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Responsible Fisheries Management (RFM) standard v1.3

Alaska Flatfish Complex

Certifícate No.: 10000445829-MSC-ANSI-USA

3rd Surveillance Report

Certification Body (CB)	MRAG Americas, Inc.
Assessment team	Amanda Stern-Pirlot (team lead), Dr. Giuseppe Scarcella, Erin Wilson
Fishery client	Alaska Seafood Cooperative
Assessment type	3rd surveillance after reassessment, remote
Date	July 18th, 2023

1 Contents

2 Glossary

ABC	Allowable Biological Catch
ADFG	Alaska Department of Fish and Game
AFSC	Alaska Fisheries Science Center
ASMI	Alaska Seafood Marketing Institute
AWT	Alaska Wildlife Troopers
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CIE	Center for Independent Experts
C/P	Catcher/Processor
CSC	Certified Seafood Cooperative
DPS	Distinct Population Segment
EBS	Eastern Bering Sea
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
F	Fishing Mortality
FAO	Food and Agriculture Organization of the United Nations
FMP	Fishery Management Plan
GOA	Gulf of Alaska
HCR	Harvest Control Rule
LLP	License Limitation Program
M	Natural Mortality
MCS	Monitoring, Control, and Surveillance
MRA	Maximum Retainable Allowance
MSRA	Magnuson-Stevens Fisheries Reauthorization Act
MSST	Minimum Stock Size Threshold
MSY	Maximum Sustainable Yield
mt	Metric tons
NEPA	National Environmental Policy Act
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council, or the Council
NPRB	North Pacific Research Board
OFL	Overfishing Level
OLE	Office of Law Enforcement
OY	Optimum Yield
PA	Precautionary Approach
PBR	Potential Biological Removal
PSC	Prohibited Species Catch
PWS	Prince William Sound
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SSB	Spawning Stock Biomass
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TSC	Technical Subcommittee
UoC	Unit of Certification
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VAST	Vector-Autoregressive Spatio-Temporal (Model)

3 Summary and Recommendations

3.1 Fundamental Clauses Summary

Fundamental Clause	Evidence adequacy rating	Justification
1. Structured and legally mandated management system	High	The AK flatfish **fisheries** are conducted in the U.S. EEZ waters of the BSAI and GOA. The principle legislative instrument for fisheries management in the U.S. is the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) and is implemented by the NMFS. The North Pacific Fishery Management Council, (NPFMC or Council) is one of eight regional councils established by the MSRA to manage fisheries in the 200-mile EEZ. The Council primarily manages groundfish in the GOA and BSAI, targeting cod, pollock, flatfish, mackerel, sablefish, and rockfish species harvested by trawl, longline, jig, and pot gear. The Council works closely with the Alaska Department of Fish and Game (ADFG) and the Alaska Board of Fisheries (BOF) to coordinate management programs in federal and state waters (0-3 nm from shore). In coastal waters off the United States, the AK flatfish complex catch is under the jurisdiction of the BSAI Groundfish FMP, GOA Groundfish FMP, and the MSRA.
2. Participation in coastal area management frameworks, decision-making processes and activities related to the fishery in support of sustainable resource use and conflict avoidance	High	The Council and NMFS manage U.S. federal fisheries off Alaska (3-200 nm). Management is coordinated, and in some cases, jointly managed, with the State of Alaska. NOAA and NMFS are also responsible for carrying out the U.S. policies to manage and conserve marine protected resources. Applicable law that is directly relevant to the management of marine fisheries includes, but not limited to, the National Environmental Protection Act (NEPA), Endangered Species Act, Marine Mammal Protection Act (MMPA), Coastal Zone Management Act (CZMA), and the Administrative Procedures Act (APA). The MSRA requires discussions and decisions to take place in public sessions using publicly available information, which ensures transparency in the process. Opportunities are provided for the public to comment on notices of proposed rulemaking. The Council resolves disputes by majority vote as required in section 302 of the MSRA.
3. Management objectives shall be implemented through regulations and formulated in a plan or other framework.	High	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. In addition to the National Standard Guidelines, the Council has established nine specific objectives, each with several sub-objectives, for BSAI and GOA groundfish fisheries in Alaska. These objectives include: 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.
4. Effective fishery data collection	High	Stock Assessment and Fishery Evaluation (SAFE) reports provide complete descriptions of data collections and time

		series. Records of catch and effort are recorded through the e-landing (electronic fish tickets) catch recording system and collected in vessel logbooks. The observer program and trawl and longline surveys also gather additional fishery dependent and independent data.
5.Stock Assessment	High	The Alaska Fisheries Science Center (AFSC) conducts stock assessments and research on AK flatfish fisheries annually, producing SAFE reports for the fisheries. ADFG contributes to scientific research and surveys that are conducted in state waters. The stock assessments are peer reviewed by external experts. Based ono the 2022 SAFE reports, these stocks in this assessment are not overfished, none are approaching an overfished condition and overfishing is not occurring.
6. Biological reference points and harvest control rules	High	Information for assessing the status of AK flatfish fisheries comes from the SAFE reports. The tier system harvest control rules (HCRs) specify the maximum permissible allowable biological catch (ABC), and the Overfishing Level (OFL) for each stock. As specified in the MSRA, if stocks decline below the Minimum Stock Size Threshold (MSST), a rebuilding plan must be implemented to bring the biomass back to the BMSY level (biomass relative to maximum sustainable yield [MSY]) within a specified timeframe.
7.Precautionary approach	High	The Council recommend harvest specifications, OFLs, ABC levels and TAC annually based on the SAFE reports, consistent with the Science and Statistical Committee (SSC) recommendations. Additionally, the tier approach assigns groundfish stock to a tier according to available data and uncertainty associated with the fishery. . In the December 2022 NPFMC meeting, the Council recommended Total Allowable Catch (TACs) with specified overfishing limit (OFL) and Acceptable Biological Catch (ABC) for the 2023 – 2024. In setting TACs for 2023 and 2024, the Council accounts for Guideline Harvest Levels (GHLs) for groundfish fisheries in State waters. The Council's OFLs, ABC, and TACs take the GHLs into account (NPFMC 2022). The BSAI harvest specifications for flatfish can be found at the following link: 2023 - 2024 BSAI harvest specifications. The GOA harvest specifications for flatfish can be found at the following link: 2023 - 2024 GOA harvest specifications.
8. Management measures to produce maximum sustainable levels	High	The MSRA, National Standards and other legislation include explicit, well-defined short- and long-term objectives for sustainable fishing and conservation.
9. Appropriate standards of fishers' competence	High	NMFS, the Council and ADFG have rules and regulations governing AK fisheries available on their websites. The BSAI and GOA FMPs also contain a summary of management measures that apply to these fisheries.
10. Effective legal and administrative framework for monitoring, surveillance, control and enforcement for all fishing within their jurisdiction.	High	There are three entities that provide enforcement for Alaska fisheries: NOAA Office of Law Enforcement (OLE), US Coast Guard (USCG) and Alaska Wildlife Troopers (AWT). Monitoring, control, and surveillance (MCS) is carried out at-sea and shore-side for the federal fisheries by the OLE and the USCG. The AWT fulfils the MCS function for the state water fisheries. Outreach was conducted by AK OLE throughout the year to meet with fleet representatives for the various AK fisheries and discuss issues and potential violations reported in the December 2022 Report to the NPFMC. There was no specific citations or violations in the OLE Enforcement

		reports that implicated or suggested non-compliance for the BSAI and GOA flatfish fisheries.
11. Framework for sanctions	High	The MSRA provides enforcement actions for violations, including citations, a civil money penalty, forfeiture action against the vessel and its catch, and in some cases, criminal prosecution. Current enforcement updates and violations are reported in the OLE Report to the Council on a quarterly basis. Personal interviews with AWT and the USCG confirm overall compliance with the AK flatfish fisheries, noting only minor infractions.
12. Impacts of the fishery on the ecosystem	High	Monitoring is carried out through the Observer Program operated by NMFS. The groundfish, Prohibited Species Catch (PSC), and non-target species catch composition for each fishery and area was updated for the most recent five full years (See Fundamental clause 12). There have been no notable trends in any of this data over the past five years that would indicate fishery changes in need of further investigation.
13. Enhanced fisheries	Not applicable	This is not an enhanced fishery.

