013.
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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI trawl – 80** **BSAI longline – 85** **BSAI pot – 85** **BSAI jig - 100** **GOA trawl- 80** **GOA longline – 85** **GOA pot – 85** **GOA jig - 100**
Condition number (if relevant)	**N/A**

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	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 all MSC UoAs/non-MSC fisheries on habitats.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
The Council adopted an environmental impact statement for essential fish habitat (EFH) in 2005, which has been subsequently reviewed and updated in 2010 and 2017. The environmental impact statement identifies and designates EFH, determines sensitive areas as habitat areas of particular concern (HAPC), and evaluates fishing impacts and determines measures to minimize, to the extent practicable, adverse impacts of fishing on habitat of all managed species. The NMFS and the Council together have instituted measures and have adopted a strategy to protect sensitive habitat (BSAI and GOA FMP, NPFMC 2018 and 2019, Tables ES-2). Nested within the EFH are habitat areas of particular concern (HAPC) such a corals and seamounts. These areas are closed to bottom contact. There are also closed areas/seasons to trawling and bottom contact gear to protect marine mammals, herring, salmon, halibut and crab species. Regulations prohibit non-pelagic trawling in the pollock fishery and require flatfish fisheries to modify non-pelagic trawls to reduce the potential impact on bottom habitat. The Northern Bering Sea Research Area was implemented in 2008 and prohibited bottom trawling in the northern part of the Bering Sea. In the GOA, 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 in place and is being implemented to manage the impact of all MSC UoAs/non-MSC fisheries on habitats (https://www.npfmc.org/habitat-protections/). When new habitat issues arise, the Council strategy requires evaluating available information and requiring new scientific inquiry as necessary. Therefore, the SG60, SG80 and SG100 levels are met.

b	Management strategy evaluation			
	Guide post	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on **information directly about the UoA and/or habitats** involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
Research and experience from fisheries in the BSAI and GOA demonstrate that identifying sensitive areas and implementing measures to protect them, to the extent practicable, will succeed. The measures implemented to protect sensitive habitats (e.g., closed areas for seamounts and corals; gear restrictions to minimize impacts; and research to improve knowledge) are likely to work and there is an objective basis, from long-term management measure here and elsewhere, for confidence that the Councils strategy will work. Closed area/season and gear restriction management of fishing impacts are 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 BSAI. VMS (Loefflad et al. 2014) and observer data provide a basis for testing that the fishing vessels comply with the regulations, which provides information directly for the fishery and habitats and confirming that the strategy will work. The SG60, SG80, and SG100 are met for all gear types.

	Management strategy implementation			
c	Guide post		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
VMS data on the spatial and temporal distribution of fishing (Loefflad et al. 2014) and high Observer Program coverage (Alaska Fisheries Science Center and Alaska Regional Office. 2018) provide quantitative 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.

	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
d	Guide post	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
There is clear quantitative evidence from VMS and Observer Program data the UoAs comply with management and protection measures to protect VMEs. Further, since the other MSC UoAs and non-MSC fisheries are all under the same management as Pacific cod UoAs, there is clear quantitative evidence that they are all following the closed area and other protection requirements. Therefore, SG60, SG80 and SG100 are met.

References

AFSC 2018.; Loefflad, M. R., F. R. Wallace, J. Mondragon, J. Watson, and G. A. Harrington. 2014.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 100** **GOA UoAs - 100**
Condition number (if relevant)	**N/A**

PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	The types and distribution of the main habitats are **broadly understood**. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – No** **GOA UoAs - No**
Rationale				

All UoAs
Comprehensive inventories of distribution of main bottom habitats in the BSAI and GOA are provided in McConnaughey et al. (2009), Zimmerman et al. (2018), Richwine et al. (2018) and a series of publications at https://www.fisheries.noaa.gov/resource/data/alaska-bathymetry-data-and-publications. The types, distributions and vulnerability of the main habitats, consisting mainly of muds, sand, and gravel bottoms, in the BS are reasonably well known at the scale relevant to the fishery. The distribution of main vulnerable habitats types in the BS is known. Habitats in the AI are less well understood, but there is a basic understanding of the main types and general distributions and their vulnerabilities, again at a scale relevant to the fishery. 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 both the BSAI and GOA for all gear types. The SG100 level is met in the BS for all gear types, but not for the AI and GOA, as the distribution of vulnerable habitats is less well known. As a result, neither the BSAI nor the GOA meet the SG100.

b	Information adequacy for assessment of impacts			
	Guide post	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. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence	The physical impacts of the gear on all habitats have been quantified fully.

			and spatial attributes of the main habitats.	
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI- trawl – No** **BSAI longline – No** **BSAI pot - Yes** **BSAI jig – Yes** **GOA trawl – No** **GOA longline – No** **GOA – pot - Yes** **GOA jig - Yes**

Rationale

All UoAs

The reports on EFH (NMFS 2005, NMFS 2010, Simpson et al. 2017) provide information to broadly understand the nature of the main impacts of gear use on the main habitats in the BSAI and GOA cod fisheries. Updated model estimates of long-term bottom habitat impact of trawl and longline gear used in the cod fishery provide sufficient data to allow the nature of impact and their spatial extent to be generally determined. The SG60 and SG80 levels are met for these gear types. Neither pot nor jig gear were considered to have measurable impacts and thus they meet the SG100 level. The SG100 level is not met for trawl and longline UoAs as physical impacts of gear on all habitat types have not been fully quantified, particularly in the AI and GOA.

	Monitoring			
c	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – No** **GOA UoAs - No**

Rationale

All UoAs

Adequate information by means of VMS and the observer program continue to be collected from the UoAs to detect any change in the distribution of the fishery and, therefore, 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 species composition and amount of the bycatch from the UoAs which could signal changes in habitat impacts. SG80 and SG100 are met. The SG100 level is not met as changes in all habitat distributions over time have not been measured.

References

McConnaughey, R. A., J. V. Olson, and M. F. Sigler. 2009; NMFS. 2005; NMFS. 2010;
Richwine, K. A., K. R. Smith, and R. A. McConnaughey. 2018.
Simpson, S. C., Eagleton, M. P., Olson, J. V., Harrington, G. A., and Kelly, S.R. 2017
Zimmermann, M., M. M. Prescott, and C. N. Rooper. 2013.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI- trawl – 80** **BSAI longline – 80** **BSAI pot - 85**

	BSAI jig – 85 **GOA trawl – 80** **GOA longline – 80** **GOA – pot - 85** **GOA jig - 85**
Condition number (if relevant)	
	N/A

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA 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	Ecosystem status			
	Guide post	The UoA 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 UoA 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 UoA 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?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
Based on the composition and amounts of primary, secondary, and PSC species (see P2.1 and P2.2) and ecosystem analyses of the BSAI (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. Similarly, in the GOA, the composition and amounts of primary and secondary species, including PSC species (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. Fluctuating or decreasing levels of primary and secondary 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

Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 100** **GOA UoAs - 100**
Condition number (if relevant)	**N/A**

PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary which take into account the **potential impacts** of the UoA on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs

The NPFMC, or the Council, has been committed to the development and implementation of ecosystem-based management (EBM) for some time. The principles and goals of EBM are described in the BSAI and GOA FMPs. The NPFMC Ecosystem Committee provides advice to the Council on ecosystem issues in the North Pacific in the light of national ecosystem discussions and suggests new ways for the Council to engage in EBM. The current status and objectives of the Council's EBM are described online. The Council has developed an AI Fishery Ecosystem Plan. The Plan is a strategic policy and planning document intended to be an educational tool and resource that can provide the Council with both an "early warning system" and an ecosystem context for fishery management decisions affecting the AI area. The Council has also adopted a BS Fishery Ecosystem Plan to provide a synthesis of ecosystem information relevant to fisheries and help managers consider the ecosystem perspective in fishery decision making. In 2006, the Council signed a Memorandum of Understanding with 10 federal agencies and four state agencies to create the Alaska Marine Ecosystem Forum (AMEF). The AMEF seeks to improve coordination and cooperative understanding between the agencies on issues of shared responsibilities related to the marine ecosystems off Alaska's coast. Given all of this, it can be said that there is strategy in place that consists of plans for both BSAI and GOA that address the main UoA impacts on the ecosystem. SG60, SG80, and SG100 are met.

b	Management strategy evaluation			
	Guide post	The **measures** are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	There is **some objective basis for confidence** that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	**Testing** supports **high confidence** that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs

There are measures in place, as specified in the BSAI and GOA FMPs (NPFMC 2018, 2019), to ensure that the fishery does not pose a risk of serious and irreversible harm to the ecosystem. The overarching objective is to "ensure the sustainability of fishery resources and associated ecosystems for the benefit of future". The Council has adopted measures to accelerate ecosystem-based management principles that protect managed species from overfishing and increase habitat protection and bycatch constraints. The management 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 represent strategy to restrain all main impacts, both direct and indirect, of the fishery. 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., Adyin et al. 2007). Thus, there is a strategy and a plan in place to control risk of ecosystem harm. Annual information and analysis (i.e., Ecosystem Considerations SAFE documents) directly from the UoAs and ecosystem involved provide a means of testing management measures against objectives providing high confidence the management strategy will work. The SG60, SG80 and SG100 levels are met.

	Management strategy implementation			
c	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a).**
	Met?		**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
Clear 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 primary, secondary species, prohibited species and interactions with ETP species. Regular research trawl and acoustic surveys monitor key elements of the ecosystem. This evidence is summarized stock assessments and in the Ecosystem Considerations SAFE reports (Siddon and Zador 2018, Zador and Ortiz 2018, Zador and Yasumiishi 2018). The SG80 and SG100 levels are met for all gear types.

References

Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007; Siddon, E. and Zador, S. [ed.] 2018; Zador, S. and Ortiz, I. [ed.] 2018; Zador, S. and Yasumiishi, E. 2018

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 100** **GOA UoAs - 100**
Condition number (if relevant)	
	N/A

PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	
Rationale				

All UoAs
In the BSAI and GOA, information is adequate to identify key elements of the ecosystem, as demonstrated by quantitative summaries of ecosystems characteristics and trends, the determination of essential fish habitat for a large number of managed species, and the research on the spatial distribution and abundance of sensitive taxa and their bottom habitats (e.g., Ecosystem Considerations, SAFEs; Simpson et al. 2017, Rooper et al. 2017). Quantitative models of both ecosystems (e.g., Aydin et al. 2007) demonstrate that information is adequate to broadly understand the key elements of the BSAI and GOA ecosystems. Thus, both SG60 and SG80 are met for all gear types.

b	Investigation of UoA impacts			
	Guide post	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	Met?	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**	**BSAI UoAs – No** **GOA UoAs - No**
Rationale				

All UoAs
The four gear types used in the Pacific cod fishery impact key elements of the ecosystems differently. The jig fishery uses off-bottom hooked lines with small catches and therefore 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. 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 little is known about the impact of lost pots even though biodegradable panels will eventually reduce or eliminate ghost fishing.

The main impacts of longline gear on seabirds and marine mammals have been well studied in Alaska (e.g., Eich et al. 2018; Muto et al. 2018). Quantitative studies on the effects of longlines on seafloor habitat features were not found (NMFS 2005). Long-term effects index for long-line impacts on fish habitat features were estimated as minimal, at 0.0% in the BS and 0.1% in the AI (NMFS 2005). 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 studied in the GOA, although the effects are not anticipated to result in serious or irreversible harm.

The impacts of bottom trawls on bottom fauna have been extensively studied, although fewer studies have been done in Alaska (Grabowski et al. 2014; Amoroso et al. 2018). These were reviewed a part of the most recent EFH analysis. Impacts are generally less in soft-bottom substrates, such as the Bering Sea, 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 AI and 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 0.1% in hard-bottom habitats of the GOA, at 0.2% in soft-bottom shelf habitats of the Bering Sea, at 0.4% in slope habitats of the Bering Sea, and at 4.2% for the hard-bottom habitats of the Aleutian Islands. Impacts of the trawl fishery on marine mammals and seabirds can be inferred from existing information and some have been investigated in detail. Therefore, SG60 and SG80 are met. SG100 is not met since all main interaction have not been investigated in detail.

	Understanding of component functions			
c	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
The main functions of and impacts on the components of the ecosystem are known through extensive biological sampling associated with regular surveys 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 fisheries on target, primary, secondary and ETP species have been identified and the main functions of these components are understood through extensive quantitative modelling of the ecosystems. Therefore, SG80 and SG100 are met.

	Information relevance			
d	Guide post		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
Regular resource surveys and species stock assessments conducted by NFMS and analyses conducted for the EFH provide adequate information of the impacts of the fishery on key elements of the ecosystem, including bottom fauna. Ecosystem modelling and annual data on seabird and marine mammal takes from the observer program have provided adequate information on the impacts of the fishery on those components of the ecosystem. These analyses and models also allow the main consequences for the ecosystem to be inferred. Therefore, SG80 and SG100 are met.

	Monitoring			
e	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		**BSAI UoAs – Yes** **GOA UoAs – Yes**	**BSAI UoAs – Yes** **GOA UoAs - Yes**
Rationale				

All UoAs
NMFS conducts a comprehensive program of surveys to monitor the abundance and key elements of the BSAI and GOA ecosystems. The observer program collects targeted catch and bycatch data annually from the fishery. Together

this data are sufficient 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 BSAI and GOA FMPs. Therefore, the SG80 and SG100 are met.

References
Grabowski et al 2014; Simpson et al 2017; Rooper et al. 2017

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	
Information gap indicator	**Information sufficient to score PI but additional information could increase score**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**BSAI UoAs – 90** **GOA UoAs – 90**
Condition number (if relevant)	
	N/A

8 Principle 3

8.1.1 Area of operation of the UoA

The following text was adapted from the MRAG Americas 2015 BSAI and GOA Alaska Pacific Cod Public Certification Report (MRAG 2015a, 2015b).

The BSAI and GOA Pacific cod fisheries are conducted in the U.S. EEZ waters (Figure 15) of the BSAI and GOA. The principle legislative instrument for fisheries management in the U.S. is the Magnuson-Stevens Fishery Conservation and Management Act (MSA) or the Magnuson-Stevens Reauthorization Act (MSRA) and is implemented by the National Marine Fisheries Service (NMFS). The North Pacific Fishery Management Council (NPFMC, or the Council) is one of eight regional councils established by the MSRA to manage fisheries between the 3 - 200-mile limit. The Council primarily manages groundfish in the BSAI and GOA, targeting cod, pollock, flatfish, mackerel, sablefish, and rockfish species harvested by trawl, longline, jig, and pot gear (NPFMC 2019a). The Council also makes allocation decisions for halibut, in concert with the International Pacific Halibut Commission (IPHC) that biologically manages the resource for U.S.-Canada waters.

8.1.2 Jurisdiction

The BSAI and GOA cod fisheries are under the jurisdiction of the NPFMC BSAI Groundfish Fishery Management Plan (FMP), the GOA FMP and the MSRA. The Council's BSAI management area is divided into BS and AI subareas. In 2014, the BSAI Pacific Cod stock was split into an AI and an EBS stock. Prior to 2014, the BSAI Pacific cod was managed as a single stock throughout the BSAI management area. While separate OFLs, ABCs, and TACs have been created for the AI and for the EBS, the actual sector allocations, except CDQ allocations, remain BSAI-wide allocations (NPFMC 2019f). The jurisdictional category according to FCR SA4.1.1 is single jurisdiction.

The State of Alaska manages groundfish fishery resources within State territorial waters (0 – 3 nm). Article 8 of the Constitution of the State of Alaska provides the framework for management of renewable resources, including fish. To meet the Constitutional requirements, the Alaska legislature created the Alaska Department of Fish and Game (ADFG) and the Alaska Board of Fisheries (BOF) with the purpose of conservation and development of fisheries resources [Alaska Statute 16.05.221]. The General Commercial Fisheries Regulations establishes the basic regulations that give the ADFG and BOF the powers to regulate and manage the state fishery resource and describe the extent of their regulatory powers. The BOF has the authority to make regulatory decisions described in Alaska Statute 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, and the ADFG is responsible for management actions based on those decisions.

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 most federal groundfish fisheries, ADFG issues emergency orders for state waters that duplicate NMFS management actions, with exception of gear or other restrictions that might vary (ADFG 2019a). These emergency orders establish parallel fishing seasons that allow vessels to fish for groundfish (primarily Pacific cod, Atka mackerel, and pollock) in state waters with the same seasons as the federal fisheries.

Internationally, the State participates and contributes to established agreements and shared management and working practices, e.g. IPHC, Pacific Salmon Treaty, Agreement between the US and Canada on enforcement.

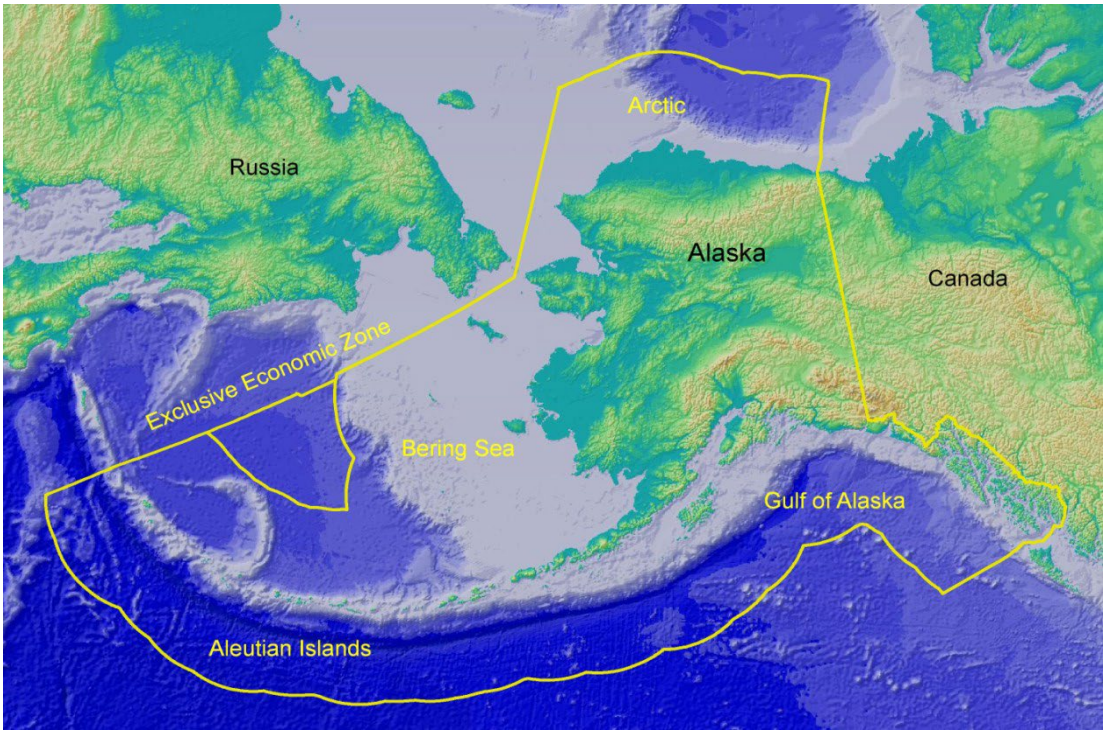

Figure 15 The US EEZ of the Bering Sea, Aleutian Islands, and Gulf of Alaska (NPFMC 2012).