3.2 Audit conclusion

This report contains the findings of the RFM 3rd surveillance audit in relation to the AK flatfish bottom trawl fisheries. A remote surveillance audit was held January 30th – February 3rd, 2023, in conjunction with the Marine Stewardship Council (MSC) surveillance audits for Bering Sea and Aleutian Islands (BSAI) Atka mackerel, Pacific Ocean perch (POP), and Northern rockfish and Gulf of Alaska (GOA) Pacific Ocean perch, Northern rockfish, and Dusky rockfish; BSAI & GOA cod; pollock. The AK flatfish complex was certified against the RFM standard in March 2021.

Seven species in the BSAI area

- Kamchatka flounder (*Atheresthes evermanni)*, arrowtooth flounder (*Atheresthes stomias)*, flathead sole (*Hippoglossoides elassodon)*, Northern rock sole (*Lepidopsetta polyxystra)*, yellowfin sole (*Pleuronectes asper, Limanda aspera)* and Alaska plaice (*Pleuronectes quadrituberculatus),* Greenland turbot *(Reinhardtius hippoglossoides)*

Five species in the GOA

- Arrowtooth flounder (*Atheresthes stomias)*, flathead sole (*Hippoglossoides elassodon)*, Northern rock sole (*Lepidopsetta polyxystra),* Rex sole (*Glytocephalus zachirus),* Southern Rock sole (*Lepidopsetta bilineata)*

No issues were identified, and no changes in the fishery occurred that would result in a change in certification from the last surveillance. The fisheries had no non-conformances or recommendations. No clauses were rescored. All information on this fishery could be obtained from the original full assessment report, subsequent surveillance reports, and re-assessment report available for the download at https://www.alaskaseafood.org/rfm-certification/certified-fisheries/alaska-flatfish/.

MRAG Americas confirms that this fishery continues to meet the RFM Standard and shall remain certified.

4 General Information

1	**Fishery name**
	Alaska Flatfish Complex
2	**Stock(s)**
	Alaska plaice (Pleuronectes quadrituberculatus), BSAI Arrowtooth flounder (Atheresthes stomias), BSAI & GOA Flathead sole (Hippoglossoides elassodon), BSAI & GOA Greenland turbot (Reinhardtius hippoglossoides), BSAI Kamchatka flounder (Atheresthes evermanni), BSAI Northern rock sole (Lepidopsetta polyxstra), BSAI & GOA Yellowfin sole (Limanda aspera), BSAI

	Southern rock sole (Lepidopsetta bilineatus), GOA Rex sole (Glyptocephalus zachirus), GOA	
3	**Date certified**	**Date of expiry**
	March 10, 2021	December 3, 2024
4	**Surveillance type**	
	remote	
5	**Surveillance number**	
	1st Surveillance	
	2nd Surveillance	X
	3rd Surveillance	
	4th Surveillance	
	Other (expedited etc)	
6	**Surveillance team details**	

Ms. Erin Wilson (team leader) joined MRAG Americas, Inc. in February 2015, where she currently works as a Senior Fisheries Program Manager and Fishery Consultant. She has collaborated as a team member on several MSC assessments and is team leader for all the Alaska Groundfish fisheries and the West Coast Groundfish limited entry trawl fishery. She also provides routine audit services for the International Seafood Sustainability Foundation (ISSF). Prior to joining MRAG Americas, Ms. Wilson worked as a Natural Resource Specialist and Biological Technician for the Oregon Marine Reserves with the Oregon Department of Fish and Wildlife (ODFW). 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 from Colorado State University, along with a Spanish minor. She has the required competencies to conduct RFM and MSC assessments, completed the ISO 19011 training requirements and has more than six years of assessment team experience. MRAG Americas confirms Ms. Wilson has no conflicts of interest in relation to the fishery under assessment.

Ms. Amanda Stern-Pirlot is an M.Sc graduate of the University of Bremen, Center for Marine Tropical Ecology (ZMT) in marine ecology and fisheries biology. Ms. Stern-Pirlot joined MRAG Americas in mid-June 2014 as MSC Certification Manager (now Director of the Fishery Certification Division) and is currently serving on several different assessment teams as team leader and team member. She has worked together with other scientists, conservationists, fisheries managers and producer groups on international fisheries sustainability issues for over 15 years. With the Institute for Marine Research (IFM-GEOMAR) in Kiel, Germany, she led a work package on simple indicators for sustainable within the EU-funded international cooperation project INCOFISH, followed by five years within the Standards Department at the Marine Stewardship Council (MSC) in London, developing standards, policies and assessment methods informed by best practices in fisheries management around the globe. Most recently she has worked with the Alaska pollock industry as a resources analyst, within the North Pacific Fisheries Management Council process, focusing on bycatch and ecosystem-based management issues, and managing the day-to-day operations of the offshore pollock cooperative. She has co-authored a dozen publications on fisheries sustainability in the developing world and the functioning of the MSC as an instrument for transforming fisheries to a sustainable basis. MRAG Americas confirms Ms. Stern-Pirlot has no conflicts of interest in relation to the fishery under assessment.

Dr. Giuseppe Scarcella is an experienced fishery scientist and population analyst and modeller, with wide knowledge and experience in the assessment of demersal stocks. He holds a first degree in Marine Biology and Oceanography (110/110) from the Unversità Politecnica delle Marche, and a Ph.D. in marine Ecology and Biology from the same university, based on a thesis "Age and growth of two rockfish in the Adriatic Sea". After his degree he was offered a job as project scientist in several research programs about the structure and composition of fish assemblage in artificial reefs, off-shore platform and other artificial habitats in the Italian Research Council – Institute of Marine Science of Ancona (CNR-ISMAR, now CNR-IRBIM). During the years of employment at CNR-ISMAR he has gained experience in benthic ecology,

	statistical analyses of fish assemblage evolution in artificial habitats, fisheries ecology and impacts of fishing activities, stock assessment, otolith analysis, population dynamic and fisheries management. During the same years he attended courses of uni- multivariate statistics and stock assessment. He is also actively participating in the scientific advice process of FAO GFCM in the Mediterranean Sea. At the moment he is member of the Scientific, Technical and Economic Committee for Fisheries for the European Commission (STECF). He is author and co-author of more than 50 scientific paper peer reviewed journals and more than 150 national and international technical reports, most of them focused on the evolution of fish assemblages in artificial habitats and stock assessment of demersal species. For some years now, Dr Scarcella has been working in fisheries certification applying the Marine Stewardship Council standard for sustainable fisheries, currently concentrating on Principle 1 of the Standard. Furthermore, Dr Scarcella holds the credential as Fishery team leader (MSC v2.0) and he completed the MSC procedure training 2.1. He also holds the credential as certifier of Responsible Fisheries Management (RFM).
7	**Audit/review time and location**
	A remote surveillance audit was January 30th – February 3rd, 2023.

The Alaska RFM program is a voluntary program that has been developed by the Alaska Seafood Marketing Institute (ASMI) to provide an independent, third- party certification that can be used to verify that these fisheries are responsibly managed according to the Alaska RFM standard.

This assessment is based on the fundamental clauses specified in the Alaska RFM Conformance Criteria v1.3. It is based on six major components of responsible management derived from the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labeling of products from marine capture fisheries (2009). The fundamental clauses are:

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

The purpose of this annual Surveillance Report is:

To establish and report on any material changes to the circumstances and practices affecting the original complying assessment of the fishery;
To monitor any actions taken in response to non-conformances raised in the original assessment of the fisheries;
To re-score any clauses where practice or circumstances have materially changed since the last audit.

5 Background to the fishery

Recent catch data are presented below:

Table 1 Total Allowable Catch for Alaska Flatfish Complex Fishery

Total Allowable Catch (TAC) and catch data UoA 1 BSAI Kamchatka flounder				
TAC	Year	**2022**	Amount	**8,982 mt**
UoA share of TAC	Year	**2022**	Amount	**8,982 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**

Total Allowable Catch (TAC) and catch data UoA 2 BSAI Arrowtooth flounder				
TAC	Year	**2022**	Amount	**15,000 mt**

UoA share of TAC	Year	**2022**	Amount	**15,000 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**

Total Allowable Catch (TAC) and catch data UoA 3 BSAI Flathead sole				
TAC	Year	**2022**	Amount	**25,000 mt**
UoA share of TAC	Year	**2022**	Amount	**25,000 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**

Total Allowable Catch (TAC) and catch data UoA 4 BSAI Northern rock sole				
TAC	Year	**2022**	Amount	**54,500 mt**
UoA share of TAC	Year	**2022**	Amount	**54,500 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**

Total Allowable Catch (TAC) and catch data UoA 5 BSAI Yellowfin sole				
TAC	Year	**2022**	Amount	**200,000 mt**
UoA share of TAC	Year	**2022**	Amount	**200,000 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**
Total catch by UoC	Year (most recent)	**2022**	Amount	**152,543 mt**

Total Allowable Catch (TAC) and catch data UoA 6 BSAI Alaska plaice				
TAC	Year	**2022**	Amount	**22,500 mt**
UoA share of TAC	Year	**2022**	Amount	**22,500 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**
Total catch by UoC	Year (most recent)	**2022**	Amount	**11,106 mt**

Total Allowable Catch (TAC) and catch data UoA 7 GOA Arrowtooth flounder				
TAC	Year	**2022**	Amount	**95,454 mt**
UoA share of TAC	Year	**2022**	Amount	**95,454 mt**
UoA share of total TAC	Year	**2022**	Amount	**100%**
Total catch by UoC	Year (most recent)	**2022**	Amount	**7,416 mt**

Total Allowable Catch (TAC) and catch data UoA 8 GOA Flathead sole				
TAC	Year	**2022**	Amount	**28,445 mt**
UoA share of TAC	Year	**2022**	Amount	**28,445 mt**

UoA share of total TAC	Year	**2022**	Amount	**100%**
Total catch by UoC	Year (most recent)	**2022**	Amount	**408 mt**

Total Allowable Catch (TAC) and catch data UoA 9 GOA Northern rock sole				
TAC	Year	**2022**	Amount	**45,673 mt***
UoA share of TAC	Year	**2022**	Amount	**45,673 mt***
UoA share of total TAC	Year	**2022**	Amount	**100%***
Total catch by UoC	Year (most recent)	**2022**	Amount	**725 mt**

* = Shallow-Water Flatfish

Total Allowable Catch (TAC) and catch data UoA 10 GOA Rex sole				
TAC	Year	**2022**	Amount	**15.416 kt**
UoA share of TAC	Year	**2022**	Amount	**15.416 kt**
UoA share of total TAC	Year	**2022**	Amount	**100%**
Total catch by UoC	Year (most recent)	**2022**	Amount	**536 mt**

Total Allowable Catch (TAC) and catch data UoA 11 GOA Southern rock sole				
TAC	Year	**2022**	Amount	**45.263 mt***
UoA share of TAC	Year	**2022**	Amount	**45.263 mt***
UoA share of total TAC	Year	**2022**	Amount	**100%***
Total catch by UoC	Year (most recent)	**2022**	Amount	**725 mt**

* = Shallow-Water Flatfish

The Alaska flatfish complex fishery was first certified under the requirements of the Alaska RFM standard v1.2 on December 5, 2013. During the fourth surveillance audit, the fishery was transferred under the RFM standard v1.3, and certificate validity was extended from the original expiry date of December 4, 2018, to December 4, 2019. The permission for certificate extension was granted by ASMI. The re-assessment in December 2019 did not result in any changes in the compliance of the fishery with the RFM standard, and no non-conformities were raised. The new certificate was therefore issued with the validity date until December 3, 2024. The first surveillance audit was carried out by DNV and found no non-conformities (DNV 2021).

6 Assessment Process

6.1 Site visits

A remote site visit was held January 30th – February 3rd, 2023, with an additional closing meeting with the client representatives held on February 16th, 2023.

Below is the agenda used for this site visit and for the RFM reassessment site visit for all AK groundfish fisheries:

Responsible Fisheries Management 3rd Surveillance Site Visit Agenda,
Alaska Flatfish Fisheries
Marine Stewardship Council 2nd Surveillance Audit
BSAI & GOA flatfish, Atka mackerel, rockfish and POP
January 30th, 2023, 9:00 AM PST

Attendees: Jason Anderson (Client representative); Erin Wilson (Team lead), Giuseppe Scarcella and Amanda Stern-Pirlot
Location: Seattle area and remote

Meeting information: **Join on your computer, mobile app or room device**
Click here to join the meeting
Meeting ID: 293 685 051 371
Passcode: LYVHHZ

Objectives: To conduct an annual surveillance audit for the BSAI & GOA flatfish, Atka mackerel, rockfish and POP fisheries against the Responsible Fisheries Management (RFM) Standard and the Marine Stewardship Council's (MSC) Standard for sustainability.