8.1.3 Recognized groups with interests in the fishery and details of the fleet

Alaska Pacific cod is harvested by commercial demersal trawl gear, jig, longline and traps or pots. The fleet consists of catcher vessels delivering to shore; catcher vessels delivering to motherships that process the catch, or, at-sea catcher/processor vessels. Most groundfish caught in the BSAI and GOA are caught commercially, but subsistence use is common as well. In the Aleutian Islands, nearly all communities are involved with the groundfish fishery, either at sea or onshore in fish processing facilities. For subsistence purposes, the Aleutian Islands are divided into five management districts and managed by ADFG Division of Commercial Fisheries and a permit is required for certain species in specific areas. There is also a recreational or sport fishery managed by ADFG, which has in place regulations and permits applicable to the different species and regions of Alaska (ADFG 2019). Other fisheries/fleets that are not certified but have the potential to coincide or interact with the Pacific cod fisheries include the: halibut longline fleet/fishery; sablefish longline fleet/fishery; BSAI crab fleet/fishery; scallop fleet/fishery; salmon fishery – in as much as some methods employed in the cod fisheries may take salmon as a bycatch.

The following text was adapted from the DNV-GL AK Cod Full Assessment Final Report, December 2017.
BSAI:
The P. cod TACs in EBS and AI Regions are allocated to multiple fleets, with CDQ entities receiving 10% of the total BSAI quota. The largest sector allocation goes to the freezer longline catcher-processors (CPs) which receive roughly 44% of the total BSAI cod quota. Vessels in this sector have formed a voluntary cooperative that allows them to form private contracts among members to distribute the sector allocation. The remaining large sectors are the trawl CPs, trawl catcher vessels (CVs,) the pot gear CVs and some smaller sideboard limits to cover the catch of P. cod while targeting other species. The CVs (collectively referred to as the inshore sector) make deliveries to shore-based processors, and catcher/processors process catch at-sea before going directly to the wholesale markets. Among the at sea CPs, catch is distributed approximately three-quarters to the hook-and-line and one quarter to trawl. The inshore sector accounts for 25%-30% of the total BSAI Pacific cod catch of which approximately two-thirds is caught by the trawl and one-third by the pot gear sectors.

GOA: Almost all of the GOA Pacific cod is caught by CVs which make deliveries to shore-based processors and account for 90% of the total GOA Pacific cod catch. Approximately 40% is caught by trawl, 40% is caught by pot gear, and 20% caught by hook and line, though the number of hook and line vessels is far greater. Production of P. cod in the GOA is relatively balanced between fillets which are typically about 50% of the value, and head and gut (H&G) which are typically 35% of the value. This product mix can vary year to year depending on prices and market conditions.

State-managed fisheries: There are 8 state-managed cod fisheries in Alaskan waters. Some of these are substantial, while others have minimal catch. Gear regulations, seasons, and allocations differ by area, and there are substantial

fisheries by jig, pot, and longline in some areas. In total, the sum of the 2017 GHLs (including the upper range of the Southeast Alaska GHR) is 45,569 tons, with about 1/3 of this being in the BSAI/Dutch Harbor subdistrict. Total state-waters Pacific cod catch in 2015 was estimated to be just over 31,000 tons, broken down by area as follows: in the Kodiak, Chignik and South Alaska Peninsula 5,497 mt, 4,649 mt and 10,826 mt respectively. 8,000 tons in the Dutch Harbor district. 1509 and 104 tons were taken in the Prince William Sound and Cook Inlet fisheries and 424 tons were taken in state waters in Southeast Alaska. The 2015 total state-waters Pacific cod catch in the Aleutian Islands District, as noted by ADFG, is confidential due to limited participation. Estimates of the 2014 sport harvest of Pacific cod from the state-wide harvest survey, were 20,323 fish in Southeast and 40,381 fish in Southcentral Alaska. The estimated annual harvests for the prior five-year period (2009-2013) averaged about 11,000 fish in Southeast Alaska and 29,000 fish in Southcentral Alaska7 (DNV-GL 2017).

The Western Alaska Community Development Quota (CDQ) Program was created by the Council in 1992 to provide western Alaska communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery (NPFMC 2019d). The CDQ Program allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to: (i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska.

The Community Quota Entity Program authorizes 46 eligible communities to form Community Quota Entities (CQEs) that may purchase commercial halibut and sablefish quota share (QS) for lease to community residents. Some CQE communities may request to be issued charter halibut permits (CHPs) and/or Pacific cod endorsements for on-trawl groundfish licenses for lease to residents. Each CQE is required to submit an annual report to NMFS (NPFMC 2019).

The BSAI and GOA groundfish management process has many stakeholders: Alaska federal groundfish license holders, processors, the states of Alaska, Washington, and Oregon, fishermen's organizations, CDQ groups and several environmental groups.

8.1.4 Legal and policy framework

Details of consultations leading to the formulation of the management plans

The MSA is the primary domestic legislation governing management of marine fisheries in the U.S. The Act was first enacted in 1976 and has been amended many times over the years. In 1996, the United States Congress reauthorized the MSA, or MSRA, to include a new emphasis on the precautionary approach in U.S. fishery management policy. The MSRA contains ten National Standards with which all fishery management plans (FMPs) must conform and which guide fishery management (NPFMC 2019a).
These National Standards 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.

The MSRA was most recently reauthorized in 2006. Two major recent sets of amendments to the law were the:

- The Sustainable Fisheries Act (1996) addresses many topics, among which includes Title V, *Implementation of Western and Central Pacific Fisheries Commission* (http://www.nmfs.noaa.gov/sfa/sustainable_fishereries_act.pdf).
- *Magnuson–Stevens Fishery Conservation and Management Reauthorization Act of 2006*, which has numerous purposes (http://www.nmfs.noaa.gov/msa2005/index.html):
    a. Acting to conserve fishery resources
    b. Supporting enforcement of international fishing agreements
    c. Promoting fishing in line with conservation principles
    d. Providing for the implementation of FMPs which achieve optimal yield
    e. Developing underutilized fisheries
    f. Protecting essential fish habitats
    g. Additionally, the law calls for reducing bycatch and establishing fishery information monitoring systems.

The Council and the National Marine Fisheries Service (NMFS) manage U.S. Federal fisheries off Alaska (3-200 nautical miles). Management is coordinated, and in some cases, jointly managed, with the State of Alaska. NOAA/NMFS is also responsible for carrying out the U.S. policies to manage and conserve marine protected resources.
Other applicable law that is directly relevant to the management of marine fisheries includes (NPFMC 2019a):

- National Environmental Policy Act (NEPA): requires environmental impact assessments of federal actions 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.
- 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.
- 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 USFWS to develop memoranda of agreement to conserve migratory birds and to evaluate the effects of their actions on migratory birds in NEPA documents.

Under the MSRA, the Council is authorized to prepare and submit to the Secretary of Commerce for approval, disapproval or partial approval, an FMP and any necessary amendments, for each fishery under its authority that requires conservation and management. The Council conducts public hearings 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 (NPFMC 2018).

The groundfish fisheries, including the Alaska Pacific cod fisheries, in the BSAI and GOA are managed by two different, but complimentary, FMPs: BSAI FMP and GOA FMP. Program policies and measures are developed by the Council through the preparation and maintenance of FMPs for groundfish, crabs, and scallop fisheries in the BS and GOA, as well as for all future fisheries in the Arctic Ocean. The FMPs are frequently amended by the Council to respond to new scientific information, changes in the environment, changes in policy, and operational changes in the fisheries. The plan amendments, together with regulatory amendments, are developed though the Council's open and transparent regulatory process and implemented by the NMFS Alaska Regional Office (NPFMC 2018a; 2018b).

BSAI FMP

The BSAI Groundfish FMP was adopted by the Council in 1980 and implemented in 1982. The FMP has been amended several times to meet the changing fishery management needs. The BSAI FMP management area is the U.S. EEZ of the Bering Sea and that portion of the North Pacific Ocean adjacent to the Aleutian Islands which is between 170E W. longitude and the U.S.-Russian Convention Line of 1867 (NPFMC 2018a). The BSAI FMP covers fisheries for all stocks of finfish and marine invertebrates except salmonoids, shrimps, scallops, snails, king crab, Tanner crab, Dungeness crab, corals, surf clams, horsehair crab, lyre crab, Pacific halibut, and Pacific herring (NPFMC 2018a). One of the major objectives of the Council in the early 1980s was to phase out foreign fishing vessel participation in the BSAI EEZ (NPFMC 2018a). The first ten amendments implemented in the BSAI Groundfish FMP specifically dealt with foreign fishing fleet participation in the fishery. After the foreign fleet was adequately addressed, the Council focused on managing and regulating the domestic fleet to allow for sustainable and profitable fisheries by limiting entry and addressing allocation issues, bycatch, and habitat conservation needs (NPFMC 2018a). In recent years, the Council has adopted amendments to streamline catch share programs and address other science and management changes. The Council has prepared summaries of each amendment to the FMPs that provide an overview of the purpose and need, analysis, regulation, and results of each action, and are meant as a resource for anyone interested in understanding the development of a federal fishery management program in the North Pacific. A full list of these actions can be found at the following link: **BSAI Amendment Action Summaries**.

GOA FMP
The GOA FMP was implemented on December 1, 1978 and has been amended over sixty times. The GOA FMP governs groundfish fisheries of the GOA. The FMP management area is the U.S. EEZ of the North Pacific Ocean, exclusive of the Bering Sea, between the eastern Aleutian Islands at 170 E W. longitude and Dixon Entrance at 132 E 40' W. longitude. The FMP covers fisheries for all stocks of finfish except salmon, steelhead, Pacific halibut, Pacific herring and tuna (NPFMC 2018b). The focus of the FMP has changed from the regulation of foreign fisheries to the management of fully domestic groundfish fisheries (NPFMC 2018b). The revised version has been updated to remove obsolete references to foreign fishery management measures, as well as outdated catch data and other scientific information. A full list of these amendments, similar to that prepared for the BSAI, can be found at the following link: **GOA Amendment Action Summaries.**

8.1.5 Resolution of disputes

Federal
The Council conducts its ongoing decision-making processes in a manner designed to avoid legal disputes. The Council relies on a consensus approach among advisory bodies with room for minority reports should these groups fail to reach consensus. The Council 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 MSRA. 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. In addition, the wide dissemination of information to promote transparency ensures that the probability of stakeholders being caught off-guard is minimal. If legal action is required, the Office of General Counsel (OGC) provides legal advice, service and counsel for all matters that may arise in the conduct of NOAA's missions. The OGC is appointed by the Secretary of Commerce, with the approval of the President (NPFMC 2012).

State
At the State level, The BOF provides a transparent mechanism for resolution of disputes regarding fishery sustainability and harvest allocation. The BOF regulatory process or "BOF Process" is used to resolve disputes that may arise, such as the allocation of Pacific cod between gear types and between adjacent management areas. Meetings are open to the public and are generally attended by ADFG staff and members of the public who can offer

background information on agenda topics. The Board receives and reviews proposals and testimony from the public. Findings are made available on the ADFG webpage. If disputes cannot be resolved through the BOF process they can ultimately be adjudicated through the State court system (ADFG 2019c).

8.1.6 Respect of rights

Federal
The MSRA states that "Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks) take into account the importance of fishery resources to fishing communities by utilizing economic and social data to provide for the sustained participation of such communities and to the extent practicable, minimize adverse economic impacts on such communities. The US management system has a mechanism to formally commit to the legal rights created explicitly for First Nations and Treaty Tribes. Federal agencies are required 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.

The Council established a Community Engagement Committee to improve outreach and communications with rural communities and Alaska Native entities and develop a method for systematic documentation of Alaska Native and community participation in the development of fishery management actions. The Committee is to advise the Council on how to provide opportunities for better understanding and participation from Alaska Native and rural communities; to provide feedback on community impacts sections of specific analyses, if requested; and to provide recommendations regarding which proposed Council actions need a specific outreach plan and prioritize multiple actions when necessary. Initial priorities of the Committee included PSC reduction. Management actions taken to reduce salmon by-catches in a number of fisheries also explicitly acknowledge the importance of the salmon resources to the individuals and communities reliant on them (NPFMC 2018c).

The CDQ Program was created by the Council in 1992 to provide western Alaska communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The CDQ Program allocates a percentage of all Bering Sea and Aleutian Islands quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to (i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska. There are approximately 65 communities within a fifty-mile radius of the BS coastline who participate in the program (NPFMC 2019d).

State
A formal and well-defined process exists to consider the views, customs, and interests of indigenous peoples who depend on fishing for their food or livelihood – this involves the BOF, a Federal Subsistence Board, and a series of regional Advisory Committees. The BOF process provides a formal and well-defined process to consider the impact of fisheries on coastal communities that are closely tied to state fisheries. This process regularly seeks and considers input from stakeholders in an effort to understand and address socioeconomic issues related to the fishery (ADFG 2019c).

8.1.7 Consultation, roles and responsibilities

The Council established a wide-ranging consultation process. The process used by the Council to manage groundfish is described in a brochure explaining the overall Council process (NPFMC 2009) and the Council Operating Procedures (NPFMC 2012a; 2012b). 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 are 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).

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).

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; 2012). 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. In addition, the Council website has newsletters, articles, publications, meeting agendas and calendars of upcoming events and highlights current issues.

State
The BOF has meeting schedules, calendars, recent actions and activities posted on the ADFG website. Stakeholders can also sign up for email notices to receive details on notices for meetings, regulation changes, proposals and other information from the BOF. An annual proposal book is available online, and hard copies are also available annually at the local Fish & Game offices beginning in late September (ADFG 2019a). There is also a Boards Support Coordinator in the various regions of Alaska that will provide assistance in writing and submitting a proposal for fishing regulations (ADFG 2019a).

ADFG have 84 local Advisory Committees within 6 regions of the state (one of which is land-locked), that have been established to meet and discuss fish and wildlife issues, provide a local forum for those issues, and make recommendations to the Alaska boards of fisheries and game. Their purpose as established by the Joint Board of Fisheries and Game includes (ADFG 2019e):

- Developing regulatory proposals
- Evaluating regulatory proposals and making recommendations to the appropriate board
- Providing a local forum for fish and wildlife conservation and use, including matters relating to habitat
- Consulting with individuals, organizations, and agencies

8.1.8 Decision-making process

Federal

The Council makes recommendations to NMFS, and NMFS approves, implements and enforces them. The Council consists of 11 voting members, including: 7 appointed members, 4 agency representatives (6 from Alaska, 3 from Washington, 1 from Oregon, and 1 from NMFS). There are also 4 non-voting members that include representatives from the US Fish and Wildlife Service, US Coast Guard, Pacific States Marine Fisheries Commission (PSFMC), and the US State Department. The Council meet 5 times per year, and each meeting is ~8 days. All meetings are open to the public. Proposals for management measures may come from the public, state and federal agencies, advisory groups, or Council members. There is also a Science and Statistical Committee (SSC) and Advisory Panel (AP) that provide input to Council at each meeting. Public testimony is taken on each agenda item, at the SSC, AP and Council (NPFMC 2012a). The Council also maintains Plan Teams for each fishery management plan and appoints standing and ad hoc committees necessary to advise the Council on conservation and management issues.

The Science and Statistical Committee (SSC)
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 (MRAG 2015). The SSC is composed of scientists in economics, biology, social science and statistics. Members appointed by the Council to the SSC shall be federal employees, state employees, academics, 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). SSC members serve one-year terms with no term limits. Members may be reappointed or replaced by the Council annually at their December Council meeting (NPFMC 2019b, MRAG 2015).

The Advisory Panel (AP)
The AP is represented by members of the fishing industry, catching and processing and subsistence and commercial fishermen, observers, consumers, environmental/conservation, and sport fishermen. 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 U.S. will utilize resources managed by the Council's fishery management plans (MRAG 2015). The AP consists of 22 members, usually serving three-year terms. These members may be reappointed or replaced by the Council annually at their December Council meeting (NPFMC 2019b).

Groundfish Plan Teams

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 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.

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 some input with assessment authors relative to adjusting these parameters. For those proposals the Council chooses to pursue it directs the 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).

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; 2012a; 2012b). 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.

Proposal for Change. Concerns and proposals for change are brought to the Council's 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 (Figure 16).

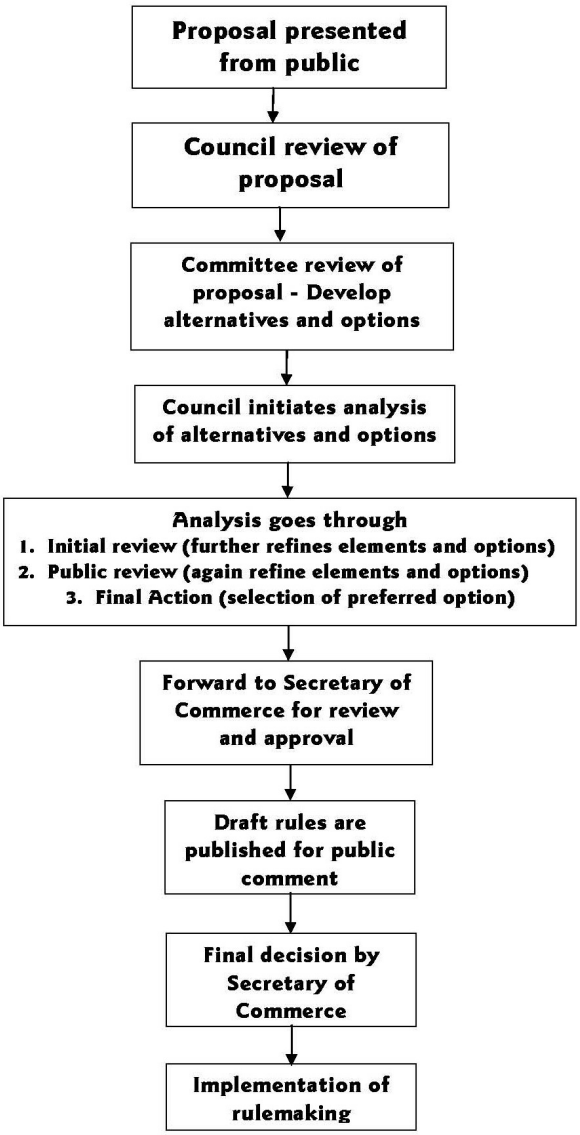

Figure 16 Process for regulatory change, NPFMC (Source: NPFMC 2009).

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 describes 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 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 designate a preliminary preferred alternative to focus comments on their indicated course of action (NPFMC 2009).

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).

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).

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).

State
State waters are fished under State of Alaska commercial fisheries regulations. The General Commercial Fisheries Regulations26 establishes the basic regulations, i.e. those that give the ADFG and BOF the powers to regulate and manage the state fishery resource and describe the extent of their regulatory powers. The Commercial Groundfish Fisheries Regulations27, defines the statewide groundfish provisions. State-wide regulations 5 AAC 28.086 and 5 AAC 28.087 give the ADFG authority to manage parallel fisheries (those Council groundfish fisheries within state waters) and parallel fisheries with Stellar sea lion (SSL) restrictions, respectively, incorporating federal/Council regulations within state waters (DNV-GL 2017).

Alaska Board of Fisheries (BOF)
The BOF has jurisdiction over state waters fisheries (within 3 nm of the Alaska coastline). 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.

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 BOF is charged with making allocative decisions, and the department is responsible for management based on those decisions (ADFG 2019a).

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 Alaska Statute 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 BOF conducts regular reviews of groundfish fisheries within state waters, 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 BOF's review of amendments and other regulatory changes include input from ADFG staff, Regional Fish & Game advisory committees, non-ADFG scientists, industry, environmental non-governmental organizations, stakeholders and the general public.