1. Introductions
    - Introductions of the team, their roles, and responsibilities regarding scoring the fishery
    - Client group
2. Overview of the RFM process
    - V1.3; Certifícate No.: 10000445828-MSC-ANSI-USA
    - Fundamental Clauses
        a. The Fisheries Management System
        b. Science and Stock Assessment Activities
        c. The Precautionary Approach
        d. Management Measures
        e. Implementation, Monitoring and Control
        f. Serious Impacts of the Fishery on the Ecosystem Traceability System Review
3. Overview of the MSC Process
    - The assessment will focus on the following three core Principles:
        - Principle 1 – Sustainable target fish stocks
        - Principle 2 – Environmental impact of fishing
        - Principle 3 – Effective Management
    - Where to find additional materials: Guide to the MSC process
    - Version details: FCP v2.2; MSC Fisheries Standard v2.01; MSC General Certification Requirements v2.4.1
4. General topics for discussion
    - General overview of the fisheries
    - Any notable changes to the stocks
    - Changes in management, regulations
    - Changes in personnel, both within the client group, management, etc.
    - Changes to traceability
5. Other topics of interest
    - Effects of Red crab area closures on fishery
    - Update on the Trawl EM Program
    - Enforcement update
6. Meetings with others for this assessment:
   John Warrenchuck – Oceana reached out for a stakeholder meeting.

6.2 Stakeholder input

Prior to the audit site visit, all stakeholders were informed of the visit and given the opportunity to provide information to the auditors in advance of, or during, the site visit. No stakeholder comments were received for this surveillance audit. Thirty days prior to the audit site visit, all stakeholders were informed of the visit and given the opportunity to provide information to the auditors in advance of, or during, the site visit. The assessment team received a meeting request from Jon Warrenchuk from Oceana specifically for the BSAI Atka Mackerel, Pacific Ocean Perch, and Northern Rockfish and GOA Pacific Ocean Perch, Northern Rockfish, and Dusky Rockfish, however because of similar gear types and areas of concern, we also included the information in this surveillance report. Mr. Warrenchuk provided information that supported his concerns; however they were not comments directly pertaining to this surveillance audit. A brief summary of the meeting with Mr. Warrenchuk is presented below.

Summary: Mr. Jon Warrenchuk from Ocean requested a meeting with the assessment team; however no comments were provided. Mr. Warrenchuk expressed concern about components of habitat that have yet to be addressed and the effects of trawl gear on juvenile populations of various species of fish and impacts to vulnerable habitat forming invertebrates. Mr. Warrenchuk also expressed concern over the fishing impacts model on potential fish habitat, which is set up to average the impacts of habitat features, however this does not take into account a category for habitats that take a long time to recover. Even though there is disturbance percentage reported, it does not include habitats lost in that reporting. The lack of observer coverage in the GOA was another issue raised, where it was discovered from satellite data from Global fishing Watch that trawling is occurring in areas of EFH. The assessment team stated that they would investigate the EFH review recently completed and advised that these comments would be better suited during a reassessment, where a more in-depth review will occur.

7 Assessment Outcome / Fundamental Clauses Summaries

Much of this text was adapted from DNV's 1st surveillance report for AK Flatfish Complex Fishery (DNV 2021).

7.1 The Fisheries Management System (A)

Fundamental Clause 1.

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

No. supporting clauses	**13**
Applicable supporting clauses	6
Non-applicable supporting clauses	7 (1.3, 1.3.1, 1.4, 1.4.1, 1.5, 1.6.1, 1.9)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

Considerable resources in the form of stock assessment, ecosystem monitoring and management expertise and capacity; management organizations and structures (e.g., National Marine Fisheries Service (NMFS) Alaska region, the North Pacific Fishery Management Council (NPFMC, or Council), NOAA Fisheries Office of Law Enforcement (OLE), United States Coast Guard (USCG), Observer Program) are dedicated to fisheries, including AK flatfish complex, in Alaskan federal waters. National legislation and the regulatory process by which the Council and NMFS are directed and follow, enable the management of the resource at regional and localized levels. The adaptive and consultative management approach adopted by the Council actively promotes stakeholder participation. The NOAA Office of General Council (OGC) reviews any proposed management action to assure compliance with the Magnuson-Stevens Reauthorization Act (MSRA). International obligations (e.g., combating Illegal, Unreported and Unregulated (IUU) fishing) and the enforcement of federal regulations are upheld by the federal departments such as USCG and OLE.

The BSAI and GOA flatfish stocks are assessed independently using assessment models that take into account all sources of fishing mortality and are based on complete catch reporting systems including extensive observer data. Catch at age models synthesize data on biomass and age composition from the fishery and integrated trawl surveys conducted by the AFSC to estimate the abundance at age of BSAI and GOA flatfish stocks. Each year several assessment models are developed and evaluated by scientists using alternative life history and fishery and survey selectivity assumptions. Additionally, in BSAI and GOA models exploring stock status in relation to changing environmental conditions have also been developed and evaluated, in some of the models also flatfish stocks are considered (see: https://www.fisheries.noaa.gov/feature-story/noaa-releases-2021-ecosystem-status-reports-eastern-bering-sea-gulf-alaska-and; Siddon, 2021; Ferriss, and Zador, 2021). Each model uses information on the status of the stock and potential effects of current management practices.

The North Pacific Council routinely reviews its management plans and actions as part of standard operating procedure.

The Council's FMPs explicitly describe the Council's commitment to review management issues and this is reflected in the numerous Council meetings that take place each year. Similarly, the BOF websites have dedicated pages to their public meetings and agendas and outcomes reflect a commitment to review previously agreed management measures.

There is an agreed system to finance the fishery management organizations and arrangements. In general, the costs of fisheries management and conservation are funded through Congressional and state appropriations that follow the federal and state budget cycles. Cost recovery from certain fleet sectors, including BSAI and GOA flatfish stocks, is also in operation. The MSA authorizes and requires the collection of cost recovery fees for the incremental costs of limited access privilege programs. Cost recovery fees recover the actual costs directly related to the management, data collection, and enforcement of the programs. The current groundfish observer program is a further example of management being financially supported through cost recovery. Estimates of the costs for federal and state management, research, and enforcement of the groundfish stocks in the BSAI and GOA are reported in the BSAI and GOA Groundfish FMPs.

There are procedures at multiple levels to review management measures, and the MSA is reviewed by Congress every five years and is periodically revised and reauthorized. The adaptive management approach taken in the BSAI and GOA flatfish stocks fisheries requires regular and periodic review. Component parts of the FMPs are regularly reviewed, including outcome indicators, and various levels of Environmental Impact Statements (EIS) are undertaken when the FMPs are amended in order to review the environmental and socio-economic consequences, as well as assess the effectiveness of the changes. Stakeholders are actively encouraged to participate in Council and BOF meetings and, in so doing, opportunity to review management measures is provided. Stock status is reviewed and updated annually, producing SAFE reports for the BSAI and GOA flatfish stocks. ADFG also conducts scientific research and surveys on its state-managed flatfish fisheries. These SAFE reports document stock status and significant trends or changes in the resource, marine ecosystems and fishery over time. The reports also assess the relative success of existing state and Federal fishery management programs and based on stock status indicators, provide recommendations for annual quotas and other fishery management measures.

The Council (and NMFS) as well as the BOF (and ADFG) provide substantial amounts of information on their websites, including agenda of meetings, discussion papers, and records of decisions. The Council and the BOF actively encourage stakeholder participation, and all Council and BOF deliberations are conducted in open, public session. Anyone may submit regulatory proposals, and all such proposals are given due consideration by both the Council and the BOF.

There is no material change in compliance with any of the following supporting clauses. The BSAI and GOA flatfish stocks in Alaska are not considered to be transboundary, straddling, highly migratory, or high seas stocks and so clauses 1.3, 1.3.1, 1.4, 1.4.1, 1.5, 1.6.1, and 1.9 are not applicable.

1.1 There shall be an effective legal and administrative framework established at local and national level appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of local, national and international laws and regulations, including the requirements of any regional fisheries management agreement.

1.2 Management measures shall consider 1) the whole stock biological unit (i.e. structure and composition contributing to its resilience) over its entire area of distribution, 2) the area through which the species migrates during its life cycle and 3) other biological characteristics of the stock.

1.2.1 Previously agreed management measures established and applied in the same region shall be taken into account by management.

1.3 Where trans-boundary, straddling or highly migratory fish stocks and high seas fish stocks are exploited by two or more States, the Applicant Management Organizations concerned shall cooperate and take part in formal fishery commission or arrangements that have been appointed to ensure effective conservation and management of the stock/s in question. ***Not applicable to this fishery**

1.3.1 Conservation and management measures established for such stock within the jurisdiction of the relevant States for shared, straddling, high seas and highly migratory stocks, shall be compatible. Compatibility shall be achieved in a manner consistent with the rights, competences and interests of the States concerned. ***Not applicable to this fishery**

1.4 A State not member/participant of a sub-regional or regional fisheries management organization shall

cooperate, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization/arrangement. ***Not applicable to this fishery**

1.4.1 States seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account. ***Not applicable to this fishery**

1.5 The Applicant fishery's management system shall actively foster cooperation between States with regard to 1) information gathering and exchange, 2) fisheries research, 3) fisheries management, and 4) fisheries development. ***Not applicable to this fishery**

1.6 States and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of countries to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management and research.

1.6.1 Without prejudice to relevant international agreements, States shall encourage banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures. ***Not applicable to this fishery**

1.7 Procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review to revise or abolish them in the light of new information.

- Review procedures shall be established within the management system.
- A mechanism for revision of management measures shall exist.

1.8 The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.

- Management arrangements
- Decision-making

1.9 Management organizations not party to the Agreement to promote compliance with international conservation and management measures by vessels fishing in the high seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement. ***Not applicable to this fishery**

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 2.

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

No. supporting clauses	**10**
Applicable supporting clauses	9
Non-applicable supporting clauses	1 (2.7)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

In managing the Alaska flatfish complex fisheries, NMFS, in conjunction with the Council and ADFG, participate in coastal area management-related issues through processes established by the NEPA, which requires that all federal agencies' funding or permitting decisions be made with full consideration of the impact to the natural and human environment. An environmental review process is required that includes a risk evaluation and evaluation of alternatives including a "no action" alternative. The Council and the BOF system were designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders. Council meetings are open, and public testimony is taken on issues prior to deliberations and final decisions. In so doing, the management organizations within Alaska and their management processes consider the rights of coastal fishing communities and their customary practices to the extent compatible with sustainable development.

The Council and BOF websites actively encourage and demonstrate participation by stakeholders at their respective public meetings and cover a wide range of topics regarding the use, development and management of coastal resources. Potential conflict between fishermen and other coastal users at the federal level are usually discussed and resolved through the NEPA process and, at the state level, through the BOF public meeting process or regional committee established as part of the state's land use and access planning processes.

The technical capacities of the federal and state agencies involved in the management of Alaska flatfish complex fisheries are significant, and include internationally recognized scientists, experienced fishery managers and policy makers and highly professional and trained enforcement officers. Appropriate technical and financial resources are in place. A joint protocol is in place between the Council and ADFG which provides the intent to provide long term cooperative, compatible management systems that maintain the sustainability of the fisheries resources in federal and state waters.

Canada abuts the U.S. border to the south and shares certain fisheries resources, however the GOA flatfish stocks are not considered to be transboundary. The United States and Canada have a very strong working relationship at both the national and regional levels. In cases involving boundary disputes and treaties governing fishery access, the USCG, NOAA, and Canadian Department of Fisheries and Oceans along with Canadian Coast Guard counterparts have effectively coordinated living marine resource enforcement efforts despite occasional related political and economic tensions. There are established agreements and shared management and working practice (e.g., International Pacific Halibut Commission, Pacific Salmon Treaty, an Agreement between the U.S. and Canada on enforcement).

The MSRA requires the Council and other groups (BOF, ADGF, etc.) to hold public meetings within their respective regions to discuss the development and amendment of FMPs. These meetings are publicized by the Council and stakeholders actively encouraged to participate changes and allow input from stakeholders. The BOF website publishes information on forth-coming BOF meetings including the "Proposal Book" which details proposed ADFG or stakeholder-requested changes that might lead to regulatory change. Stakeholders are actively encouraged to participate at the meetings and submit proposal prior to the meetings. The OLE and AWT put an emphasis on educating and informing stakeholders of new regulatory changes and other important fishery related matters.

Fisheries of the exclusive economic zone (EEZ) off Alaska; Bering Sea and Aleutian Islands; proposed 2021 and 2022 harvest specifications for groundfish are available at the following link:

https://www.federalregister.gov/documents/2020/12/03/2020-26598/fisheries-of-the-exclusive-economic-zone-off-alaska-bering-sea-and-aleutian-islands-proposed-2021

The 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. The program involves eligible communities who have formed six regional organizations, referred to as CDQ groups. There are 65 communities within a 50-mile radius of the BS coastline who participate in the program. The CDQ program allocates a percentage of the BSAI quotas to CDQ groups. The program is reviewed every 10 years, with the last review occurring in 2012. Analysis by the State of Alaska in 2013 determined that each CDQ entity had maintained or improved performance against its objectives. The CDQ program provides an example of how the management system takes account of the allocation and use of coastal resources with respect to their economic, social and cultural value.

A considerable amount of monitoring of the coastal environment in Alaska is conducted and supported by multiple federal and state agencies (e.g., NMFS, AFSC, ADFG, universities such as the University of Alaska Fairbanks' Institute of Marine Science, and organizations that support and facilitate marine research such as the North Pacific Research Board [NPRB]). The NPRB have helped fund two major projects in the Alaska region: The Bering Sea Project and the Gulf of Alaska Ecosystem Study. AFSC has established the Ecosystem Monitoring and Assessment Program with an overall goal to improve and reduce uncertainty in

stock assessment models of commercially important fish species through the collection of observations of fish and oceanography.

The State of Alaska is represented in the Oil Spill Task Force by the Department of Environmental Conservation. Its Division of Spill Prevention and Response prevents spills of oil and hazardous substances, prepares for when a spill occurs and responds rapidly to protect human health and the environment. The Oil Spill Recovery Institute located in PWS conducts research into oil spills and their effects on the Alaskan environment, particularly the natural resources in PWS.

There is no material change in compliance with any of the following supporting clauses. Clause 2.7 is not applicable.

2.1 An appropriate policy, legal and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, taking into account 1) the fragility of coastal ecosystems and finite nature of their natural resources; 2) allowing for determination of the possible uses of coastal resources and govern access to them, 3) taking into account the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, 4) States shall take due account of the risks and uncertainties involved.

2.1.1 States shall establish mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas.

2.1.2 States shall ensure that the authority or authorities representing the fisheries sector in the coastal management process have the appropriate technical capacities and financial resources.

2.2 Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involved in other activities related to coastal area management planning and development. The public shall also be kept aware on the need for the protection and management of coastal resources and the participation in the management process by those affected.