Legislative committees have conducted oversight and legislative hearings regarding the BOF's actions in a region's fisheries. The BOF and ADFG 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. This process of external review is repeated in the BOF meeting schedule every 3 years (ADFG 2019a).

8.1.9 Long term and fishery specific objectives for the fishery

The Council has several goals and objectives in both the BSAI FMP and the GOA FMP that have been established in order "to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than re-actively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations" (NPFMC 2019). The following objectives were taken directly from the BSAI and GOA FMPs (NPFMC 2018a, 2018b):

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.*

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 non-commercial 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.*
22. *Continue to improve the retention of groundfish where practicable, through establishment of minimum groundfish retention standards.*

Avoid Impacts to Seabirds and Marine Mammals:

23. *Continue to cooperate with U.S. Fish and Wildlife Service (USFWS) to protect ESA-listed species, and if appropriate and practicable, other seabird species.*
24. *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.*
25. *Encourage programs to review status of endangered or threatened marine mammal stocks and fishing interactions and develop fishery management measures as appropriate.*
26. *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:

27. *Review and evaluate efficacy of existing habitat protection measures for managed species.*
28. *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.*
29. *Develop a Marine Protected Area policy in coordination with national and state policies.*
30. *Encourage development of a research program to identify regional baseline habitat information and mapping, subject to funding and staff availability.*
31. *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:

32. *Provide economic and community stability to harvesting and processing sectors through fair allocation of fishery resources.*
33. *Maintain the license limitation program, modified as necessary, and further decrease excess fishing capacity and overcapitalization by eliminating latent licenses and extending programs such as community or rights-based management to some or all groundfish fisheries.*
34. *Provide for adaptive management by periodically evaluating the effectiveness of rationalization programs and the allocation of access rights based on performance.*
35. *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:

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

Improve Data Quality, Monitoring and Enforcement:

39. *Increase the utility of groundfish fishery observer data for the conservation and management of living marine resources.*
40. *Develop funding mechanisms that achieve equitable costs to the industry for implementation of the North Pacific Groundfish Observer Program.*
41. *Improve community and regional economic impact costs and benefits through increased data reporting requirements.*
42. *Increase the quality of monitoring and enforcement data through improved technology.*
43. *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.*
44. *Cooperate with research institutions such as the North Pacific Research Board in identifying research needs to address pressing fishery issues.*

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.*

The state of Alaska states its regard for natural resources in its constitution. Article 8 lays out the framework for management of renewable resources (ADFG 2019a):

- ***§ 2. General Authority*** *— The legislature shall provide for the utilization, development, and conservation of all-natural resources belonging to the state, including land and waters, for the maximum benefit of the people.*

- ***§ 3. Common Use*** *— Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.*

- ***§ 4. Sustained Yield*** *— Fish, forests, wildlife, grasslands, and all other replenishable resources belong to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.*

- ***§ 15. No Exclusive Right of Fishery*** *[as amended in 1972 to allow limited entry] — No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the state.*

Because fish and wildlife were recognized as critically important, the ADFG was created as a cabinet level department run by a commissioner, who answers directly to the governor. ADFG states the mission of the Division of Commercial Fisheries is to *manage subsistence, commercial, and personal use fisheries in the interest of the economy and general well-being of the citizens of the state, consistent with sustained yield principle, and subject to allocations through public regulatory processes.* In addition, the Core Services states a mission to *ensure the conservation of natural stocks of fish, shellfish and aquatic plants based on scientifically sound assessments* (ADFG 2019a).

8.1.10 Monitoring, control and surveillance

Monitoring, control and surveillance (MCS) is carried out at-sea and shore-side for the federal fisheries by the NMFS Office of Law Enforcement (OLE 2019a) and the U.S. Coast Guard (17th District USCG) (USCG, 2019). In state water fisheries, monitoring efforts are carried out primarily by the Alaska Wildlife Troopers (AWT).

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 (NOAA 2019a). 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. The OLE in Alaska protects marine wildlife and habitat by enforcing domestic laws, e.g. Federal Fisheries Regulations for Fisheries of the EEZ of Alaska (50 CFR 679) (NOAA 2019d). The OLE focus on outreach and education programs to help the fishing industry understand the rationale for regulations and prevent or minimize infractions. While the OLE are generally shore-based, they have inshore vessels and work closely with State of Alaska Wildlife Troopers (AWT), often sharing patrols and intelligence.

The OLE publishes a national annual report (OLE 2019b) and the Alaska region submits six monthly reports to the Council. As an example, see OLE 2018.

The USCG is the primary agency for at-sea fisheries enforcement. The USCG objectives are to prevent encroachment into the US EEZ, ensure compliance with domestic fisheries regulations, ensure compliance with international agreements and high seas fishing regulations. The USCG use a software package (FishTactic) to assess risk of infringements and use this enforcement tool to assist the deployment of vessels and aircraft and target fisheries enforcement effort. If the USCG detect a fisheries infringement they gather evidence and hand over the investigation to the OLE. The 17th Coast Guard District (D17) covers the Alaska EEZ and is responsible for the largest amount of coastline and one of the largest areas of responsibility within the USCG. The D17 Response Division is responsible for search and rescue, maritime law enforcement, and incident/pollution response within the D17 area of responsibility (USCG 2019).

The USCG publishes an annual report as well as reports, as requested by the Council's Enforcement Committee. The reports include updates on the resources applied to fishery enforcement in the previous year, the number of boardings/inspections, the number of violations, lives lost at sea, safety issues, and any changes in regulations (USCG 2019)

OLE agents/officers have the option to provide a written warning for minor offences however, these are taken into account for repeat offenders. More serious offences can be dealt with by a summary settlement, i.e. a violation which is not contested and results in a ticket which may include a discounted fine, thus allowing the violator to quickly resolve the case without incurring legal expenses. Thereafter, an offence is referred to NOAA's Office of General Counsel (OGC) for Enforcement and Litigation which can impose a sanction on the vessels permit or further refer the case to the US Attorney's Office for criminal proceedings. Penalties may range from severe monetary fines, forfeiture of catch, boat seizure and/or imprisonment. The MSA has an enforcement policy section (50 CFR 600.740) that details these "remedies for violations" (MSRA 2006).

The Alaska Department of Public Safety (ADPS 2019), through its Division of Alaska Wildlife Troopers, is primarily responsible for enforcing fish and wildlife-related statutes and regulations in Alaska. Some ADFG biologists and other staff have undertaken enforcement training and may participate in enforcement activities and assist the Wildlife Troopers as needed. The AWT attend the BOF and have an important input in the development of state regulations and legislation. The AWT also liaise with the OLE and may also request the assistance of the USCG vessels and aircraft to help in their surveillance and enforcement activities.

The low proportion of violations encountered during at-sea patrols of the Alaska groundfish fisheries suggests high compliance and effective deterrence, e.g. Dec 2018 - March 2019: 1,057 fishing vessels boarded; 23 violations – most of which were safety related; 2% violation rate – which is slightly below the average between 2015-2018 (USCG 2019).

The Council's Enforcement Committee is charged with reviewing proposed FMP amendments, regulatory changes, and other management actions on matters related to enforcement and safety at sea. The Committee is made up of governmental agencies (including OLE, USCG, ADFG, AWT) and organizations having expertise relating to the enforcement and monitoring of North Pacific groundfish and crab fisheries. Meetings are held on a regular basis, typically in conjunction with regular Council meetings and, are open to the public (NPFMC 2019h).
The North Pacific Observer Program (The Observer Program) is an important component of the monitoring of the BSAI and GOA groundfish fisheries. The program is the main data gathering program for all biological and fishery data

that feed into groundfish stock assessments and management. While observers are not directly part of the federal MCS program they are required to report infringements. OLE and USCG officers conduct de-briefing interviews with observers, checking on vessels fishing practices and the conduct of the crew. Observers will often report potential infringements to the vessel captains, thereby contributing to self-regulation and corrective action.
The Federal North Pacific Groundfish Observer Program places all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two observer coverage categories: 1) full observer coverage, or, 2) partial observer coverage. Vessels and processors in the full coverage category have at least one observer present during all fishing or processing activity. Vessels and processors in the partial coverage category are assigned observer or Electronic Monitoring (EM) based on the sampling plan described in the Annual Deployment Plan (ADP). Observer coverage in the BSAI groundfish fisheries by catcher/processors, and catcher vessels delivering to motherships is 100%. EM deployment in 2019 continues to be funded through a combination of federal funding and other sources such as from the National Fish and Wildlife Foundation. In 2018, NMFS placed 168 vessels in the EM selection pool (NOAA 2019c).

Vessels and processors in the full coverage category have at least one observer present during all fishing or processing activity. Vessels and processors in the partial coverage category are assigned observer or EM based on the sampling plan described in the ADP (NOAA 2019c; NMFS 2018). The selection rates as described in the 2018 ADP and programmed into the Observer Declare and Deploy System were as follows:

- No selection (zero coverage) – 0%;
- EM – 30%;
- Trawl (No Tender) – 20%;
- Hook-and-line – 17%;
- Pot (No Tender) – 16%;
- Tender trawl – 17%; and
- Tender pot – 17%.

Notable changes since the 2018 ADP include observer deployment on vessels in the partial coverage category for 2019 and the expansion of the EM selection pool. NMFS adopted the following stratification scheme with sample sizes allocated according to the 15% plus optimization based on discarded groundfish, Pacific halibut and Chinook salmon for the 2019 ADP:

- No selection – 0%;
- EM – 30%;
- Trawl – 24%;
- Hook-and-line – 18%,
- Pot – 15%;
- Tender trawl – 27%; and
- Tender pot – 16% (AFSC 2019).

NMFS is responsible for funding and overall administration of the program including observer training, debriefing and data management. In the full observer coverage category, 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 (NMFS 2018). Observer coverage responsibilities are shared among the fishing industry and independent observer contractors. 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. In the partial coverage category NMFS contracts directly with the observer providers, and charges fees to the industry for running the observer program based on ex-vessel value.

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 2019 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 BSAI and GOA FMPs (NPFMC 2018a, 2018b). An annual Observer Program report is produced each year, which covers fisheries in the BSAI and GOA Region (NOAA 2019a; 2019c).

For fisheries in state waters, landings, buying and production data for groundfish are recorded on ADFG fish tickets or through the eLandings system (internet-based electronic filing), and the Commercial Operators Annual report, as required by Alaska Statute (Section 16.05.690 Record of Purchases) and the Alaska Administrative Code 5 AAC 39.130. AWT ensure compliance with these reporting requirements.

Alaska state law, universal citation 16.05.723, describes the penalties for violating a BOF regulation. Fines, up to a maximum of $15,000 or imprisonment for not more than 1 year are stipulated, along with forfeiture of any fish, its market value, forfeiture of vessel and any fishing gear. A third misdemeanor conviction within a 10-year period will result in a fine 3 times the value of any fish in possession or a fine of $10,000, whichever is greater. The option of pursuing criminal action is also available to the state.

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 2019d). The division also enforces other types of regulations passed by the Board of Game and the BOF. 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 (ADFG 2019d).

8.1.11 Regulatory framework and measures

A Federal groundfish license is required for catcher vessels (including catcher/processors) participating in all BSAI and GOA groundfish fisheries, other than fixed gear sablefish. Exemptions for vessels fishing in State of Alaska waters (0-3 miles offshore) and vessels less than or equal to 26 LOA in the GOA and 32 LOA in BSAI (NPFMC 2018a; 2018b). Catch is monitored through record keeping, reporting requirements and observer monitoring, and fishermen must retain all of their Pacific cod catch (NOAA 2019a; 2019b).

The U.S measures for regulating the BSAI and GOA fisheries are found in 50 CFR 600 and 50 CFR 679.

Other applicable regulations for the BSAI and GOA groundfish fisheries are listed below with links to the most recent available data:

- Essential Fish Habitat EFH 5 year review approach
- BSAI Harvest Specifications
- GOA Harvest Specifications
- Stellar Sea Lions Protection Measures

For the state fishery, the Guideline Harvest Level (GHL) is deducted from the area ABC before the federal/parallel fishery TACs are set, and the State is responsible for enforcement. The State has managed a guideline harvest (GHL) fishery for Pacific cod in State waters in the AI subarea since 2006 and in the BS since 2014 (NPFMC 2019g). The AI GHL is 27% of the AI ABC, with annual step up provisions if the AI GHL is fully harvested. The BS GHL is 6.4% of the BS ABC (NPFMC 2019g).

For the parallel fisheries, the Federal authorities can only enforce federal vessels (vessels with a License Limitation Program license (LLP), or a Federal Fisheries Permit (FFP) that are participating in the parallel fishery. The State can also provide enforcement for those federal vessels in the parallel fishery, but the State is responsible for enforcement of state vessels only (vessels without an LLP license or an FFP) (Jon McCracken, personal communication, September 17, 2019).

The BSAI and GOA cod fisheries are required to have full observer coverage when harvesting, receiving or processing groundfish in a federally managed or parallel groundfish fishery (FR Title 50; § 679.2). The federal regulations also have additional observer requirements for vessels classified as catcher processors (CPs) and as CPs using trawl gear and groundfish CDQ fishing. Additionally, motherships that receive unsorted codends from catcher vessels groundfish CDQ fishing must also have two observers aboard the mothership, at least one of whom must be endorsed as a lead level two observer (Federal Register Title 50; § 679.2).

All vessels participating in a parallel groundfish fishery, except those using jig or hand troll gear, must have a NMFS-approved VMS. According to the regional vessel monitoring information provided by NOAA, a vessel is required to use a VMS in Alaska when:

- *The vessel has a species and gear endorsement on its Federal Fisheries Permit for directed fishing for pollock, Pacific cod, or Atka mackerel and these fisheries are open, except if the vessel is using jig gear or dinglebar gear (50 CFR 679.7(a)(18)).*
- *The vessel is operating in the Aleutian Islands or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).*

- *The vessel has non-pelagic trawl or dredge gear onboard in the Gulf of Alaska or in adjacent State of Alaska waters (50 CFR 679.28(f)(6)).*
- *The vessel is in federal reporting areas 610, 620, or 630, and receives and processes groundfish from other vessels (50 CFR 679.28(f)(6)).*
- *The vessel is participating in the Rockfish Program (50 CFR 679.7(n)(3)).*
- *The vessel is fishing for sablefish in the Bering Sea or Aleutian Islands (50 CFR 679.42(k)(2)).*
- *The vessel is participating in the Crab Rationalization Program (50 CFR 680.23(d))* (NOAA 2019b).

If trawling in the AI, vessels are required to set their VMS to transmit the vessel location at least 10 times per hour (50 FR 679.28(f)(7)).

BSAI Pacific Cod

In the BSAI, Pacific cod has undergone several changes in the past two decades. One of the changes has been sector allocations. Allocations of BSAI Pacific cod between the different harvesting sectors has occurred in four separate amendment packages, with the most recent being Amendment 85, which was implemented in 2008 (NPFMC 2019f). The nine non-CDQ fishery sectors and the percentage of the combined BSAI non-CDQ TAC allocated to each sector are shown in the list below (NPFMC 2019f):

· Hook-and-line C/Ps – 48.7 percent
· Trawl CVs – 22.1 percent
· Amendment 80 trawl C/Ps – 13.4 percent
· Pot CVs greater than or equal to 60 feet LOA – 8.4 percent
· American Fisheries Act (AFA) trawl C/Ps – 2.3 percent
· Hook-and-line and pot CVs less than 60 feet LOA – 2 percent
· Pot C/Ps – 1.5 percent
· Jig vessels – 1.4 percent
· Hook-and-line CVs greater than or equal 60 feet LOA – 0.2 percent

Annually, the Council develops harvest specifications based on information from the Groundfish Plan Teams, Scientific and Statistical Committee, Advisory Panel, the public, and any other relevant information (NPFMC 2018a). Final harvest specifications are implemented by mid-February each year and based on new information contained in the latest groundfish SAFE reports. The most recent Council approved harvest specifications for the 2018-2019 can be found at BSAI Groundfish Specifications for 2019-2020.

In February 2019, the Council conducted a comprehensive review of the Programmatic Groundfish Management Policy, highlighting activities relevant to priorities and objectives established by the Policy in 2018. It was determined by the Council that the policy continues to appropriately characterize management priorities and objectives and chose not to initiate any FMP amendments to modify the policy. For future reviews, the Council will continue to monitor actions relative to policy objectives through the programmatic workplan that is provided at every meeting. Comprehensive reviews of the policy will be done on a three-year cycle that aligns with the multi-year lifespan of major Council actions.

In April 2019, the Council took final action on proposed changes that limit Amendment 80 and American Fisheries Act (AFA) catcher/processors from acting as motherships when receiving BSAI CDQ Pacific cod from trawl catcher vessels. Two trawl catcher/processors will be allowed to act as a mothership for directed BSAI Pacific cod harvests by trawl catcher vessels. One of the trawl catcher/processors is a member of the AFA catcher/processor sector and the other is a member of the Amendment 80 sector (NPFMC 2019c). All other trawl catcher/processors in those two sectors will continue to be allowed to accept deliveries of Pacific cod harvested incidentally in other BSAI trawl catcher vessel target fisheries if the 20% maximum retainable amount (MRA) is not exceeded (NPFMC 2019b). Also included in the final action, was a provision that would prevent replaced Amendment 80 vessels from acting as a mothership in the BSAI or GOA cod fisheries (NPFMC 2019c).

At the June Council meeting, the BSAI Pacific cod allocation was reviewed and accepted as complete and final pending the addition, to the extent practicable, of recommended information by the SSC (NPFMC 2019b). The review was in response to the NMFS' Fisheries Allocation Policy Directive, issued July 2016, under which the Council is required to conduct a 10-year review of BSAI Pacific cod allocation to ensure that the optimal yield is being achieved under current conditions. The Council noted that Amendment 85 has overall provided stability for sectors in the BSAI Pacific cod fishery, provided entry level and local opportunities for some small vessels, and improved social and economic structures. As a follow up, the Council requested a description of the process for reallocating cod in season among the BSAI sectors, as well as including the potential impacts on other sectors of the proposed rationalization of the trawl CV and pot CV sectors in the scoping paper scheduled for the October Council meeting (NPFMC 2019b).

Also at the June Council meeting, a discussion paper was reviewed that included a status report on Amendment 113 litigation and potential regulatory approaches that could be used to provide opportunities for trawl catcher vessels harvesting Pacific cod in the AI and delivering the Pacific cod to AI shore based plants (NPFMC 2019a). After the review and receiving public testimony, the Council requested a discussion of trawl CV harvests and deliveries in the AI Pacific cod fishery and the set-aside provisions be included in the BSAI Pacific cod trawl catcher vessel management scoping document scheduled for the October 2019 Council meeting (NPFMC 2019a). The Council noted that depending on the results of the document, the Council may consider an AI focused limited access program (LAP) as a long-term solution for AI shore-based plant protections in the future.

As previously mentioned in Section 6, the BSAI Pacific cod has been separated into an AI stock and a BS stock. Separate OFLs, ABCs and TACs have been created for the AI and for the BS stocks, however the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. 10.7 percent of the TAC is allocated to the CDQ program, and the rest is allocated among the various fishing sectors based on gear type, vessel size, and ability to process their catch (NOAA 2019).

In December 2018, the Council adopted the BS Fishery Ecosystem Plan (FEP), which serves as a framework for a more formal approach for continued incorporation of ecosystem goals and actions in regional management. Five Action Modules were adopted, and the Council prioritized them:

1. Evaluate short-and long-term effects of climate change on fish and fisheries and develop management considerations – INITIATED.
2. Develop protocols for using local knowledge and traditional knowledge in management and understanding impacts of Council decisions on subsistence use – INITIATED
3. Gap analysis of BS management with EBFM best practices
4. Interdisciplinary conceptual models for the BS ecosystem
5. Align and track Council priorities with research funding opportunities.

The Council will periodically reconsider the list of Action Modules, their prioritization and which of them to initiate for action (NPFMC 2019i).

In 2016, Amendment 113 set aside a portion of the AI Pacific cod TAC for harvest by vessels fishing for AI Pacific cod and delivering their catch to a shoreside processor located on land west of 170°W. longitude in the AI. This set-aside provides the opportunity for vessels, AI shore-based processing plants and the communities where AI shore-based processing plants are located to receive benefits from a portion of the AI Pacific cod fishery (NPFMC 2019j).

Aleutian Island Fishery Ecosystem Plan

The Council developed the Aleutian Islands Fishery Ecosystem Plan (AI FEP) as a pilot project in December of 2007. The AI FEP identified research priorities, ecosystem interactions, indicator status and data gaps for the AI. The ecosystem indicators have since been developed into an AI ecosystem assessment and are monitored on an annual basis as part of the Council's Ecosystem Considerations appendix to the Groundfish Stock Assessment and Fishery Evaluation Report (SAFE) (NPFMC 2007).

GOA Pacific Cod

Pacific cod is the predominant groundfish species targeted by the fixed gear sectors in the GOA (NPFMC 2018b). Implemented in 2012, the Council added gear-specific (hook-and-line, jig or pot) Pacific cod endorsements to GOA fixed gear licenses that met a minimum catch threshold during 2002-2008. The action also decreased the number of fixed gear licenses eligible to access the GOA Pacific cod fisheries, so that the number of participants in the directed GOA Pacific cod fisheries are permanently capped at the number of available licenses. Therefore, new entrants will have to purchase an existing license if they wish to fish in federal waters (NPFMC 2019g). The TAC is 90 percent to the inshore sector and 10 percent to the offshore sector in the eastern GOA (NOAA 2019a).

At the June 2019 meeting, the Council took final action to recommend adjusting GOA pollock and Pacific cod seasonal allocations. The purpose of this action is to reduce management inefficiencies in the Western and Central GOA trawl CV pollock and Pacific cod fisheries. The Council intends to promote opportunities to harvest the resource when it is most valuable and accessible and to avoid redistribution of fishing opportunities between harvest sectors or management areas (e.g. non-trawl sectors). The Council also wants to offer flexibility to the fleet to manage and avoid prohibited species catch (PSC). Finally, the Council's preferred alternative is intended to be in accordance with measures that mitigate impacts on ESA-listed Steller sea lions (NPFMC 2019a). For Pacific cod, the Council aims to reduce the underharvest of B season TAC in the trawl CV sector by moving some of the seasonally allocated TAC to the A season. The Council re-specified the options for the amount of the seasonal reallocation, to clarify that sectors

other than the trawl CVs would not be impacted. The preliminary preferred alternative would result in an A/B seasonal TAC ratio – across all sectors – of 64%:36%, compared to the status quo of 60%:40% (NPFMC 2019a, 2018b).

Annually, the Council develops harvest specifications based on information from the Groundfish Plan Teams, SSC, AP, the public, and any other relevant information (NPFMC 2018b). Final harvest specifications are implemented by mid-February each year and based on new information contained in the latest groundfish SAFE reports. The most recent Council approved harvest specifications for the 2018-2019 can be found at GOA Groundfish Specifications for 2019-2020.

State Waters

At the BOF 18-19 October 2018 meeting in Anchorage, the Board discussed proposals for the following ADFG GOA Pacific cod management plans fisheries:

- Chignik Area Pacific cod Management Plans
- South Alaska Peninsula Area Pacific Cod Management Plan

The summary outcome for each management plan follows:

Chignik Area Pacific cod Management Plans

It was agreed to coordinate season opening dates between Chignik Area state-waters and parallel Pacific cod fisheries.

South Alaska Peninsula Area Pacific Cod Management Plan

It was agreed to repeal the regulation that delays opening of the South Alaska Peninsula state-waters Pacific cod jig gear fishery based on National Weather Service marine forecast.

When the weather delay provision was adopted in 2007, it was primarily directed at the pot gear fishery given that fishery is highly competitive with seasons typically lasting less than 21 days. The jig gear fishery is comparatively slow-paced, and the weather delay provision does not significantly reduce competition or improve access for participants. From 2007 through 2018, the average jig gear season length was 158 days and less than 3% of all landings occurred during the first week of the fishery (ADFG 2019a).

8.1.12 Management evaluation

Details of any planned education and training for interest groups

The Council 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 Council website identify several elements of Council procedures that enable the distribution of information to stakeholders and the provision of public comment to management.

The Northern Bering Sea Research Area (NBSRA) was implemented in 2008 and prohibited bottom trawling in the northern part of the Bering Sea. The objective of the Council was to develop a research plan that would provide better data to allow for increased understanding of the potential impacts of trawling on the benthic and epibenthic fauna of the northern Bering Sea before any commercial trawling was authorized (NPFMC 2019f). The Council requested that the Alaska Fisheries Science Center (AFSC) develop a research plan and a discussion paper that compiles existing information on the NBSRA and review relevant data on the northern Bering sea ecosystem (NPFMC 2019f).

The Council has signed a Memorandum of Understanding (MOU) with 4 State agencies and 10 Federal agencies to create the Alaska Marine Ecosystem Forum (AMEF). The AMEF seeks to improve coordination and understanding between the agencies on issues of shared responsibilities related to the marine ecosystems off Alaska's coast. The purpose of the forum is to: promote information and dialogue exchange; improve agency coordination by sharing data and priorities; allow agencies to understand the ecosystem impact of other activities; and provide opportunities for joint work and problem solving (NPFMC 2019). The Council also developed an Aleutian Islands Fishery Ecosystem Plan (AIFEP) and a Bering Sea Fishery Ecosystem Plan (BS FEP). These plans are intended to be an educational tool and resource that can provide the Council with an ecosystem context for fishery management and policy decisions (NPFMC 2019a; 2019i; 2007).

Date of the next review and audit of the management plan

The annual management cycle and activities related to groundfish, including BSAI and GOA Alaska Pacific cod fisheries management, contain extensive points of review detailed in the NPFMC Operating Procedures (NPFMC 2012). These involve specific review of actions taken by the SSC, and Advisory Panel. Management measures are implemented annually with harvest specifications (ABCs and OYs) identified for each year. These actions are specified in detail in the Council Operating Procedures (NPFMC 2012). Final harvest specifications are implemented by mid-February each year to replace those already in effect for that year and based on new information contained in the latest groundfish SAFE reports (NPFMC 2019a). The next NPFMC Council meeting is scheduled for June 2020.

8.2 Principle 3 Performance Indicator scores and rationales

The “Governance and Policy” component of Principle 3 (the PIs pre-fixed with 3.1) focuses on the high-level context of the fishery management system within the UoA. In this instance, there are two aspects of the management that need to be taken into account – the Federal and the State.

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: - Is capable of delivering sustainability in the UoA(s); - 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	Compatibility of laws or standards with effective management			
	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - Yes**
Rationale				

Federal
Management of the BSAI and GOA fisheries is carried out under the authority of the federal Magnuson-Stevens Fishery Conservation and Management Act (MSA), first passed in 1976 and most recently reauthorized in 2006 (MSRA). The MSRA is the principal law governing the harvest of fishery resources within the federal portion of the U.S. 200-mile zone. Under the MSRA, the North Pacific Fishery Management Council (NPFMC, or the Council) recommends management actions to the National Marine Fisheries Service (NMFS) for approval. In addition to the MSRA, the Council 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, Alaska natives have rights that are taken into account in the management of the fishery, coordinated by NMFS.

Internationally, the BSAI and GOA Pacific cod fisheries are 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.

The Council relies on a consensus approach among advisory bodies with room for minority reports should these groups fail to reach consensus (NPFMC 2009). The Council 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 MSRA. 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.

Therefore, it is concluded that there is an effective legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2, thereby meeting the SG 60, 80 and 100.

State
The state of Alaska manages groundfish fishery resources within state territorial waters (0 – 3 nm). Article 8 of the Constitution of the State of Alaska provides the framework for management of renewable resources:

- § 2. General Authority — The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the state, including land and waters, for the maximum benefit of the people.
- § 3. Common Use — Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.
- § 4. Sustained Yield — Fish, forests, wildlife, grasslands, and all other replenishable resources belong to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.
- § 15. No Exclusive Right of Fishery [as amended in 1972 to allow limited entry] — No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the state

To meet the Constitutional requirements, the Alaska legislature created the Alaska Department of Fish and Game (ADFG) and, the Alaska Board of Fish (BOF) with the purpose of conservation and development of fisheries resources [Alaska Statute 16.05.221]. The regulations the BOF has authority over are Title 5 Alaska Administrative Code (AAC) Chapters 1-77.

The General Commercial Fisheries Regulations establishes the basic regulations that give the ADFG and BOF the powers to regulate and manage the state fishery resource and describe the extent of their regulatory powers.

The BOF has the authority to make regulatory decisions described in Alaska Statute 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, and the ADFG is responsible for management actions based on those decisions.

The ADFG and BOF work closely with the Council and NMFS to ensure organized and effective co-operation in managing overlapping groundfish stocks, e.g. State-wide regulations give the ADFG authority to manage “parallel fisheries” (the state manages these fisheries in accordance with federal rules and regulations and the catch is recorded against the federal Total Allowable Catch (TAC). In other instances, the State of Alaska establishes “state waters” (or state-managed) fisheries with separate catch quotas and fishing seasons under state groundfish regulations (ADFG 2019a).

Internationally, the State participates and contributes to established agreements and shared management and working practices, e.g. International Pacific Halibut Commission, Pacific Salmon Treaty, Agreement between the US and Canada on enforcement.

Therefore, it is concluded that there is an effective legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2, thereby meeting the SG 60, 80 and 100.

b	Resolution of disputes			
	Guide post	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 UoA.	The management system incorporates or is 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?	**Federal – Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**

Rationale

Federal
Legal disputes are handled under the Administrative Procedures Act, which governs the process by which federal agencies (e.g. NOAA/NMFS) develop and issue regulations. Opportunities are provided for the public to comment on notices of proposed rulemaking (http://www.nmfs.noaa.gov/pr/pdfs/laws/apa.pdf). NOAA has an extensive Dispute Resolution Process, defined by the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320. The Council resolves disputes by majority vote as required in section 302 of the MSRA. All stakeholders have an opportunity for input prior to the decision by the Secretary of Commerce. Any disputes remaining following adoption of regulations/rules may be resolved through the federal court system. The MSRA requires discussions and decisions to take place in public sessions using publicly available information, which ensures transparency in the process and is appropriate to the context of the fishery.

Therefore, it is concluded that the management system incorporates or is 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, thereby meeting the SG 60, 80 and 100.

State
The BOF provides a transparent mechanism for resolution of disputes regarding fishery sustainability and harvest allocation. The BOF is established by 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 Alaska Statute 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 Title 5 Alaska Administrative Code (ACC) Chapters 1- 77.

The BOF process is used to resolve disputes that may arise, such as the allocation of surplus salmon between gear types and between adjacent management areas. Meetings are open to the public and are generally attended by ADFG staff and members of the public who can offer background information on agenda topics. The Board receives and reviews proposals and testimony from the public. Findings are available on the ADFG webpage.

If disputes cannot be resolved through the BOF process they can ultimately be adjudicated through the State court system as happens on occasion.

Therefore, it is concluded that the management system incorporates or is 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, thereby meeting the SG 60, 80 and 100.

	Respect for rights			
c	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**

Rationale

Federal
The MSRA states that “Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks) take into account the importance of fishery resources to fishing communities by utilizing economic and social data to provide for the sustained participation of such communities and to the extent practicable, minimize adverse economic impacts on

such communities. The US management system has a mechanism to formally commit to the legal rights created explicitly for First Nations and Treaty Tribes. Federal agencies are required 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.

The NPFMC has established a Rural Community Engagement Outreach Committee to improve outreach and communications with rural communities and Alaska Native entities and develop a method for systematic documentation of Alaska Native and community participation in the development of fishery management actions. The Committee is to advise the Council on how to provide opportunities for better understanding and participation from Alaska Native and rural communities; to provide feedback on community impacts sections of specific analyses, if requested; and to provide recommendations regarding which proposed Council actions need a specific outreach plan and prioritize multiple actions when necessary. Initial priorities of the Committee included PSC reduction. Management actions taken to reduce salmon by-catches in a number of fisheries also explicitly acknowledge the importance of the salmon resources to the individuals and communities reliant on them.

The CDQ Program was created by the NPFMC in 1992 to provide western Alaska communities an opportunity to participate in the BSAI fisheries that had been foreclosed to them because of the high capital investment needed to enter the fishery. The CDQ Program allocates a percentage of all Bering Sea and Aleutian Islands quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to (i) to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; (ii) to support economic development in western Alaska; (iii) to alleviate poverty and provide economic and social benefits for residents of western Alaska; and (iv) to achieve sustainable and diversified local economies in western Alaska. There are approximately 65 communities within a fifty-mile radius of the BS coastline who participate in the program.

Therefore, it is concluded that the management systems have formally committed 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, thereby meeting the SG 60, 80 and 100.

State
A formal and well-defined process exists to consider the views, customs, and interests of indigenous peoples who depend on fishing for their food or livelihood – this involves the BOF, a Federal Subsistence Board, and a series of regional Advisory Committees. The BOF process provides a formal and well-defined process to consider the impact of fisheries on coastal communities that are closely tied to state fisheries. This process regularly seeks and considers input from stakeholders in an effort to understand and address socioeconomic issues related to the fishery.

Therefore, it is concluded that the management systems have formally committed 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, thereby meeting the SG 60, 80 and 100.

References

NOAA 2019; NOAA 2013; MSRA, 2007; UNCLOS, 1982, NPFMC 2009

ADFG 2019a, Commercial Groundfish Fisheries
https://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryGroundfish.main#other

Alaska State Constitution https://law.justia.com/constitution/alaska/

Alaska Statute 16.05.251 t scohttp://www.touchngo.com/lglcntr/akstats/statutes/title16/chapter05/section251.htm ring

Title 5 Alaska Administrative Code (AAC) Chapters 1-77 http://www.touchngo.com/lglcntr/akstats/aac/title05.htm

Rural Community Engagement Outreach Committee https://www.npfmc.org/outreach/

Community Development Quota Program https://www.npfmc.org/community-development-program/

ADFG/BOF Advisory Committees http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory

State-wide Commercial Groundfish Regulations
https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 100 All UoAs** **State – 100 All UoAs**
Condition number (if relevant)	**N/A**

PI 3.1.2 – Consultation, roles and responsibilities

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	Roles and responsibilities			
	Guide post	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?	**Federal – Yes** **State - Yes**	**Federal – Yes** **State - Yes**	**Federal - Yes** **State - Yes**
Rationale				

Federal
The MSRA and amendments to the MSRA, in addition to other relevant Acts, mandate that the functions, roles and responsibilities are well understood and explicitly defined for key areas of responsibility and interaction. Under the MSRA, the Council recommends management actions to the NMFS for approval. Ultimate decision authority is placed with the Secretary of Commerce. 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. These management authorities are clearly defined in law and are functional.

Therefore, it is concluded that 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, meeting the SG 60, 80 and 100.

State
The function and role of ADFG and the BOF are described in legislation and regulation. The BOF process has been established for many years is well understood by participants and is clearly set out on the ADFG website. The website also clearly sets out the role and function of their organisation and individuals within it. Local Advisory Committees, and native associations have been established and are actively involved in the management process. Participants in the fishery and interested parties are actively encouraged to participate in the BOF process through the ADFG website and local ADFG offices and staff.

Therefore, it is concluded that 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, meeting the SG 60, 80 and 100.

b	Consultation processes			
	Guide post	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**.

	Met?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**
Rationale				

Federal
NOAA/NMFS has several processes that regularly seek and accept relevant information, including local knowledge. NOAA Fisheries partners with federal agencies and federally recognized tribes to advise and collaborate on activities that might impact endangered and threatened species, marine mammals, and important marine habitats. NMFS has also developed a Public Consultation Tracking System (PCTS), which is an information management system covering NMFS (NOAA Fisheries) consultations under the ESA and under the Magnuson-Stevens Fishery Conservation and Management Act sections 305(b)(2) & 305(b)(4) EFH. Information is publicly available that explains how information and management decisions are made, consultations with the various agencies and inter-agency sectors, council representation, etc. The Council meets five times a year according to a pre-announced schedule. Notice of meetings is made through the Federal Register. Meeting agendas are widely distributed before each meeting and accessible on the Council website. Most Council meetings take eight days, with individual advisory body meetings occurring during the course of the week. All meetings are open to the public, except for a short-closed Council session in which the Council deals with in which the Council deals with personnel, administrative, or litigation issues.

Therefore, it is concluded that 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.

State
The BOF process provides an open and transparent process for development and refinement of management policies and plans for fishery management. The BOF conducts public meeting for each fishery area in a rotating three-year cycle and also considers out-of-cycle issues in annual state-wide work sessions. Regulatory proposals and testimony are invited from the public and other stakeholders. Related technical information is provided by ADFG and every proposal is considered in an open public meeting which typically extends for multiple days depending on the region. Consultations, proceedings and decisions are documented extensively and publicised on the ADFG website, including management action if applicable and appropriate.

Therefore, it is concluded that 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.

	Participation			
c	Guide post		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?		**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**
Rationale				

Federal
All meetings are open to the public and meeting information is available on the Council website. Dates and locations of Council meetings are publicized in advance. Several upcoming webinars are posted on the Council website, where interested parties can participate and receive information pertaining to Groundfish subcommittees, catch estimation methodology, electronic monitoring and from various other adhoc committees and subcommittees. The Council website also provides a manual called “Navigating the Council Process” explaining the fishery management process in nontechnical language.

There are several other procedures that promote the engagement of stakeholders, including consultation among agencies, universities and stakeholders on needed research and scientific information, public review and comment of data and analysis, public attendance and comment periods at advisory body meetings, representation on advisory

bodies and the Council, Council newsletter, blogpost, twitter feed, public review periods for regulations and FMP amendments, agency responses to review comments, and opportunity for legal challenges to Council actions.

Therefore, it is concluded that the consultation process provides opportunity and encouragement for all interested and affected parties to be involved and facilitates their effective engagement consideration, thereby meeting the SG 60, 80 and 100.

State
The BOF process provides an open and transparent process for development and refinement of management policies and plans for fishery management. The BOF provides opportunity for input through public notification and their website of upcoming meetings and opportunities to input into the management process. The BOF conducts public meeting for each fishery area in a rotating three-year cycle and also considers out-of-cycle issues in annual state-wide work sessions. Participants in the fishery and interested parties are actively encouraged to participate in the BOF process through the ADFG website and local ADFG offices and staff. Regulatory proposals and testimony are invited from the public and other stakeholders. Related technical information is provided by ADFG and every proposal is considered in an open public meeting which typically extends for multiple days depending on the region. Consultations, proceedings and decisions are documented extensively and publicised on the ADFG website, including management action if applicable and appropriate.

Therefore, it is concluded that the consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement; and therefore, meets the SG 60, 80 and 100 level.