2.3 Fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g. aquaculture, tourism, energy) shall be adopted and fishing shall be regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear and fishing methods. Procedures and mechanisms shall be established at the appropriate administrative level to settle conflicts which arise within the fisheries sector and between fisheries resource users and other coastal users.

2.4 States and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.

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

2.6 States shall cooperate at the sub-regional level in order to improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote systems for research and monitoring of the coastal environment, in order to improve coastal area management, and promote multidisciplinary research in support and improvement of coastal area management using physical, chemical, biological, economic, social, legal and institutional aspects.

2.7 States shall, within the framework of coastal area management plan, establish management systems for artificial reefs and fish aggregation devices. Such management systems shall require approval for the construction and deployment of such reefs and devices and shall take into account the interests of fishers, including artisanal and subsistence fishers. ***Not applicable to this fishery**

2.8 In the case of activities that may have an adverse transboundary environmental effect on coastal areas, States shall:

a) Provide timely information and if possible, prior notification to potentially affected States.

b) Consult with those States as early as possible.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 3.

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

No. supporting clauses	**8**
Applicable supporting clauses	8
Non-applicable supporting clauses	0
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

The Council manages the Alaska flatfish under the jurisdiction of the BSAI Groundfish Fishery Management Plan (FMP), and the GOA Groundfish FMP. Within these FMPs are nine management and policy objectives, that are reviewed annually. These include preventing overfishing, preserving the food web, and reducing bycatch and waste. The BOF, identified guiding principles when developing their initial groundfish management, which are similar to the Council objectives.

The Alaska License Limitation Program (LLP) has been in place since 2000. The intent of the program has been to use fishing track records to rationalize the Alaska groundfish and crab fleet by limiting the number, size and specific operation of vessels as well as eliminating latent licenses. The Restricted Access Management Program has prepared lists of LLP groundfish and crab licenses. LLP licenses are initially issued to persons, based on the activities of original qualifying vessels.

Amendment 80, implemented in 2008, allocates BSAI yellowfin sole, flathead sole, rock sole, Atka mackerel, and Aleutian Islands Pacific Ocean perch to the head and gut trawl catcher processor sector, and allows qualified vessels to form cooperatives (NPFMC 2022). The program establishes GOA groundfish sideboard limits for pollock, Pacific cod, Pacific Ocean perch, northern rockfish, and pelagic shelf rockfish, as well as GOA halibut prohibited species catch (PSC). GOA sideboard restrictions are based on historic participation during 1998-2004 (NPFMC 2022).

Groundfish licenses are currently required to participate in the BSAI groundfish fisheries in Federal waters of Alaska. Licenses may contain endorsements for both areas (EBS and AI), or one of the two areas. Gear endorsements define what type of gear may be used: non-trawl, trawl, or both. The GOA groundfish fisheries are among the few remaining limited access (not rationalized) fisheries in Alaska.

General state-wide groundfish regulations include a vessel registration requirement, legal gear definitions, bycatch allowances, and requirements for seabird avoidance measures to be used when fishing with longline gear. The state fisheries for Alaska flatfish complex are not closed access fisheries.

The MSRA requires that conservation and fisheries management measures prevent overfishing while achieving OY on a continuing basis. NMFS and the Council follow a multi-faceted PA (OFL, ABC, TAC, OY) to manage the federal Alaska flatfish complex fisheries, based on targets, limits, and pre-defined harvest control rules (HCRs), as well as overall ecosystem considerations (e.g., the OY limits). The fisheries management system is supported by high level science, and management measures have been generally effective in avoiding overfishing and promoting responsible fishing. Objectives for the BSAI and GOA are set out in the FMPs and include the need to take into account socio-economic considerations. Estimates of ex-vessel value by area, gear, type of vessel, and species, are included in the annual Economic Status SAFE report (Fissel et al., 2021 - https://www.fisheries.noaa.gov/resource/data/2020-economic-status-groundfish-fisheries-alaska), and each stock assessment SAFE also contains extensive economic data.

The 2021 and 2022 assessments of Alaska flatfish complex stocks are available in SAFE reports, which give extensive histories of the models used in the assessments (see:

https://www.fisheries.noaa.gov/tags/north-pacific-groundfish-stock-assessments). Safe reports indicate that the stocks are not in overfishing and overfished.

BSAI Specifications:
In the December 2022 NPFMC meeting, the Council recommended Total Allowable Catch (TACs) with specified overfishing limit (OFL) and Acceptable Biological Catch (ABC) for the 2023 – 2024. In setting TACs for 2023 and 2024, the Council accounts for Guideline Harvest Levels (GHLs) for groundfish fisheries in State waters. The Council's OFLs, ABC, and TACs take the GHLs into account (NPFMC 2022). The BSAI harvest specifications for flatfish can be found at the following link: 2023 - 2024 BSAI harvest specifications.

The Council specified an ABC reserve for flathead sole, rock sole, and yellowfin sole, which was specified as the ABC surplus for the species (i.e., the difference between the ABC and TAC); specified Prohibited Species Catch (PSC) limits for halibut, crab, and herring; and specified halibut discard mortality rates (DMRs) for the BSAI. Crab PSC limits have all declined from 2021 levels due to the decline in the estimated abundances of Red King crab, Snow crab and Tanner crab. Additionally, Federal regulations state that the Red King Crab Savings Subarea is closed to nonpelagic trawl gear if Alaska Department of Fish and Game (ADFG) does not set a TAC for red king crab in the Bristol Bay area in the previous year. A TAC is not set for the 2022/2023 Bristol Bay red king crab season; thus the area will be closed to nonpelagic trawl gear in 2023 (NPFMC 2022a).

In April 2021, the Council reviewed and revised options for a proposed management measure to link the Pacific halibut PSC limit for the Amendment 80 commercial groundfish trawl sector in the BSAI to halibut abundance. In December 2021, the Council took final action on the draft Environmental Impact Statement (DEIS) for the abundance-based management (ABM) of the Amendment 80 halibut PSC limit. The current PSC limit is set as a fixed amount at 1,745 mt, which becomes an increasingly larger proportion of total halibut removals in the BSAI when halibut abundance declines. Under this ABM program, the A80 halibut PSC limit will move both up and down according to the indices of abundance and be responsive to changing halibut stock conditions that affect all halibut users, while never exceeding the current PSC limit (NPFMC 2021). The preferred alternative apparently balances between the Magnuson-Stevens Act (MSA) requirements under MSA National Standard 9 (establish conservation measures that minimize bycatch) with MSA National Standard 1 (achieving optimum yield on a continuing basis). It also seeks to balance the interests of the two largest halibut user groups in the BSAI, the directed commercial halibut fishery and the A80 sector. Implementation of this action will occur in either 2023 or the beginning of the 2024 fishing year (NPFMC 2021).

GOA Specifications:

The 2022 GOA Groundfish SAFE report includes stock status updates for all stocks or stock complexes managed through the GOA Groundfish FMP. The GOA SAFE report forms the basis for GOA groundfish harvest specifications for the next two fishing years. Based on consideration of stock prioritization including assessment methods and data availability, some stocks are assessed on an annual basis while others are assessed less frequently. Full assessments were produced for all stocks in the GOA in 2022 with the following exceptions: partial assessments were produced for Pacific ocean perch, shallow water flatfish including northern and southern rock sole, deep water flatfish, rex sole, blackspotted/rougheye rockfish, and arrowtooth flounder. No assessments were produced for shortraker rockfish, the other rockfish complex, Atka mackerel, skates, nor octopus. For these exceptions, specifications were rolled over from the previous assessment for each stock (NPFMC 2022b). The GOA harvest specifications for flatfish can be found at the following link: 2023 - 2024 GOA harvest specifications.