References

MSRA 2007, NPFMC 2019a;

Board of fisheries http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

Board Process http://www.adfg.alaska.gov/index.cfm?adfg=process.main

Advisory Committees http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory

Advisory Committee Forms and Information http://www.adfg.alaska.gov/index.cfm?adfg=process.forms

Understanding the Advisory Committee Process
http://www.adfg.alaska.gov/static/regulations/regprocess/pdfs/acmanforms/ac_process_brochure_2014.pdf

Submission of written comments to the BOF http://www.adfg.alaska.gov/index.cfm?adfg=process.comments

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 100** **State - 100**
Condition number (if relevant)	**N/A**

PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are **explicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - No**
Rationale				

Federal
The MSRA, National Standards and other legislation include explicit, well-defined short- and long-term objectives for sustainable fishing and conservation. NMFS incorporated precautionary concepts to ensure compliance with the Sustainable Fisheries Act 1996, which includes 10 National Standards for conservation and management of fisheries in the U.S. The Council have several goals and objectives in the BSAI and GOA FMPs that have been established in order to promote a stable planning environment for the seafood industry, including marine recreation events, while also maintaining the health of the resource and the environment (NPFMC 2018; 2018a).

Therefore, it is concluded that, clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are explicit within and required by management policy, thereby meeting the SG 60, 80 and 100.

State
Article 8 of the Constitution of the State of Alaska provides the framework for management of renewable resources and states, “§ 4. Sustained Yield — Fish, forests, wildlife, grasslands, and all other replenishable resources belong to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses”.

ADFG’s has an overarching mission statement that states, “The Alaska Department of Fish and Game's mission is to manage, protect, maintain, and improve the fish, game and aquatic plant resources of Alaska. The primary goals are to ensure that Alaska's renewable fish and wildlife resources and their habitats are conserved and managed on the sustained yield principle, and the use and development of these resources are in the best interest of the economy and well-being of the people of the state”.

ADFG states the mission of the Division of Commercial Fisheries is to manage commercial, subsistence, and personal use fisheries in the interest of the economy and general well-being of the citizens of the state, consistent with the sustained yield principle, and subject to allocations through public regulatory processes. In addition, the Core Services states a mission to “ensure the conservation of natural stocks of fish, shellfish and aquatic plants based on scientifically sound assessments” (ADFG 2019b). Because these objectives are directly stated, they are considered to be explicit within management policy, meeting the SG80 level. It is unclear, however, how these objectives are **required** by management policy, so the SG100 level is not met.

References

NPFMC 2018a; 2018b; UNCLOS, 1982; MSRA, 2007

Alaska State Constitution https://law.justia.com/constitution/alaska/

ADFG Mission https://www.adfg.alaska.gov/index.cfm?adfg=about.mission

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**More information sought / Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 100** **State - 80**
Condition number (if relevant)	**N/A**

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system 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	Objectives			
	Guide post	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific 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-specific 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-specific management system.
	Met?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - No**	**Federal – Yes** **State - No**
Rationale				

Federal
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 GOA 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.

Since these fisheries are primarily managed by NMFS, the 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-specific management system, meeting the SG 80 and SG 100 level for this scoring indicator.

State
The BOF, when developing their initial groundfish management plans (BOF 1996), identified guiding principles (5 AAC 28.089) for the development of such plans. In the view of the assessment team, these were the equivalent of objectives, however, these were repealed in 2013.

In their absence, the ADFG Mission Statement and Guiding Principles are used as the basis for the objectives for groundfish fisheries in State waters, as evidence in the "Statewide Commercial Groundfish Fishing Regulations", where they appear in the preamble to the groundfish provisions. Thereafter, the statutes and regulations are set out and include the State waters Pacific cod management plans (5 AAC 28.081) that are in place for Prince William Sound Area (5 AAC 28.267), Cook Inlet Area (5 AAC 28.367), Kodiak Area (5 AAC 28.467), Chignik Area (5 AAC 28.537), South Alaska Peninsula Area (5 AAC 28.577), and Bering Sea – Aleutian Islands Area (5 AAC 28.647 and 5 AAC 28.648).

With respect to Principle 2 related objectives, regulations prohibit the deliberate take of ETP species in groundfish fisheries and fishing is also prohibited near Stellar sea lion rookeries and haul-out areas (5 AAC 28.087).

Therefore, it is concluded that objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery-specific management system, thereby meeting the SG 60. The SG 80 is not met as short- and long-term objectives are not explicit within the fishery specific management system.

References

NPFMC 2018a; 2018b; 2019a, BOF state managed fisheries:
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter028/section089.htm

BOF 1996, Meeting record- "Findings from State Waters Pacific Cod Management Plan" Oct 1996, Wasilla.

5 AAC 28.089, Repeal, Office of Lieutenant Governor of Alaska, 2013
https://aws.state.ak.us/OnlinePublicNotices/Notices/Attachment.aspx?id=90928

Statewide Commercial Groundfish Fishing Regulations 2019 - 2020
https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 100** **State - 60**
Condition number (if relevant)	**2**

PI 3.2.2 – Decision-making processes

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		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	
Rationale				

Federal
Decision-making for North Pacific groundfish occurs primarily within the NPFMC process. However, NMFS, the states of Alaska, Washington and Oregon, and numerous industry, academic, and NGO stakeholders participate in the process. The process used by the Council for decision-making is described in the guide for navigating the Council process (NPFMC 2009) and the Council Operating Procedures (NPFMC 2012a). The 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.

Therefore, there are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives, thereby meeting the SG 60 and 80.

State
Decision-making for State waters groundfish occurs primarily within the BOF process. The BOF holds multiple public meetings each year at various locations throughout Alaska and establishes similar decision-making processes, with each BOF decision being recorded in a public forum after public comments. The BOF conducts regular reviews of groundfish fisheries within state waters of Alaska. The Board's review of management plans, amendments and other regulatory changes include input from ADFG staff, Regional ADFG advisory committees, non-ADFG scientists, industry, environmental non-governmental organizations (ENGOs), stakeholders and the general public.

Therefore, there are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives, thereby meeting the SG 60 and 80.

b	Responsiveness of decision-making processes			
	Guide post	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?	**Federal – Yes** **State – Yes**	**Federal – Yes** **State – Yes**	**Federal – No** **State – No**
Rationale				

Federal

Within the Council, decision-making processes are designed by law and practice to be responsive to issues raised from a number of sources. Processes are transparent, timely and adaptive to wider circumstances. The Council and its groundfish advisory bodies meet five times a year. Between meetings, committees composed of stakeholders, scientists and managers hold public meeting to consider specific problems and to evaluate management programs, developing recommendations for Council action. The BSAI and GOA FMPs state*: The Council will maintain a continuing review of the fisheries managed under this FMP through the following methods: l. Maintain close liaison with the management agencies involved, usually the Alaska Department of Fish and Game and NMFS, to monitor the development of the fisheries and the activity in the fisheries. 2. Promote research to increase their knowledge of the fishery and the resource, either through Council funding or by recommending research projects to other agencies. 3. Conduct public hearings at appropriate times and in appropriate locations to hear testimony on the effectiveness of the management plans and requests for changes. 4. Consider all information gained from the above activities and develop, if necessary, amendments to the FMP. The Council will also hold public hearings on proposed amendments prior to forwarding them to the Secretary for possible adoption.*

The Council also works very closely with the ADFG and the BOF to coordinate management programs in federal and state waters (0-3 nm from shore).

Therefore, it is concluded that 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, thereby meeting the SG 60 and 80. The SG 100 is not considered to have been met as there was no evidence to show that decision-making processes respond to **all** issues.

State
Decision-making processes respond to serious and other important issues, for example, at the BOF meeting in Anchorage between 18-19 October 2018, the Board discussed proposals for the following ADFG Pacific cod management plans:

- Aleutian Island Subdistrict Pacific Cod Management Plan
- Dutch Harbor Subdistrict Pacific Cod Management Plan
- Chignik Area Pacific Cod Management Plan
- South Alaska Peninsula Area Pacific Cod Management Plan

Over 30 written and oral presentations were made by stakeholders and ADFG staff, highlighting alternate management options for each management plan including impact analysis of the proposed management changes.

Therefore, it is concluded that 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, thereby meeting the SG 60 and 80. The SG 100 is not considered to have been met as there was no evidence to show that decision-making processes respond to **all** issues.

	Use of precautionary approach			
C	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		**Federal – Yes** **State - Yes**	
Rationale				

Federal

The Council management approach has incorporated forward looking conservation measures that address differing levels of uncertainty. The BSAI and GOA FMPs describe the Council's policy to management of groundfish 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… the Council management approach has incorporated forward looking conservation measures that address differing levels of uncertainty. This management approach has been labelled 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… As part of its policy, the Council intends to consider and adopt, as appropriate, measures that*

accelerate the Council's precautionary, adaptive management approach through community-based or rights-based management, ecosystem-based management principles that protect managed species from overfishing, and where appropriate and practicable, increase habitat protection and bycatch constraints. All management measures will be based on the best scientific information available." (NPFMC 2018, 2018a).

Therefore, the SG 80 is considered to have been met.

State
The State permits parallel Pacific cod fisheries in State waters, where fishing is conducted against the federal TAC, regulations and management measures from the adjacent federal waters and, in other instances, with Stellar sea lion (SSL) restrictions. Both take into account the precautionary approach through the federal management decision-making process. Annual guideline harvest levels (GHLs) set out in the State-waters management plans depend on the Pacific cod stock assessments conducted by NMFS, as well as the federal decided ABCs (5 AAC 28.075). There is also evidence of use of the precautionary approach by ADFG by area closures when the GHL is approached, or if there is a decrease in the overall biomass. For example, ADFG issued an announcement of area closure in the waters of Cross Sound, Icy Strait and Port Frederick on January 29, 2019, in response to reduced biomass reported by port sampling, similar to that seen in the Gulf of Alaska (https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1010849198.pdf).

Therefore, it can be said that the precautionary approach is implicitly used at the state level, meeting the SG 80 level for this scoring issue.

	Accountability and transparency of management system and decision-making process			
d	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's 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 the fishery's 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?	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - Yes**	**Federal - Yes** **State - Yes**
Rationale				

Federal
At the federal level, the Council is required to create a record of decisions. Actions taken by the Council are recommendations to the Secretary of Commerce who holed the ultimate decision authority but, in most instances, delegates this authority to the NMFS or NOAA Fisheries level. A formal rulemaking process is conducted under which federal regulations are issued as proposed rules subject to public comment. Responses to stakeholder comments are included in the final rule.

Stakeholders also receive comprehensive reporting on management actions through live blogs of Council meetings, meeting minutes and the Council newsletter.

Therefore, it is concluded that formal reporting to all interested stakeholders provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity, thereby meeting the SG 60, 80 and 100.

State
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 ADFG, public comment received from people inside and outside of the state, and guidance from the Alaska Department of Public Safety and Alaska Department of Law when creating regulations that are sound and enforceable. 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 reviews FMPs, amendments, regulatory changes and includes input from ADFG staff, Regional Fish & Game advisory committees, non-ADFG scientists, industry, environmental non-governmental organizations, stakeholders and the general public.

Therefore, it is concluded that formal reporting to all interested stakeholders provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity, thereby meeting the SG 60, 80 and 100.

	Approach to disputes			
e	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**

Rationale

Federal

Legal disputes are handled under the Administrative Procedures Act, which governs the process by which federal agencies (e.g. NOAA/NMFS) develop and issue regulations. Opportunities are provided for the public to comment on notices of proposed rulemaking (*http://www.nmfs.noaa.gov/pr/pdfs/laws/apa.pdf*). NOAA has an extensive Dispute Resolution Process, defined by the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320. The Council resolves disputes by majority vote as required in section 302 of the MSRA. All stakeholders have an opportunity for input prior to the decision by the Secretary of Commerce. Any disputes remaining following adoption of regulations/rules may be resolved through the federal court system.

The MSRA requires discussions and decisions to take place in public sessions using publicly available information, which ensures transparency in the process.

The Council conducts its ongoing decision-making processes in a manner designed to avoid legal disputes. It places a heavy emphasis on the use of advisory committees and stakeholder input as new regulations or programs are developed so that differences are resolved in the design stage. In addition, the wide dissemination of information to promote transparency ensures that the probability of stakeholders being caught off-guard is minimal.

Therefore, it is concluded that, the management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges, thereby meeting the SG 60, 80 and 100.

State

Early and frequent public engagement and responsiveness by the management system through the BOF process is considered to facilitate a proactive approach to mitigating legal disputes. The transparent and inclusive approach provided through the BOF allows for stakeholder concerns to be raised, discussed and options for resolutions to be debated and considered. If the BOF process is unable to resolve a dispute the judicial system provides a route for parties and has been occasionally used for fishery allocation and jurisdictional issues.

Therefore, it is concluded that, the management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges, thereby meeting the SG 60, 80 and 100.

References

NPFMC 2009; NPFMC 2012a; NPFMC 2018; 2018a; NPFMC 2019, NOAA 2019

BOF Process http://www.adfg.alaska.gov/index.cfm?adfg=process.main

BOF meeting Alaska Peninsula/Chignik/Bering Sea-Aleutian Islands Pacific Cod: October 18-19, 2018
http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=10-18-2018&meeting=anchorage

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 90** **State - 90**
Condition number (if relevant)	**N/A**

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
	MCS implementation			
a	Guide post	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery 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 and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - Yes**
Rationale				

Federal

Monitoring, control and surveillance (MCS) is carried out at-sea and shore-side for the federal fisheries by the Office of Law Enforcement (OLE) and the U.S. Coast Guard (17th District USCG). The USCG also undertake inspections of fishing vessels and enforce mandatory safety of life and property at sea requirements for the fishing fleets.

OLE protects marine wildlife and habitat by enforcing domestic laws, e.g. Federal Fisheries Regulations for Fisheries of the EEZ of Alaska [50 CFR 679]) and international agreements, e.g. combating Illegal, Unreported, Unregulated (IUU) fishing through the Joint Statement on Enhanced Fisheries Cooperation between the US and Russia.

The OLE in Alaska focuses on outreach and education programs to help the fishing industry understand the rationale for regulations and prevent or minimize infractions. The OLE enforcement staffing levels increased in 2017; sixteen special agents and enforcement officers now operate in the Alaska region. The NMFS Alaska Region OLE reports few major compliance issues.

The OLE publishes a national annual report and the Alaska region submits bi-annual reports to the NPFMC (as an example see OLE 2018 - Report for the period 1st October 2017 – 31st March 2018: for all fisheries, there were: 91 written warnings, 218 summary settlements and 1 criminal case. The report does not distinguish which fishery the offences relate to.

The USCG is the primary agency for at-sea fisheries enforcement. The USCG objectives are to prevent encroachment into the US EEZ, ensure compliance with domestic fisheries regulations, ensure compliance with international agreements and high seas fishing regulations. The 17th District covers the Alaska EEZ and is responsible for the largest amount of coastline and one of the largest areas of responsibility within the USCG.

If the USCG detects a fisheries infringement they gather evidence and hand over the investigation to the OLE. The USCG makes an annual report to the NPFMC on resources applied to fishery enforcement in the previous year, the number of boardings/inspections, the number of violations, lives lost at sea, safety issues, and any changes in regulations. The most recent report April – May 2017, indicates a low number of infractions: from a total of 93 boardings, all but one was related to safety equipment deficiencies.

The NPFMC Groundfish and Halibut Observer Program (The Observer Program) is an important component of the monitoring of the Alaska groundfish fisheries. It is industry-funded and provides a monitoring and data collection function that uses onboard observers and electronic monitoring (EM). On August 8, 2017 NMFS published a final rule to integrate EM into the North Pacific Observer Program.

The program is the main data gathering program for all biological and fishery data that feed into groundfish stock assessments and management. While observers are not directly part of the federal MCS program they are required to

report infringements. OLE and USCG officers conduct de-briefing interviews with observers, checking on vessels fishing practices and the conduct of the crew. Observers will often report potential infringements to the vessel captains, thereby contributing to self-regulation and corrective action.

The NPFMC have an established Enforcement Committee charged with reviewing proposed FMP amendments, regulatory changes, and other management actions on matters related to enforcement and safety at sea. The Committee is made up of governmental agencies (including OLE, USCG, ADFG, Alaska Wildlife Troopers) and organizations having expertise relating to the enforcement and monitoring of North Pacific groundfish and crab fisheries. Meetings are held on a regular basis, typically in conjunction with regular Council meetings and, are open to the public.

Therefore, a comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules, thereby meeting the SG 60, 80 and 100.

State

The primary responsibility for enforcing fish and wildlife-related statutes and regulations in Alaska state waters lies with the Alaska Department of Public Safety, through its Division of Alaska Wildlife Troopers (AWT) (the division also enforces non-fisheries related regulations passed by the Board of Game). Biologists and other staff of the ADFG sometimes participate in enforcement activities and assist the Wildlife Troopers as needed. Some ADFG field staff have enforcement training and have powers of arrest. The AWT attend the BOF and have an important input in the development of state regulations and legislation. The AWT also regularly liaise and patrol with the OLE and may also request the assistance of the USCG vessels and aircraft to help in their surveillance and enforcement activities.

ADFG fishery managers monitor harvest through daily harvest reports from fishermen and with fish tickets submitted at the time of landing. State managers track harvest, effort, weather, stock spawning condition (through regular communication with fishermen and processor fleet managers), delivery schedules, and fleet fishing patterns daily throughout the fishery to track harvest and formulate closures when the GHL is achieved. State managers work closely with federal fishery managers to coordinate fishery seasons, bycatch concerns, and harvest limits. Estimated bycatch and discards rates from state-waters vessels are integrated into NMFS total catch accounting. These data are available from NMFS Alaska Region and are typically reported directly to the NPFMC during their annual harvest specification review each December (ADFG 2019a).

Therefore, a comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules, thereby meeting the SG 60, 80 and 100.

	Sanctions			
b	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - Yes**	**Federal – No** **State - No**
Rationale				

Federal

OLE agents/officers have the option to provide a written warning for minor offences however, these are taken into account for repeat offenders. More serious offences can be dealt with by a summary settlement, i.e. a violation which is not contested and results in a ticket which may include a discounted fine, thus allowing the violator to quickly resolve the case without incurring legal expenses. Thereafter, an offence is referred to NOAA's Office of General Counsel (OGC) for Enforcement and Litigation which can impose a sanction on the vessels permit or further refer the case to the US Attorney's Office for criminal proceedings. Penalties may range from severe monetary fines, boat seizure and/or imprisonment. The MSRA has an enforcement policy section (50 CFR 600.740) that details these "remedies for violations".

Therefore, it is considered that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence, thereby meeting the SG 80. While fishers and enforcement officer may consider

sanctions provide an effective deterrent, it is difficult to demonstrably show this to be the case, therefore the SG 100 is not met.

State
Alaska state law, universal citation 16.05.723[10], describes the penalties for violating a BOF regulation. Fines, up to a maximum of $15,000 or imprisonment for not more than 1 year are stipulated, along with forfeiture of any fish, its market value, forfeiture of vessel and any fishing gear. A third misdemeanour conviction within a 10-year period will result in a fine 3 times the value of any fish in possession or a fine of $10,000, whichever is greater. The option of pursuing criminal action is also available to the State.

Therefore, it is considered that sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence, thereby meeting the SG 80. While fishers and enforcement officer may consider sanctions provide an effective deterrent, it is difficult to demonstrably show this to be the case, therefore the SG 100 is not met.

	Compliance			
C	Guide post	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?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal – No** **State - No**
Rationale				

Federal
The OLE publishes a national annual report and the Alaska region submits six monthly reports to the NPFMC (as an example see OLE 2018 - Report for the period 1st October 2017 – 31st March 2018: for all fisheries, there were: 91 written warnings, 218 summary settlements and 1 criminal case. The report does not distinguish which fishery the offences related to.

The NOAA Ole Report to the Council in June 2019, indicates that there were 67 OLE written warnings, 156 OLE summary settlements and 30 settlements issued for bycatch/groundfish overages in October 2018 through March 2018, however none of these settlements indicated that it was the BSAI or GOA cod fishery (NOAA OLE 2019).

The USCG 17th District publishes an annual report to the NPFMC on resources applied to fishery enforcement in the previous year, the number of boardings/inspections, the number of violations, lives lost at sea, safety issues, and any changes in regulations. The most recent report April – May 2017 (See Enforcement Committee webpage), indicates a low number of infractions: from a total of 93 boardings, all but one was related to safety equipment deficiencies, none were associated with the Pacific cod fishery.

The low occurrence of serious offences indicates that the Pacific cod fisheries are generally compliant with regulations.

Harvesters are required to provide species and fishing activity information in logbooks or eLandings.

Therefore, some evidence exists to demonstrate fishers comply with the management system, including, when required, providing information of importance to the effective management of the fishery. The SG 100 was not met owing to the lack of fisheries specific information with respect to the OLE reports.

State
The assessment team heard from representatives of the AWT that compliance was high within the Pacific cod fishery.

[10] https://law.justia.com/codes/alaska/2015/title-16/chapter-16.05/article-04/section-16.05.723

The only issues of non-compliance had to do with improper marking of cod pots, where the identification markers had fallen off. The ADFG publish citations for offences, incidents and non-compliance of State Regulations. No evidence of non-conformity in the Pacific cod fishery were reported on the website. The team also checked the Alaska Department of Public Safety – daily dispatch for the most recent year and no citations were issued for the Pacific cod fishery (https://dps.alaska.gov/dailydispatch/Home).

Harvesters and buyers are required to report catches through the completion of fish tickets and comply with requests by ADFG staff to sample their catch for biological attributes.

Therefore, fishers are generally thought to comply with the management system for the fishery and some evidence exists to demonstrate this. Fishers also provide information in relation to catch and effort information which is of importance to the effective management of the fishery. Therefore, the SG 80 is considered to have been met. The SG 100 was not met as there was not enough available information to provide the assessment team with a high degree of confidence to say that fishers comply with the State management system.

	Systematic non-compliance			
d	Guide post		There is no evidence of systematic non-compliance.	
	Met?		**Yes**	

Rationale

Federal & State
At the site visit and at previous surveillance audits of this fishery no evidence of systematic non-compliance was or has been reported by any stakeholder. Therefore, the SG 80 is met.

References

NOAA 2019; USCG 2014;

Alaska State Wildlife Troopers http://dps.alaska.gov/AWT/

Electronic Monitoring in the North Pacific
https://www.fisheries.noaa.gov/alaska/resources-fishing/electronic-monitoring-north-pacific

ADFG Enforcement. https://www.adfg.alaska.gov/index.cfm?adfg=enforcement.main

US Coastguard 17th District http://www.pacificarea.uscg.mil/Our-Organization/District-17/

NPFMC Enforcement Committee https://www.npfmc.org/committees/enforcement-committee/

The Alaska Department of Public Safety http://dps.alaska.gov

The Alaska Department of Public Health and Safety, Public Info office
https://dps.alaska.gov/dailydispatch/Home/Index

NOAA OLE Report NPFMC June meeting – 2019.
https://meetings.npfmc.org/CommentReview/DownloadFile?p=f4300841-73b1-4eac-b2c9-ee7fa59d5040.pdf&fileName=B4%20AKD%20OLE%20Presentation.pdf

Alaska state law, universal citation 16.05.723. https://law.justia.com/codes/alaska/2015/title-16/chapter-16.05/article-04/section-16.05.723

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**60-79**
Information gap indicator	**More information sought to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 85** **State - 85**
Condition number (if relevant)	**N/A**

PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		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	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	**Federal - Yes** **State - Yes**	**Federal - Yes** **State - Yes**	**Federal – Yes** **State - No**
Rationale				

Federal
The Council 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 (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, demonstrate the wide range of management topics evaluated by the Council. Congress reviews the MSA every five years and amends it as necessary.

Therefore, it is concluded that there are mechanisms in place to evaluate all parts of the fishery-specific management system, thereby meeting the SG 60, 80 and 100.

State
Annual management reports for groundfish fisheries in State waters are published by ADFG. Changes to the Pacific cod fisheries State waters management plans were recently evaluated and reviewed through the BOF process and revisions made in an open and transparent manner. While the assessment team could not find a specific policy or procedures for clearly setting out mechanisms for evaluating the Pacific cod fisheries, the BOF process clearly provides a mechanism through which stakeholders and/or ADFG staff can identify fishery specific management issues for review, evaluation and revision, however it is unclear if there are mechanisms in place to evaluate all parts of the fishery specific management system.

Therefore, it is concluded that the state component meets the SG80 level, but not the SG100.

b	Internal and/or external review			
	Guide post	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?	**Federal - Yes** **State -Yes**	**Federal - Yes** **State - No**	**Federal - Yes** **State - No**
Rationale				

Federal
The Council 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 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. OGC reviews proposed actions to assure compliance with the MSRA. The Center for Independent Experts periodically reviews the Alaska management and stock assessments. Further external review occurs through occasional legal challenges, which refine understanding of requirements under laws and regulations.

The SG100 level is met for all UoAs for this scoring issue.

State
ADFG and the BOF regularly undertake internal review of the Pacific cod management system, e.g. the 2018 review of the State-water Pacific cod management plans. According to the Joint Protocol between NPFMC and BOF, proposals identified as being of mutual concern to both the BOF and NPFMC will be forwarded to the NPFMC for its consideration and potential input prior to final action by the BOF. A joint NPFMC-BOF Protocol committee will be formed and will meet as necessary to review available analyses, proposals and any other matters of mutual concern, and to provide recommendations to the NPFMC and BOF. The NPFMC and BOF shall encourage ADFG and NMFS to consult actively with each other and other agencies as appropriate in order to prevent duplication of research, management and enforcement effort and to make optimum use of the resources available for management of fisheries.

Legislative committees have conducted oversight and legislative hearings regarding the BOF's actions in a region's fisheries. The BOF and ADFG 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. This process of external review is repeated in the BOF meeting schedule every 3 years (ADFG 2019a; 2019b). While this offers some evidence of general external review, more evidence is needed to confirm how the **fishery specific management** system is externally reviewed, what organization conducts the review and how often. Without such evidence of external review for the Pacific cod management, the SG 80 level is not met.

References

NPFMC 2009; 2012

Annual Management Report for Groundfish Fisheries in the Bering Sea – Aleutian Islands Management Area 2017. http://www.adfg.alaska.gov/FedAidPDFs/FMR18-18.pdf

Joint Protocol Between the North Pacific Fishery Management Council and Alaska Board of Fisheries, 2009. https://www.npfmc.org/wp-content/PDFdocuments/meetings/JointProtocol1209.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	**Federal – 100** **State - 70**
Condition number (if relevant)	

9 References

Principle 1 References:

Abookire, A. A., Piatt, J. F., and Norcross, B. L. 2001. Juvenile groundfish habitat in Kachemak Bay, Alaska during late summer. Alaska Fisheries Research Bulletin, 8: 45–56.

Abookire, A. A., J. T. Duffy-Anderson, C. M. Jump. 2007. Habitat associations and diet of young-of-the-year Pacific cod (Gadus macrocephalus) near Kodiak, Alaska. Marine Biology 150:713-726

Alderdice, D. F. and C. R. Forrester. 1971. Effects of Salinity, Temperature, and Dissolved Oxygen on Early Development of the Pacific Cod (Gadus macrocephalus). Journal of the Fisheries Research Board of Canada 28(6):883-902.

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10 Appendices

10.1 Assessment information

10.1.1 Previous assessments

The BSAI and GOA cod fisheries have been MSC certified since April 2010 when the first certificate was issued. There was a first re-assessment that concluded in June 2015. This is the second reassessment. Previously, the BSAI and GOA fisheries were listed as separate fisheries and reported in separate reports on the MSC website. This report is the first to combine the regions into one report. The reassessment that concluded in 2015 had no conditions. The initial assessment reports are available on the MSC website, and there is a separate report for each stock. As this was nearly ten years ago, and the assessment trees used are very different to the one in use now, it is not appropriate to go through each one and report on conditions that may have existed and been closed in the initial certification term.

10.2 Evaluation processes and techniques

10.2.1 Site visits

The assessment process as defined in the MSC Fishery Certification Process version 2.1 was followed in this audit.

Information supplied by the clients and management agencies was reviewed by the assessment team ahead of the onsite meeting, and discussions with the clients and management agencies centred on the content within the provided documentation. In cases where relevant documentation was not provided in advance of the meeting, it was requested by the assessment team and subsequently supplied during, or shortly after the meeting.

Thirty days prior to the audit site visit, all stakeholders from the full assessment were informed of the visit and the opportunity to provide information to the auditors in advance of, or during, the site visit. The site visit was held partly at the offices of At-Sea Processors and at Alaska Fisheries Science Center (AFSC) in Seattle, WA, June 17th – June 19th. Stakeholders attended either in person or via teleconference.

The following participants were in attendance:

Name	Affiliation
Erin Wilson	MRAG Americas
Paul Knapman	MRAG Americas and DNV assessment team member
Don Bowen	MRAG Americas assessment team member
Jake Rice	DFO Emeritus, MRAG Americas assessment team member
Jodi Bostrom	MRAG Americas assessment team member
Amanda Stern-Pirlot	MRAG Americas
Michealene Corlett	MRAG Americas
Giuseppe Scarcella	MRAG Americas and DNV assessment team member
Anna Kiselva	DNV GI
Miki Takada	Marine Stewardship Council (MSC)
Gonzalo Banda	MSC
Eileen Ekstrom	ANSI Technical Assessors
Austin Estabrooks	At-Sea Processors Association
Mark Fina	Alaska Seafood Cooperative
Christopher Oliver	Alaska Seafood Cooperative
Dave Gaudet	Alaska Fisheries Development Foundation (AFDF)
Riley Smith	AFDF
Matt Tinning	At Sea Processors Association
Julie Decker	AFDF (teleconference)
Susan Robinson	Ocean Peace Inc.
Nicole Kimball	Pacific Seafood Processors Association (teleconference)
Mark Stichert	Groundfish/Shellfish Fisheries Management Coordinator, Alaska Department of Fish and Game (ADFG), (teleconference)
Forrest Bowers	ADFG (teleconference)
Miranda Westphal	ADFG (teleconference)
Asia Beder	ADFG (teleconference)
Jim Ianelli	Alaska Fisheries Science Center (AFSC)
Steve Barbeaux	AFSC
Martin Dorn	AFSC
Meaghan Bryan	AFSC
Thomas Wilderbuer	AFSC
Sandra Lowe	AFSC

Name	Affiliation
Chris Wilson	AFSC
Martin Dorn	AFSC
Grant Thompson	AFSC (teleconference)
Pete Hulson	AFSC (teleconference)
Jeremy Sterling	AFSC
Brian Fadely	AFSC
Shannon Fitzgerald	NMFS/AFSC
Kerim Aydin	AFSC
Ed Melvin	AFSC
Kirsten Holsman	AFSC
Elizabeth Siddon	AFSC
Jennifer Ferdinand	AFSC
Lieutenant Jonathan Streifel	Alaska Wildlife Troopers (AWT; teleconference)
Julie Bonney	Alaska Fisheries Databank (teleconference)

The following is a summary of the agenda for the site visit:

Alaska Responsible Fisheries Management & Marine Stewardship Council

Site Visit Agenda/Audit June 17 – 19th

Monday, June 17th, 2019

Location:
At-Sea Processors Association
4039 21st Ave West Suite 400
Seattle, WA 98199

Time	Topic	MSC Team members	RFM Team members	Interviewees
8:30-9:00	General opening meeting with all clients and both programs to go over the agenda and logistics for the visit. MSC Agenda Items: • Objectives/Introductions • Overview of the assessment process, changes with the FCP RFM assessment team and their opening meeting	EW, GS, JB, PK (JR, WDB, ASP, MC)	AK, GS, JB, PK	Chris Oliver, Austin Estabrooks, Mark Fina, Dave Gaudet, Julie Decker, Riley Smith
9:00-10:30	Flatfish, rockfish, Atka mackerel client meeting: • Review of general info about the client group • Review of fishing operations: • Review of impacts on the ecosystem	EW, GS, JB, PK (JR, WDB, ASP, MC)	AK, GS, JB, PK	Chris Oliver, Mark Fina
10:30–10:45	Break			
10:45-12pm	Flatfish/Mackerel, POP and Rockfish Continued • Review of management practices			
12-1pm	Lunch	All	All	Austin, Chris, Mark, Dave
1-2pm	Pollock opening meeting • Review agenda and ensure content for P1, P2 and P3 has been gathered, meetings arranged, etc. • Confirm traceability for fisheries • Review current certificates • Review any changes, new developments	EW, JR, WDB, PK (ASP, GS, JB, MC)	N/A	Austin Estabrooks, Ruth Christiansen, Nicole Kimball
2:00	Meeting with cod complainant	EW, JR, WDB, PK (ASP, GS, JB, MC)	N/A	Complainant and only the MSC assessment team
3:00 - 4:00	Cod opening meeting • Review agenda and ensure content for P1, P2 and P3 has been gathered, meetings arranged, etc.	EW, JR, WDB, PK (ASP, GS, JB, MC)	N/A	Dave Gaudet, Julie Decker, Chad See, Nicole Kimball

Time	Topic	MSC Team members	RFM Team members	Interviewees
	• Confirm traceability for fisheries • Review current certificates • Review any changes, new developments			
4:00-5:00	• Management Review, changes in regulations, management plan, enforcement, monitoring, etc.	EW, PK		ADF&G: Forrest Bowers
	End Day 1			

Tuesday, June 18th, 2019
Location:
Alaska Fishery Science Center
7600 Sand Point Way N.E., Building 4
Seattle, WA 98115
Traynor Room 2079

Time	Topic	MSC Team members	RFM Team members	Interviewees
9:00 am	Introductions, review agenda			
9:10-10:15	2018 Stock assessments overview of BSAI and GOA pollock	JR, WDB, PK, EW (GS)	N/A	Pollock assessments EBS pollock – Jim Ianelli AI Pollock - Steve Barbeaux GOA Pollock – Martin Dorn
10:15-11:15	EBS, AI, and GOA Pacific cod (same as above)	JR, WDB, PK, EW (GS)	N/A	Pacific cod assessments EBS and AI Pacific cod - Grant Thompson *teleconference* GOA Pacific cod- Steve Barbeaux
11:15-12	BSAI Atka mackerel (same as above)	JR, WDB, PK, EW (GS)	AK, GS, JB, PK	BSAI Atka mackerel – Sandra Lowe
1:30-2:30	2018 Stock assessments overview of BSAI and GOA flatfish stocks (same as above)	GS, JB, PK, EW	GS, JB, PK, AK	BSAI Kamchatka flounder, Greenland turbot –Meaghan Bryan GOA N & S rock sole – Meaghan Bryan BSAI northern rock sole – Tom Wilderbuer Yellowfin sole – Tom Wilderbuer BSAI Alaska plaice – Tom Wilderbuer
3:00	BREAK			
3:15	2018 Stock assessments overview of BSAI and GOA flatfish stocks continued...			BSAI and GOA arrowtooth flounder assessments – Tom Wilderbuer

Time	Topic	MSC Team members	RFM Team members	Interviewees
4:00	2018 Stock assessments overview of BSAI and GOA rockfish stocks (same as above)	JR, WDB, PK, EW (GS)	AK, GS, JB, PK	BSAI northern rockfish – Paul Spencer GOA northern rockfish – Pete Hulson *teleconference* BSAI POP – Paul Spencer GOA POP – Pete Hulson GOA Dusky rockfish – Pete Hulson for Kari Fenske
	End Day 2			

Wednesday, June 19th, 2019

Morning sessions were held at:
Alaska Fishery Science Center
7600 Sand Point Way N.E., Building 4
Seattle, WA 98115
Traynor Room 2079

Afternoon sessions were held at:
At-Sea Processors Association
4039 21st Ave West Suite 400
Seattle, WA 98199

Time	Topic	MSC Team members	RFM Team members	Interviewees
9-10	Marine Mammal Lab/Seabirds	All	All	Marine Mammals – Brian Fadely and Jeremy Sterling Seabirds – Shannon Fitzgerald and Ed Melvin *teleconference*
10-11am	Ecosystems	All	All	Ecosystem status and trend updates – Ebett Siddon Ecosystem and multispecies modeling – Kirstin Holsman, Kerim Aydin
11-11:15	BREAK			

Time	Topic	MSC Team members	RFM Team members	Interviewees
11:15-12	Fisheries Monitoring and Analysis- Observer program	All	All	Jennifer Ferdinand
12-1:45	Lunch and travel to APA office			
1:45-2:00	Bycatch engineering/reduction including Salmon avoidance	All	All	Austin Estabrooks presenting Noelle Yochum's slides (NMFS Conservation Engineering)
2pm	Habitats/EFH	All	All	John Olson-NMFS habitat division *teleconference*
TBD	Enforcement			AWT/TBD
3.00-3:30	Pollock closing meeting	EW, JR, WDB, PK (ASP, GS, JB, MC)	N/A	Austin Estabrooks, Ruth Christiansen, Julie Bonney, (Nicole Kimball)
3:30-4:00	Cod closing meeting	EW, JR, WDB, PK (ASP, GS, JB, MC)	N/A	Dave Gaudet, Julie Decker, Chad See
4.00-4:30	Team debrief and planning meeting	All		
	End Day 3			

10.2.2 Stakeholder participation

Thirty days prior to the audit site visit, all stakeholders from the full assessment were informed of the visit and the opportunity to provide information to the auditors in advance of, or during, the site visit. We received no requests from outside stakeholders to take part in meetings regarding the BSAI or GOA cod fishery. We did receive one stakeholder request to meet with the team privately and is summarized in Section 10.4.

10.2.3 Evaluation techniques

MRAG published an announcement of the assessment on our website and sent a direct email to all stakeholders on our stakeholder list. MSC posted the announcement on its BSAI and GOA Pacific cod track-a-fishery page, as well as sent it by email in their Fishery Announcements newsletter to all registered recipients. At this time, MRAG Americas also announced the assessment site visit dates and location, as well as the assessment team. This was done according to the process requirements as laid out in MSC's Fisheries Certification Process v2.1, and in the MSC Fisheries Standard v2.0/2.01. The site visit for this assessment was held at the same time as the site visit for the 4th surveillance audit and reassessment activities of the certified AK BSAI and GOA flatfish, pollock and cod fisheries, and the announcements for both went to stakeholders together. Together, these media presented the announcement to a wide audience representing industry, agencies, and other stakeholders.

Information supplied by the clients and management agencies was reviewed by the assessment team ahead of the onsite meeting, and discussions with the clients and management agencies centred on the content within the provided documentation. In cases where relevant documentation was not provided in advance of the meeting, it was requested by the assessment team and subsequently supplied during, or shortly after the meeting. The assessment team and the clients set up meetings with BSAI and GOA Pacific cod fisheries' management and science personnel, and industry and harvest-sector representatives relevant to the fishery assessment.