During the NPFMC February 2023 meeting, The Council reviewed the summary report of a 5-year review of essential fish habitat (EFH) components of the Council's FMPs, and initiated an analysis at this meeting to update the Council's BSAI Groundfish, GOA Groundfish, BSAI King and Tanner Crab, Salmon, and Arctic FMPs' descriptions and maps of Essential Fish Habitat (EFH). The Council elected not to initiate additional habitat-specific processes at this time (NPFMC 2023).

Information for assessing the status of flatfish come from the Stock Assessment and Fishery Evaluation (SAFE) reports (see: https://apps-afsc.fisheries.noaa.gov/Plan_Team/2022/assessments.htm). Catches of Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) flatfish continue to be constrained by halibut bycatch limits. The 12 stocks considered in the present surveillance report are above MSY level both in BSAI and in GOA (Figure 1 and Figure 2 and the following paragraph by stock).

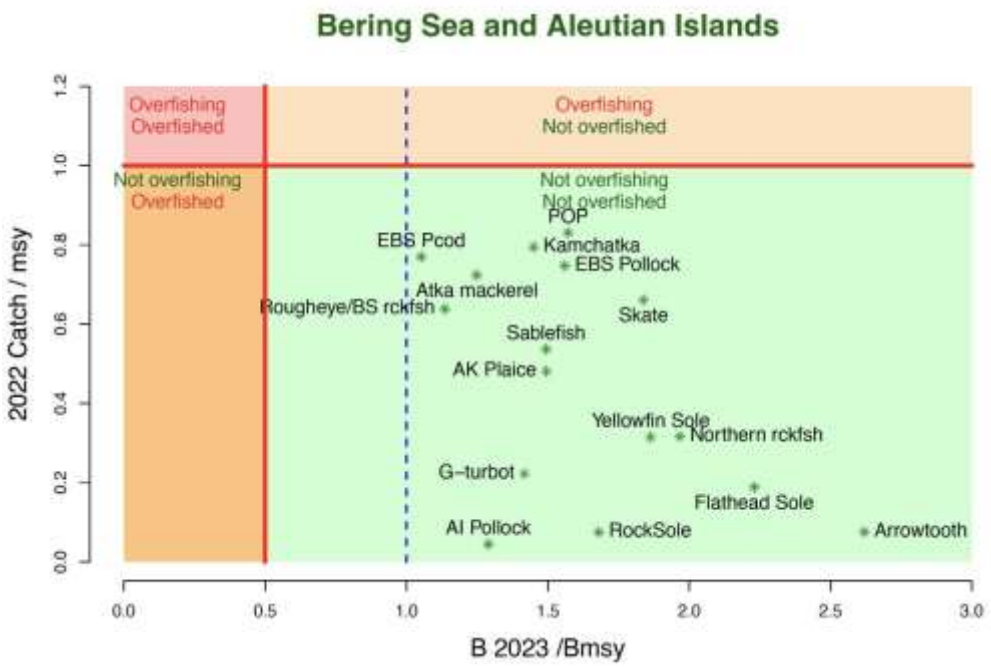

Figure 1 - Summary of Bering Sea and Aleutian Islands stock status next year (spawning biomass relative to B_{MSY}; horizontal axis) and current year catch relative to fishing at F_{MSY} (vertical axis) where F_{OFL} is taken to equal F_{MSY}. Source: Aydin, et al., 2022

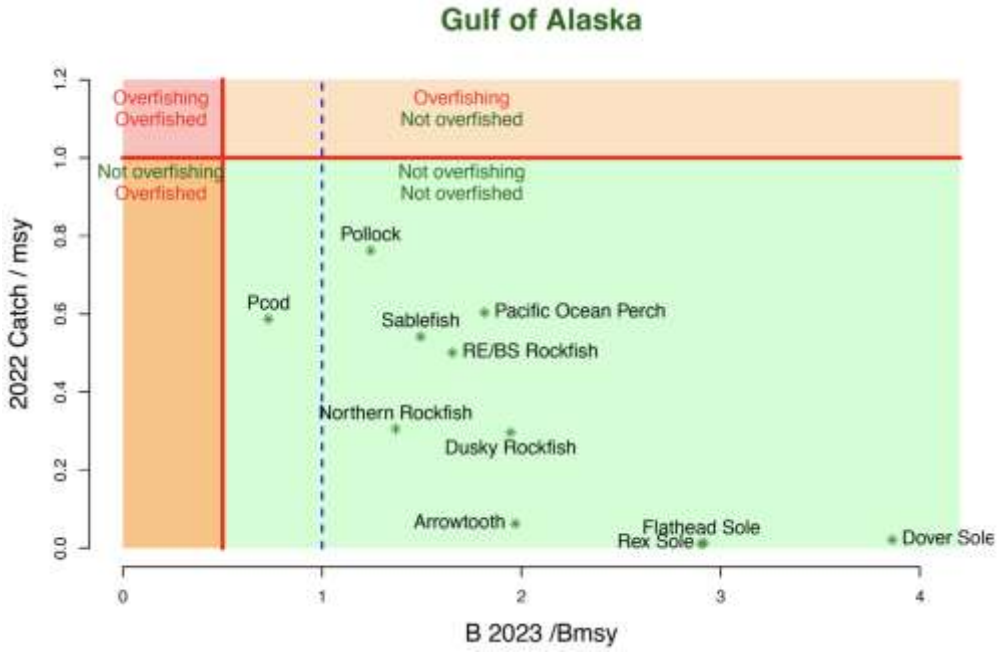

Figure 2 - Summary of Gulf of Alaska stock status next year (spawning biomass relative to BMSY; horizontal axis) and current year catch relative to fishing at FMSY (vertical axis). Note that sablefish is for Alaska-wide values including the BSAI catches. Barbeaux, et al., 2022

FMPs, protected species management plans, and biological opinion reviews are all supported by well-designed data-gathering programs and analyses, widely available through NMFS and Council websites. These are, in relation to the complexity of factors which may affect species dynamics, comprehensive and rigorous in their analysis.

There are mechanisms developed to identify significant effects on essential fish habitat (EFH) and for identifying habitat areas of particular concern and are considered consistent with achieving management objectives for avoidance, minimization or mitigation of impacts on essential habitats for the “stock under consideration” and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. This is further supported by habitat ecosystem indicators considered as part of the SAFE process. There are processes in place – primarily through FMPs, endangered species management plans

and Biological Opinions and EISs of the various plans - that allow for direct and indirect impacts that are likely to have significant (not only serious) consequences to be addressed.

There are several processes in place which address actual or potential impacts identified through the monitoring of the groundfish fishery and the ecosystem supporting the fishery. The primary mechanism is the annual SAFE report. There are specific processes through NMFS and U.S. Fish and Wildlife Service (USFWS) to review potential impacts (generally indirect effects through changes in prey availability) on endangered species (through the Endangered Species Act, ESA) and marine mammals (Marine Mammal Protection Act, MMPA).