In the FCR v2.0 default assessment tree used for this assessment, the MSC has 28 'performance indicators', six in Principle 1, 15 in Principle 2, and seven 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 issue may not have a scoring guidepost at each of the 60, 80, and 100 levels; in the case of the example above, scoring issue (b) does not have a scoring issue at the SG60 level. 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.

Scoring for this fishery 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 3.2-3.5 by all team members assured that the assessment team was aware of the issues for each performance indicator. Subsequently, the assessment team member, or members in this case, 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.

Performance Indicator scores were entered into MSC's Fishery Assessment Scoring Worksheet (see Section 7 Scoring) to arrive at Principle-level scores.

10.3 Peer Review reports

To be drafted at Public Comment Draft Report

There was only one peer reviewer for this assessment, Peer Reviewer A. The comments from the peer reviewer are included below.

General Comments Peer Reviewer A

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	Yes	Overall the assessment is well articulated. I have indicated in places where possible scoring changes might be appropriate. There is an important change from previous assessments in that the Aleutian Islands stock is now included. This is well covered in P1. For P2 and P3 it is more complex with the assessors not always separating out AI and scoring BSAI only combining EBs and AI. While this would seem a reasonable approach based on the broader ecosystem, the complex gear-related UoA scoring is in places confusing. For P2 certainly the breakdown of SGs and when they are met or not is absorbed into the text making it difficult in many place to differentiate. While the scoring rationale provided is generally well supported with references and good tables, it would certainly make it easier for PR and public interpretation if the P2 level scores of the UoAs were more clearly broken down in the scoring rationale. For PI comments I have separated the UoAs where appropriate only when scores differed between UoAs - when scores applied to all UoAs and were the same, the comments apply to all UoAs. There were a few places where the scores between the summary table and PI tables differed	The team has changed scoring where applicable. We will ensure that the scores in the summary table and PI tables are consistent and updated.

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	There are three conditions and one recommendation: 1: 1.1.1 for GoA only - there is a 5 year time frame to achieve SG80 which would seem appropriate (by 4th audit). 2: 3.2.1 for fishery specific objectives at state level to be developed - time frame to reach SG80 over 5 years is appropriate. 3: 3.2.4 for Monitoring and management performance evaluation to establish internal and external reviews. The time frame to achieve SG80 is appropriate.	Thank you for the comments.
Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]		Not Applicable at this stage	No response needed.
Enhanced fisheries only: Does the report clearly evaluate any additional impacts that might arise from enhancement activities?		Not Applicable	No response needed.

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	1. The report is of high quality and well structured. 2. It is a complex assessment - I have made some comments on improvement, not relating to material scoring but for ease of interpretation. 3. Regrading observer data - the information is generally well presented in tables etc. to accommodate the many UoAs, particularly for P2. It however is certainly not easy to follow all the scoring logic. 4. The observer data are critical to the scoring throughout the assessment - the language with respect to observer coverage in the various UoAs is not always well articulated - in particular where text refers to this coverage to support scores between the different UoAs. 5. For PR the assessment depends strongly on knowledge of previous assessments - while this would seem a reasonable approach due to the scale of the assessment and large number of UoAs, cross-refencing is complicated in places and difficult to support scores, particularly with the changes and references to BSAI and the separation of EBS and AI. This is not necessarily a criticism, but an area the assessment could be improved in the future.	Thank you for the comments. Additional rationale and references have been added to hopefully add clarity to this complicated fishery. We have also addressed some of the scoring issues, resulting in score changes for many of the scoring indicators.

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Performance Indicator (PI)	Has all available relevant information been used to score this PI?	Does the information and/or rationale used to score this PI support the given score?	Will the condition(s) raised improve the fishery's performance to the SG80 level?	PRs should provide support for their answers in the left three columns by referring to specific scoring issues and/or scoring elements, and any relevant documentation as appropriate. Additional rows should be inserted for any PIs where two or more discrete comments are raised e.g. for different scoring issues, allowing CABs to give a different answer in each case. Paragraph breaks may also be made within cells using the Alt-return key combination. Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).	CABs should summarise their response to the Peer Reviewer comments in the CAB Response Code column and provide justification for their response in this column. Where multiple comments are raised by Peer Reviewers with more than one row for a single PI, the CAB response should relate to each of the specific issues raised in each row. CAB responses should include details of where different changes have been made in the report (which section #, table etc).	See codes page for response options
1.1.1	Yes	Yes	NA	Score 80: The scoring rationale is sound and based on good stock assessment. Arguments presented re PRI are strong.	No response needed.	Accepted (no score change)
1.1.1	Yes	Yes	NA	Score 80: As for EBS but with lower certainty. Score would seem appropriate and the information presented adequate.	No response needed.	Accepted (no score change)
1.1.1	Yes	Yes	Yes	Score 60: The assessment as correctly focused on the uncertainty and the weakness in information to fully assess GoA cod stock. Scored also for stock rebuilding, Condition would seem appropriate.	No response needed.	Accepted (no score change)
1.1.2	Yes	Yes	NA	Score 100: (GOA only) - the rationale for scoring S1a at 100 could be strengthened ("seems highly feasible") to more explicitly state the rebuilding strategy aims for 1 generation of the stock. Ok with Sib rationale.	Rationale was added to the GOA scoring.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
1.2.1	Yes	Yes	Yes	Score 90: Scoring and rationale appropriate	No response needed.	Accepted (no score change)
1.2.1	Yes	Yes	Yes	Score 80: Rationale for different (lower) scoring of AI due to limited information and new stock assessment compared to EBS and GoA would seem appropriate.	No response needed.	Accepted (no score change)
1.2.1	Yes	Yes	Yes	Score 90: Scoring and rationale appropriate	No response needed.	Accepted (no score change)
1.2.2	Yes	Yes	NA	Score 95:	No response needed.	Accepted (no score change)
1.2.2	Yes	Yes	NA	Score 85: The dependence of Ai as a relatively newly defined stock leaves me a little uneasy particularly because it is dependent on surveys of trawlable areas only with parts of the stock outside of this area. I largely agree with the rationale provide although this aspect however is not considered or mentioned for both GoA and EBS - assuming that there is more confidence in the information and more established assessments.	Comment noted. Text has been added to explain why the uncertainty due to the survey not covering all area of AI seabed is considered to be appropriately addressed in the stock assessments. No change in scoring required.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
1.2.2	Yes	Yes	NA	Score 80: As for AI largely agree with rationale and scoring for Si(b). Is the intent with the recommendation applicable only to GoA?	The recommendation is an overall consideration for the exploration of HCRs that respond more rapidly when 'warm events' appear in the oceanographic or ecosystem modelling. While it specifically addresses the anomalous warming condition in the GOA, the same considerations could be applicable to most fisheries.	Accepted (no score change)
1.2.3	Yes	Yes	NA	Score 100: Scoring and rational appropriate	No response needed.	Accepted (no score change)
1.2.3	Yes	Yes	NA	Score 80: Scoring and rational appropriate	No response needed.	Accepted (no score change)
1.2.3	Yes	Yes	NA	Score 100:Scoring and rational appropriate	No response needed.	Accepted (no score change)
1.2.4	Yes	Yes	NA	Score 100: Agree with scoring and rationale	No response needed.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
1.2.4	Yes	Yes	NA	Score 85: Agree with scoring and rationale	No response needed.	Accepted (no score change)
1.2.4	Yes	Yes	NA	Score 100: Agree with scoring and rationale	No response needed.	Accepted (no score change)
2.1.1	Yes	Yes	NA	Score 95: Trawl. Complex primary species, although the rational and data provided is supportive	Agreed. Scoring changed to 90.	Accepted (non-material score reduction)
2.1.1	Yes	Yes	NA	Score 90: Longline BSIA only. Scoring agreed	No response needed	Accepted (no score change)
2.1.1	Yes	No (non-material score reduction expected)	NA	Score 95: Longline GoA only. Again, a complex scoring the rationale provided re other large sculpins is not well supported - suggest consistency with BSAI score at 90	Agreed. Scoring changed to 90.	Accepted (non-material score reduction)
2.1.1	Yes	Yes	NA	Score 85: BSIA Pot only. Scoring agreed	We have revised the pot scores for the BSAI and GOA to 90.	Accepted (score increased)
2.1.1	Yes	No (scoring implications unknown)	NA	Score 90: GoA Pot only. For consistency in interpretation GoA score probably 85. Alternately revise rationale for consistency between BSIA and GoA	We have revised the pot scores for the BSAI and GOA to 90.	Accepted (no score change)
2.1.1	Yes	Yes	NA	Score 100: Jig all UoAs. Scoring agreed	No response needed	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
2.1.2	Yes	No (scoring implications unknown)	NA	Score 95: All UoAs. Rationale argues for Si(b) that there is an objective basis for MSE testing at SG100 supported by Observer Programme. While this could be safely argued for BSAI, the Observer coverage for GoA is lower. While the observer coverage would seem mostly adequate, it is not consistent for all UoAs with lower confidence particularly for GoA. The language re Observer coverage is vague - see 2.1.3 "Much of the cod fleet in BSAI and GoA has 100% observer coverage ...". text could be strengthened to support the rational provided.	We have added text to clarify the nature of observer coverage in all UoAs to support the scores given.	Accepted (no score change)
2.1.3	Yes	No (scoring implications unknown)	NA	Score 80: All UoAs - see comment in 2.1.2	We have added text to clarify the nature of observer coverage in all UoAs to support the scores given.	Accepted (no score change)
2.2.1	Yes	Yes	NA	Score 90: All UoAs. Scoring agreed and rationale provided adequate.	No response needed	Accepted (no score change)
2.2.2	Yes	Yes	NA	Score 95: all Boas: Scoring agreed	No response needed	Accepted (no score change)
2.2.3	Yes	Yes	NA	Score 90: all UoAs. Scoring agreed - could be set at 85 re guidance 7.10.5.3a(iii) though rationale for "few are not fully met at SG100" sound.	No change. The score of 90 seems appropriate since only a few species in the bycatch report are not individually reported and FCP 7.17.11 states to score "upwards by the scores falling between 2 SGs obtained by the individual elements that exceed an upper SG level."	Accepted (no score change)
2.3.1	Yes	No (non-material score reduction expected)	NA	Score 90 or 85? : all BSAI UoAs only. There is a conflict in the scoring tables with BSAI scored at 90 in Par7 (ex ACDR) and scoring in 2.3.1	The scoring tables have been updated to reflect the correct score of 85.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
2.3.1	Yes	Yes	NA	Score 85: all GoA UoAs only. Scoring agreed. Set at 85 for all UoAs - ref. BSAI above for consistency in final score calculation in Para 5.	The scoring tables have been updated to reflect the correct score of 85.	Accepted (no score change)
2.3.2	Yes	Yes	NA	Score 95: all UoAs. Scoring agreed	No response needed.	Accepted (no score change)
2.3.3	Yes	Yes	NA	Score 90: BSAI and GoA UoAs without Jig. Scoring agreed	No response needed.	Accepted (no score change)
2.3.3	Yes	Yes	NA	Score 100: BSAI and GoA Jig only. No information - scoring and rational agreed	No response needed.	Accepted (no score change)
2.4.1	Yes	Yes	NA	Score 80: Trawl UoAs Scoring agreed	No response needed.	Accepted (no score change)
2.4.1	Yes	No (non-material score reduction expected)	NA	Score 90: Longline and Pot UoAs 1 of 3 Sis scored at SG100. score 85 (see guidance 7.10.5.3a(iii))	Agreed. The score has been changed for all longline and pot UoAs to 85.	Accepted (material score reduction to <80)
2.4.1	Yes	Yes	NA	Score 100: Jig UoAs. Scoring agreed	No response needed.	Accepted (no score change)
2.4.2	Yes	Yes	NA	Score 100: all UoAs. Agree with scoring - note UoAs for gear apply broadly to BSAI including AI and EBS and GOA	No response needed.	Accepted (no score change)
2.4.3	Yes	Yes	NA	Score 80: Trawl and Longline only: Agree with scoring	No response needed.	Accepted (no score change)
2.4.3	Yes	Yes	NA	Score 85: Jig and Pot only: Agree with scoring	No response needed.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
2.5.1	Yes	Yes	NA	Score 100: all UoAs: Scoring agreed and rationale provided appropriate	No response needed.	Accepted (no score change)
2.5.2	Yes	Yes	NA	Score 100: all UoAs: Scoring agreed and rationale provided appropriate	No response needed.	Accepted (no score change)
2.5.3	Yes	Yes	NA	Score 90: all UoAs. Scoring agreed and rationale provided appropriate	No response needed.	Accepted (no score change)
3.1.1	Yes	Yes	NA	Score 100: Scoring agreed for both Federal and State	No response needed.	Accepted (no score change)
3.1.2	Yes	Yes	NA	Score 100: Scoring agreed for both Federal and State	No response needed.	Accepted (no score change)
3.1.3	Yes	Yes	NA	Score 100: Scoring agreed for Federal only.	No response needed.	Accepted (no score change)
3.1.3	Yes	Yes	NA	Score 80: Scoring agreed - there is probably scope for partial scoring at SG100, but it will make no material difference	No response needed.	Accepted (no score change)
3.2.1	Yes	No (score increase expected)	NA	Score 80: The logic used in downgrading this score to SG80 seems contradictory. The issue is if Federal system has fishery specific well-defined objectives etc. - which it has? then SG100 is appropriate. The fact that the state system does not is scored under state management system	The team agrees with the peer reviewer and the score for federal has been changed to 100.	Accepted (score increased)
3.2.1	Yes	Yes	Yes	Score 60: Scoring agreed	No response needed.	Accepted (no score change)
3.2.2	Yes	Yes	NA	Score 90: Agree with scoring applies to both federal and state	No response needed.	Accepted (no score change)

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
3.2.3	No (scoring implications unknown)	Yes	NA	Score 85: largely agree with scoring. However actual numbers or examples of compliance levels are not provided (except for boarding levels and reference to "low") - stronger evidence needs to be provided to support the scoring. e.g. we are referred to Ole and USCG reports - the assessor should provide examples of no of compliance events, evidence of systematic or not. This referee has not got access to these reports to make a reasonable judgement of the scoring - rationale needs to be expanded with evidence.	The text stated that the team heard from representatives from the Alaska Wildlife Troopers (AWT), in addition to the team reviewing all available data to ensure compliance. The reports available from the OLE and USCG are general in nature and can be accessed by the references provided. Additional rationale was added on how the team assessed overall compliance.	Accepted (no score change)
3.2.4	Yes	Yes	NA	Score 100: scoring agreed and rationale sound.	No response needed.	Accepted (no score change)
3.2.4	Yes	No (non-material score reduction expected)	Yes	Score 75: Check scoring 1 of 2 Si's score 70?	The team agrees with the peer reviewer and the score for the state has been changed to 70.	Accepted (non-material score reduction)

10.4 Stakeholder input

To be drafted at Client and Peer Review Draft Report
To be completed at Public Certification Report

The following comment was originally submitted as a complaint to the MSC, then passed to MRAG Americas. The assessment team subsequently met with the complainants during the site visit. During the meeting at the site visit, the complainant agreed to reclassify his complaints as stakeholder comments to the assessment so that they could be explicitly and publicly considered as part of the reassessment. Therefore, the required forms for stakeholder submissions were not used.

Summary of Meeting with Chuck Hosmer
June 17th, 2019

Meeting Attendees:
Chuck Hosmer (complainant), Doug Wells (complainant), Erin Wilson (team leader for the MSC AK groundfish re-assessment and surveillance), Jake Rice (team member), Don Bowen (team member), Paul Knapman (team member), Amanda Stern-Pirlot (MRAG Americas), Michealene Corlett (MRAG Americas)

Mr. Charles (Chuck) Hosmer of Romanzof Fishing Co. submitted a complaint to the MSC regarding the Area 'O' in Alaska state waters cod fishery, or the Dutch Harbor Subdistrict (DHS) for the Pacific cod fishery. We contacted Mr. Hosmer and Mr. Doug Wells on Wednesday, June 5th, to arrange a time to meet during our site visit for the AK groundfish 4th surveillance and re-assessment, and in conjunction with the initial assessment of the BSAI and GOA Atka mackerel, POP, Northern and Dusky rockfish. Mr. Hosmer and Mr. Wells' complaint with the Pacific Cod fishery is summarized below:

- The following should be considered by the Assessment Team in relation to the MSC certification for Area O cod fisheries:
    - There is no stock assessment of the resource taken in the narrow band (within 3 miles from shore) where harvesting takes place; the TAC setting procedure does not comply with MSC Standards, and there is also concern with the lack of overall experience and expertise in setting fish quotas with the Alaska Board of Fish.
    - 100% of the harvest is taken during the winter spawning season, whereas in the Federal fishery catch is limited to 60% of the total quota that can be taken during the spawning season, or "A" season
    - Lack of monitoring; no observers and therefore there is no information on bycatch for other species

MRAG Americas and the MSC assessment team for AK Groundfish fishery met privately with Mr. Hosmer and Mr. Wells on June 17th at the office of MRAG Americas, Inc. (Seattle) to further discuss the issue of Area "O". The events of the meeting are summarized as follows:

- The state-waters Area "O", or DHS, guideline harvest level (GHL) was set of the Board of Fisheries at 8% of the federal allowable biological catch (ABC) for Pacific cod in the federal Bering Sea Subarea. The state-waters GHL increases 1% following each year the GHL is fully harvested to a maximum of 15% of the Federal ABC for Pacific cod.
- Federal participants are concerned by the prospect of an increase in the DHS GHL. The 15% limit is not a hard limit and could increase within the BOF process in the future.
- No gear restrictions, no observer coverage, no monitoring.
- 'Super 8s' are being constructed, which are vessels at or below 58 feet in length overall, but has dimensions and attributes which are 'super-sized' relative to the length; leads to concerns over capacity and competition with the resource without the commensurate monitoring requirements for longer vessels with similar capacity.

MRAG responded that our assessment team would inquire further about these concerns in our upcoming meetings with ADF&G, Alaska Fisheries Science Center, etc. Mr. Hosmer and Mr. Wells agreed to submit their complaint as a stakeholder submission, rather than a complaint, to ensure their concerns will be addressed in the different drafts of the assessment report.

MRAG's Response: The assessment team addressed the stakeholders' concerns with ADFG. ADFG responded in the following summary:

ADF&G response to complaint filed on May 9, 2019 by Mr. Charles Hosmer of Romanzof Fishing Co to the Marine Stewardship Council (MSC) summarized below:

Complaint 1. The TAC setting procedure does not comply with the MSC standards. It has no scientific basis and has been arbitrarily set by the Board of Fisheries. Additionally, there is no stock assessment within 3 nmi where the state-waters fishery occurs.

The state-waters Dutch Harbor Subdistrict (DHS) fishery is assessed as part of the federal eastern Bering Sea Pacific cod stock which is evaluated annually under the Assessment of the Pacific cod stock in the Eastern Bering Sea produced by the NPFMC's Groundfish Plan Team. Since Pacific cod are highly migratory and harvested over much of the Bering Sea shelf, the assessment encompasses the entire stock throughout its range in the Bering Sea, including state waters. Fisheries independent data for the stock assessment is provided by National Marine Fisheries summer Bering Sea shelf trawl survey.

The 2019 DHS guideline harvest level (GHL) was set by the Board of Fisheries at 8% of the federal allowable biological catch (ABC) for Pacific cod in the federal Bering Sea Subarea. The state-waters GHL increases 1% following each year the GHL is fully harvested to a maximum of 15% of the federal ABC for Pacific cod. Additionally, a small jig fishery was established for the 2019 season that occurs within the DHS with a fixed GHL of 100,000 pounds. The state-waters GHL is annually coordinated with the federal stock assessment and Bering Sea Subarea Pacific cod ABC and OFL. The federal Pacific cod ABC/OFL apply to the entire Bering Sea Subarea. There are no other spatially explicit management measures for Pacific cod in the Bering Sea Subarea except that the DHS state-waters fishery is limited to state waters (0-3 nmi).

ADF&G staff are fully integrated into the federal stock assessment and regulatory process with state representatives appointed to the NPFMC's groundfish plan team, science and statistical committee, and the council. When issues of mutual interest arise, the NPFMC and BOF meet through a joint protocol committee to discuss overlap of multijurisdictional fisheries such as changes to the DHS state-waters Pacific cod fishery. The joint protocol committee met in October 2018 to specifically discuss and evaluate harvest limits for the DHS state-waters fishery.

Federal Bering Sea Pacific cod ABC, Dutch Harbor Subdistrict pot gear Pacific cod GHL, state-waters harvest, in pounds, as a proportion of the federal ABC, by year, 2014–2019.

	Federal	State-waters		
Year	Bering Sea ABC	DHS GHL	Harvest	Percent of ABC
2014	562,173,000	17,863,874	17,666,510	3.1%
2015	562,173,000	18,029,404	17,636,103	3.1%
2016	562,173,000	35,979,072	35,519,920	6.3%
2017	526,899,400	33,721,562	33,247,414	6.3%
2018	443,124,600	28,360,000	29,055,603	6.6%
2019	399,032,600	31,922,600	32,345,033	8%
Avg.	509,262,600	27,646,085	27,524,692	5.4%

Complaint 2. Harvest of the Dutch Harbor Subdistrict Pacific cod fishery occurs during winter spawning seasons. In the winter federal Pacific cod fisheries outside of state waters, A season catch is limited to 60% of the total quota in order to lessen the impacts to spawning biomass and lessen the impacts of winter feeding of Steller sea lions.

Pacific cod in the Bering Sea spawn annually in large, near-shore, aggregations. Spawning typically occurs late-February through mid-April. Pacific cod fisheries (state and federal) have historically occurred during this time.

Federal seasonal apportionments only apply to Steller sea lions (SSL) prey stocks; Pacific cod, Atka mackerel, and walleye pollock. Federal Pacific cod seasons were established in order to preserve a portion of the Pacific cod stock for SSL foraging throughout the fishing year. The 2001 biological opinion for federal Amendment 85, in compliance with changes to the Magnuson-Stevens Act, requires temporal dispersion of harvest so that the overall BSAI federal Pacific cod fishery is limited to seasonal percentages of no more than 70% between January 1 and June 10 and 30% between June 10 and December 31. Seasonal apportionments are made solely to comply with protection measures for SSL without regard to Pacific cod spawning stock conservation.

The DHS state-waters fishery is not subject to the terms of federal Amendment 85. The state adopts most other Steller sea lion conservation measures including rookery and haul-out closures inside state waters.

Complaint 3. There is no meaningful in-season monitoring as there are no fisheries observers required and therefore no information on interactions with bycatch such as crab and other fish species.

The state does not have an established groundfish observer program nor are federal observers placed on state-waters vessels during the DHS fishery. ADF&G fishery managers monitor harvest in the DHS through daily harvest reports from fishermen and with fish tickets submitted at the time of landing. State managers track harvest, effort, weather, stock spawning condition (through regular communication with fishermen and processor fleet managers), delivery schedules, and fleet fishing patterns daily throughout the fishery to track harvest and formulate closures when the GHL is achieved. State managers work closely with federal fishery managers to coordinate fishery seasons, bycatch concerns, and harvest limits.

Bycatch and discards rates are applied to the vessels fishing state-waters based on federal observer coverage and data collected by federal observers. Observer coverage rates for federal fisheries changes from year to year and are based on a percentage of trips anticipated. Deployment rates for 2019 are:

No Selection – 0%
Electronic Monitoring (EM) – 30%
Trawl – 24%
Hook-and-line – 18%
Pot – 15%
Trawl vessels delivering to a tender – 27%
Pot vessels delivering to a tender – 16%

In general, federal bycatch and discard rates are calculated from observer data based on a three-week average reporting window for observed vessels within each gear/deployment strata. Bycatch and discard rates for unobserved vessels are calculated from observer data collected from vessels in the same gear strata and target fishery for vessels participating in similar locations and time of year. To allow for total catch accounting, bycatch and discard rates computed from the federal A-season pot gear strata are applied to state-waters fishery removals in the same manner as they are to unobserved pot gear vessels during the federal fishery. The DHS fishery opens 7 days following closure of the federal BSAI ≤60 ft pot gear sector. Nearly all vessels that fish in the federal fishery also fish in the DHS fishery and the location and fishing practices across the two fisheries are very similar. Bycatch and discard rates calculated from the ≤60 ft pot gear federal fishery are likely comparable to state-waters fishery although no specific evaluation has been made.

Estimated bycatch and discards rates from state-waters vessels are integrated into NMFS total catch accounting. These data are available from NMFS Alaska Region and are typically reported directly to the NPFMC during their annual harvest specification review each December.

After further review of the issues raised, the assessment team agreed to separate the management component (Principle 3) and independently score the state and federal parts of the management system. The separation was made as the State clearly takes an active role in managing the Pacific cod fishery and not just adopting a parallel fishery. The parallel fisheries are managed separately from the State Guideline Harvest Level (GHL) fisheries. The State GHL fisheries occur during distinct seasons that generally do not overlap the parallel and Federal waters seasons and are managed by ADFG under a GHL and a distinct set of regulations. The current BOF action allows for a potential step up of 1% each year to the maximum 15% allocation (in 2026 if step up each year). However, this could change (by going up or down) when this fishery comes up in the next 3-year BOF cycle, when the Board process would consider updated information from the public, NMFS and ADFG staff on the stock and the participation patterns in the fishery.

The assessment team agreed that the federal management of the BSAI and GOA cod fisheries is very well managed, with explicit roles, decision making processes and monitoring. The state component, however, did not score as well against the MSC standard, and thus resulted in two conditions for Principle 3. The assessment team concluded that as the state issued GHL could potentially increase, clear objectives and management review are needed both at the state and federal level.

10.5 Conditions

To be drafted from Client and Peer Review Draft Report

Table 32 Condition 1

Performance Indicator	1.1.1 GOA stock
Score	60
Justification	Please reference page 38 of this report.
Condition	By year 5, evidence needs to be presented that it is highly likely that the stock is above the PRI.
Milestones	Because the stock status is due to anomalous warming conditions and not because of overfishing, the client should work with NMFS and the Council to comply with the rebuilding plan and follow the limits in place for the directed fishery (currently closed). By the first annual audit (2021) the fishery should demonstrate that they have a plan to comply with the rebuilding plan and are supporting efforts to bring the stock above the PRI. By the second annual audit (2023), the fishery will show that that their efforts and the rebuilding plan is progressing. By the third annual audit (2023), the fishery will show that the plan is progressing according to schedule. By the fourth annual audit (2024), the fishery will show that the plan is progressing according to schedule, and rebuilding efforts have been successful.
Consultation on condition	The CAB has verified that any parties implicated in the execution of the client action plan have been duly notified, and as the plans required for the first milestone evolve, the assessment team expects to verify at the first annual audit that any actions implicating entities besides the client have been agreed with their involvement.

Table 33 Condition 2

Performance Indicator	3.2.1 State Management
Score	60
Justification	Please reference page 192 of this report.
Condition	By year 5, clear fishery specific objectives for the Pacific cod fishery should be explicit at the state level of management.
Milestones	The client should work with ADFG and the BOF to instate short- and long-term objectives for Pacific cod. By the first annual audit (2021), the fishery demonstrates that they have a plan to ensure short- and long-term objectives are in place for Pacific Cod in State of Alaska waters. By the second annual audit (2022) the fishery will show that the plan is progressing according to schedule. By the third annual audit (2023) the fishery will show that the plan is progressing according to schedule. By the fourth annual audit (2024) the fishery will show that short- and long-term objectives are in place for the Pacific cod fishery in State waters.
Consultation on condition	The CAB has verified that any parties implicated in the execution of the client action plan have been duly notified, and as the plans required for the first milestone evolve, the assessment team expects to verify at the first annual audit that any actions implicating entities besides the client have been agreed with their involvement.

Table 34 Condition 3

Performance Indicator	3.2.4 Monitoring and management performance evaluation
Score	60
Justification	Please reference page 203 of this report.
Condition	By year 5, evidence needs to be provided with how the State fishery specific management system is externally reviewed and how often.
Milestones	The client should work with ADFG and the BOF to create a plan that implements occasional external review for the fishery-specific management system of Pacific cod. By the first annual audit (2021), the fishery demonstrates that they have a plan to ensure occasional, external review of the fishery specific management system for Pacific cod in State waters. By the second annual audit (2022) the fishery will show that the plan is progressing according to schedule. By the third annual audit (2023) the fishery will show that the plan is progressing according to schedule. By the fourth annual audit (2024) the fishery will demonstrate that occasional external review of the fishery specific management system for Pacific cod occurs for the Pacific cod fishery in State waters.
Consultation on condition	The CAB has verified that any parties implicated in the execution of the client action plan have been duly notified, and as the plans required for the first milestone evolve, the assessment team expects to verify at the first annual audit that any actions implicating entities besides the client have been agreed with their involvement.

10.6 Client Action Plan

To be added from Public Comment Draft Report

MRAG Americas confirms the following Client Action Plan is sufficient to achieve the SG80 for the scoring issues in question under the three current conditions and that all relevant entities will be informed.

Erin Wilson, Assessment Team Lead, MRAG Americas
1631 15th Ave W, Suite 215, Seattle, WA 98119
erin.wilson@mragamericas.com

RE: AFDF Client Action Plans for the Alaska Pacific cod fishery

Dear Ms. Wilson, March 4, 2020

As the Client for the MSC certification of the Alaska Pacific cod fishery, the Alaska Fisheries Development Foundation (AFDF) commits to the following Client Action Plans in response to the conditions issued by MRAG Americas in the Client Draft Report (CDR) for the 2nd recertification of the Alaska Pacific cod fishery, issued on January 6th, 2020. The conditions issued refer to the following Principle Indicators (PIs) and Scoring Guidepost (SG) 80 criteria under the MSC standard v 2.1:

1) *PI 1.1.1 (Gulf of Alaska (GOA) stock status): The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing. SG80: It is highly likely that the stock is above the Point of Recruitment Impairment (PRI).*

2) *PI 3.2.1 (state fishery specific objectives): The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2. SG80: Short and long-term objectives are explicit within the fishery-specific management system.*

3) *PI 3.2.4 (State management evaluation): 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. SG80: The fishery-specific management system is subject to regular internal and occasional external review.*

<u>Condition 1 (PI 1.1.1)</u>: *By the 4th year surveillance audit, it needs to be highly likely that the GOA stock is above the PRI. This is due to anomalously warm temperatures and not due to overfishing.*

The GOA Pacific cod stock status is due to anomalous warming conditions (a marine heat wave in 2014 through 2016) and not overfishing. AFDF and fishery stakeholders will work with National Marine Fisheries Service (NMFS) and the North Pacific Fisheries Management Council (Council) (including following recommendations of the Council's Scientific Statistical Committee (SSC)) to establish directed fishery limits that are expected to result in the stock exceeding the PRI. AFDF will compile a short report each year regarding GOA Pacific cod stock surveys and NMFS management actions as long as this condition is outstanding.

- **<u>AFDF ACTION:</u>** Until such time as the condition is satisfied, at the time of each annual audit, the fishery will demonstrate compliance

with SSC recommendations and supporting efforts to bring the stock above the PRI. AFDF will provide the Assessment Team (AT) a review of the annual stock surveys and resulting NMFS management action in accordance with the existing NMFS management plan (including an update of progress toward the fishery exceeding PRI and stock projections showing the potential time by which this condition will be satisfied).

Condition 2 (PI 3.2.1): *By the 4th year surveillance audit, short and long-term objectives need to be explicit within the State's fishery specific management system.*

AFDF will work with stakeholders to identify the appropriate entity to submit a proposal to the Board of Fisheries (BOF) to include explicit short- and long-term fishery objectives in the Alaska Department of Fish and Game (ADFG) Pacific Cod Fisheries Management Plan.

- **AFDF ACTION:** By the first annual audit (2021), the fishery will demonstrate a plan to ensure short- and long-term fishery objectives are in place for Pacific cod in State of Alaska waters. AFDF will work with stakeholders, including ADFG, to develop a plan which identifies possible entities to submit a proposal to the BOF for inclusion of explicit fishery objectives. AFDF will also provide an outline of the proposal and a timeline for submission to and potential approval by the BOF. Until the condition is met, at the time of each annual audit, AFDF will submit to the AT a progress report specifically describing progress toward satisfying this condition.

Condition 3 (PI 3.2.4b): *By the 4th year surveillance audit, recent evidence needs to be provided on how the State's fishery-specific management is externally reviewed.*

If, after reviewing the regulatory structure, comments and documents submitted by AFDF to the CDR and the Public Comment Report, the AT continues to maintain that a condition is warranted under PI 3.2.4b, AFDF will work with fishery stakeholders and ADFG (and the BOF, as needed) to create a plan that ensures external review for the fishery-specific management system of Pacific cod.

- **AFDF ACTION:** Until this condition is met, at the time of each annual audit, the fishery will report on its progress toward a system for periodic external review. AFDF will work with stakeholders, including ADFG, to produce a plan to ensure adequate external review of the fishery. Part of the plan will include a detailed report on the external management review process in place for the State of Alaska's groundfish management system. Additionally, AFDF will work with ADFG to include state groundfish fishery management biologists during the annual audits for Pacific cod.

Thank you for your consideration of these Client Action Plans.

Sincerely,

Julie Decker, Executive Director, AFDF

10.7 Surveillance

To be drafted from Client and Peer Review Draft Report

Table 35 Fishery surveillance program

Surveillance level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit & re-certification site visit
Level 4	**On-site**	**Off-site**	**Off-site**	**On-site surveillance audit & re-certification site visit**

Table 36 Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	e.g. May 2018	e.g. July 2018	e.g. Scientific advice to be released in June 2018, proposal to postpone audit to include findings of scientific advice
Year 1	TBD	Within 6 months of anniversary date of certificate	This surveillance will be coordinated with the certified BSAI and GOA flatfish, pollock and flatfish fisheries

Table 37 Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
Year 1	**On-site**	1 on-site auditor with remote support from by the rest of the team	Considering that milestones indicate that most conditions will be closed out in year 4/5, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this is to ensure that all information is collected and because the information can be provided remotely.
Year 2	**Off-site**	Remote support from the entire team	Information could be provided remotely on progress of the conditions.
Year 3	**Off-site**	Remote support from the entire team	Information can be provided remotely on progress of the conditions.
Year 4	**On-site surveillance audit & re-certification site visit**	On-site audit with the entire assessment team.	The entire assessment team will need to be present for review of new information and changes in the fishery since the last reassessment.

10.8 Harmonised fishery assessments

To be drafted at Announcement Comment Draft Report stage
To be completed at Public Certification Report stage

Table 23 – Overlapping fisheries

Fishery name	Certification status and date	Performance Indicators to harmonise
BSAI Alaska Pollock	Certified, April 18, 2015	PIs 2.1.x, 2.2.x, 2.3.x, 2.4.x, 2.5.x, 3.1.x,
BSAI Flatfish	Certified, October 29, 2015	PIs 2.1.x, 2.2.x, 2.3.x, 2.4.x, 2.5.x, 3.1.x,
GOA Alaska Pollock	Certified, April 18, 2015	PIs 2.1.x, 2.2.x, 2.3.x, 2.4.x, 2.5.x, 3.1.x, 3.2.x
GOA Flatfish	Certified, October 29, 2015	PIs 2.1.x, 2.2.x, 2.3.x, 2.4.x, 2.5.x, 3.1.x,
BSAI and GOA Atka Mackerel, Pacific Ocean perch, northern rockfish, and dusky rockfish	In assessment	PIs 2.1.x, 2.2.x, 2.3.x, 2.4.x, 2.5.x, 3.1.x,
Supporting information		
- Describe any background or supporting information relevant to the harmonisation activities, processes and outcomes.		
There is a Memorandum of Agreement between the clients for all of the Alaska groundfish fisheries, allowing certified species under each certificate to be landed and sold as certified by the other clients. Principle 3 management is very similar for all NPFMC-managed groundfish fisheries in the BSAI and GOA, and scores are consequently aligned for PI 3.1.x. All clients participate in joint assessment and audit visits and have more or less the same assessment teams. There is no need for any more formal harmonization process as a result.		
Was either FCP v2.1 Annex PB1.3.3.4 or PB1.3.4.5 applied when harmonising?		**No**
Date of harmonisation meeting		**Not applicable; see above**
If applicable, describe the meeting outcome		
- e.g. Agreement found among teams or lowest score adopted.		

Table X – Scoring differences

Performance Indicators (PIs)	Fishery name	Fishery name	Fishery name	Fishery name
PI	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
PI	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**
PI	**Not applicable**	**Not applicable**	**Not applicable**	**Not applicable**

11 Appendix 2 UoC tables

11.1 Unit(s) of Certification (UoC)

UoA 1	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Eastern Bering Sea (EBS) Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 2	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 3	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Jig
Client group	AFDF
Other eligible fishers	N/A
UoA 4	Description
Species	Pacific Cod (*Gadus macrocephalus*)

Stock	EBS Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 5	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	Aleutian Islands (AI) Federal manged stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 6	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI Federal manged stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 7	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI Federal manged stock
Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Jig
Client group	AFDF
Other eligible fishers	N/A
UoA 8	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI Federal manged stock

Geographical area	US Federal EEZ and State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 9	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Demersal trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 10	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Demersal longline
Client group	AFDF
Other eligible fishers	N/A
UoA 11	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 12	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA Federal managed stock
Geographical area	US Federal EEZ and State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	Jig
Client group	AFDF

Other eligible fishers	N/A
UoA 13	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 14	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	longline
Client group	AFDF
Other eligible fishers	N/A
UoA 15	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Pot
Client group	AFDF
Other eligible fishers	N/A
UoA 16	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	EBS State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	Jig
Client group	AFDF
Other eligible fishers	N/A
UoA 17	Description

Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 18	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	longline
Client group	AFDF
Other eligible fishers	N/A
UoA 19	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	pot
Client group	AFDF
Other eligible fishers	N/A
UoA 20	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	AI State managed stock
Geographical area	US State Waters of the Bering Sea, FAO 67 and 61
Harvest method / gear	jig
Client group	AFDF
Other eligible fishers	N/A
UoA 21	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA State managed stock
Geographical area	US State Waters of the Gulf of Alaska, FAO 67

Harvest method / gear	trawl
Client group	AFDF
Other eligible fishers	N/A
UoA 22	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA State managed stock
Geographical area	US State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	longline
Client group	AFDF
Other eligible fishers	N/A
UoA 23	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA State managed stock
Geographical area	US State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	pot
Client group	AFDF
Other eligible fishers	N/A
UoA 24	Description
Species	Pacific Cod (*Gadus macrocephalus*)
Stock	GOA State managed stock
Geographical area	US State Waters of the Gulf of Alaska, FAO 67
Harvest method / gear	jig
Client group	AFDF
Other eligible fishers	N/A

11.2 Objection Procedure – delete if not applicable

To be added at Public Certification Report stage

The report shall include all written decisions arising from a 'Notice of Objection', if received and accepted by the Independent Adjudicator.

Reference(s): FCP v2.1 Annex PD