There is no material change in compliance with any of the following supporting clauses.

3.1 Long term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

3.2 Management measures shall provide inter alia that:

3.2.1 Excess fishing capacity shall be avoided and exploitation of the stocks remains economically viable.

3.2.2 The economic conditions under which fishing industries operate shall promote responsible fisheries.

3.2.3 The interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries shall be taken into account.

3.2.4 Biodiversity of aquatic habitats and ecosystems shall be conserved and endangered species shall be protected. Where relevant, there shall be pertinent objectives, and as necessary, management measures.

3.2.5 There shall be management objectives seeking to avoid, minimize or mitigate impacts of the unit of certification on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.

3.2.6 There shall be management objectives that seek to minimize adverse impacts of the unit of certification, including any enhancement activities, on the structure, processes and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

7.2 Science and Stock Assessment Activities (B)

Fundamental Clause 4.

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

No. supporting clauses	13
Applicable supporting clauses	8
Non-applicable supporting clauses	5 (4.7, 4.8, 4.9, 4.10, 4.11)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

NMFS and ADFG collect fishery data and conduct fishery independent surveys to assess the Alaska flatfish complex fisheries and ecosystems in GOA and BSAI areas. SAFE reports (see: https://www.fisheries.noaa.gov/tags/north-pacific-groundfish-stock-assessments) provide complete descriptions of the data collected and used in the annual assessments, used to determine stock status and harvest recommendations for the Alaskan target stocks. For these fisheries, there is a well-established system that allows for the production, maintenance, regular update, and verification of statistical data. Reporting of commercial catch from both state and federally managed fisheries is done through the Catch Accounting System, a multi-agency (NMFS, International Pacific Halibut Commission, and ADFG) system that centrally collates landings data from shore-based processing and landings operations as well as retained catch observations from individual vessels. Catch reports for previous years can be found on the NMFS and ADFG websites. The Alaska Fisheries Information Network maintains an analytic database of both state and federal commercial fisheries data in Alaska and provides that data in usable formats.

All data from the state and federally are included in the stock assessments. Relative to commercial catch, there is minimal recreational, personal use, or subsistence fishing for Alaska flatfish complex in Alaskan waters, and all estimates of such catches compiled by ADFG are included in the assessment catch data. Smaller scale fisheries managed by ADFG and BOF are controlled with specified GHL and other regulations, such as closed areas around Steller sea lion rookeries.

Amendment 86 to the FMP of the BSAI and Amendment 76 to the FMP of the GOA established the new North Pacific Groundfish and Halibut Observer Program, and all vessels fishing for groundfish in federal Alaskan waters are required to carry observers, at their own expense, for at least a portion of their fishing time. Data gathered in the Observer Program cover all biological information from commercial fisheries, including catch weights (landings and discards), catch demographics (species composition, length, sex and age) and interactions with species such as sharks, rays, seabirds, marine mammals and other species with limited or no commercial value. NMFS and the Council have developed at-sea electronic monitoring to integrate video monitoring into the Observer Program to improve data collection. On August 8, 2017, NMFS published a final rule to integrate electronic monitoring into the Observer Program (Ganz et al. 2018). Observer coverage in the groundfish fisheries has been at or near 100% for the past several years, while in the GOA, lower coverage rates exist. Detailed annual reports (e.g., Alaska Fisheries Science Center and Alaska Regional Office 2020) from the Observer Program can be found on NMFS website, and provide extensive information on the Observer Program, including observer deployments, coverage rates, data collections, etc.

NMFS and ADFG have extensive scientific databases which include Alaska flatfish complex stocks, and the Council has substantial information on management of target stocks in Alaskan waters. These data are made widely available through the agency websites, publications and at various publicly attended meetings. Data on certain aspects of commercial fishing are considered to be confidential, such as individuals or individual vessels in the analysis of fishery catch-per-unit-effort data, depending on the number of individuals or entities involved. Annual economic SAFE reports (e.g., Fissel et al. 2020) on social/cultural/economic value of the Alaskan fisheries resources are produced, which include extensive information also sbout the Alaska flatfish complex fisheries. Individual assessment SAFE reports of flatfish stocks have extensive sections on the economic performance of the fisheries. Alaska supports both the

Alaska Seafood Marketing Institute and the Kodiak Seafood and Marine Science Center to stimulate research and to support and distribute the benefits of seafood in human diets.

There is no material change in compliance with any of the following supporting clauses. Clauses 4.7, 4.8, 4.9, 4.10, and 4.11 are not applicable.

4.1. All fishery removals and mortality of the target stock(s) shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery/ies and ecosystems - including data on retained catch, bycatch, discards and waste shall be collected. Data can include relevant traditional, fisher or community knowledge, provided their validity can objectively be verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States and sub-regional, regional and global fisheries organizations.

4.1.1 Timely, complete and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for the setting of management objectives, reference points and performance criteria, as well as for ensuring adequate linkage, between applied research and fisheries management (e.g. adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management and development.

4.1.2 In the absence of specific information on the “stock under consideration”, generic evidence based on similar stocks can be used for fisheries with low risk to that “stock under consideration”. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.

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

4.3. Sub-regional or regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.

4.4. States shall stimulate the research required to support national policies related to fish as food.

4.5. States shall ensure that a sufficient knowledge of the economic, social, marketing and institutional aspects of fisheries is collected through data gathering, analysis and research and that comparable data are generated for ongoing monitoring, analysis and policy formulation.

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

4.7 States conducting scientific research activities in waters under the jurisdiction of another State shall ensure that their vessels comply with the laws and regulations of that State and international law**. *Not applicable to this fishery**

4.8 States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas and shall, where appropriate, support the establishment of mechanisms, including, inter alia, the adoption of uniform guidelines, to facilitate research at the sub-regional or regional level and shall encourage the sharing of such research results with other regions**. *Not applicable to this fishery**

4.9 States and relevant international organizations shall promote and enhance the research capacities of developing countries, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development and provision of research facilities, in order for them to

participate effectively in the conservation, management and sustainable use of living aquatic resources. ***Not applicable to this fishery**

4.10 Competent national organizations shall, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished. ***Not applicable to this fishery**

4.11 Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries, in particular the least developed among them and small island developing countries. ***Not applicable to this fishery**

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 5.

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

No. supporting clauses	**7**
Applicable supporting clauses	6
Non-applicable supporting clauses	1 (5.4)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

NMFS has a well-established institutional framework for research developed within the AFSC, which operates several laboratories and Divisions, including the Auke Bay Laboratories in Alaska which conduct scientific research on fish stocks, fish habitats, and the chemistry of marine environments. Peer reviewed stock assessments are done annually and used as the scientific basis to set catch quotas, taking into account uncertainty and evaluating stock status relative to reference points in a probabilistic way. The SAFE reports are compiled annually by the Council and include a volume on Ecosystem Considerations. The SAFE report provides information on the historical catch trend, estimates of the maximum sustainable yield (MSY) or proxy of the groundfish complex as well as its component species groups, assessments on the stock condition of individual species groups; assessments of the impacts on the ecosystem of harvesting the groundfish complex at the current levels given the assessed condition of stocks. This includes consideration of rebuilding depressed stocks; and alternative harvest strategies and related effects on the component species groups.

The SAFE documents are reviewed first by the Council's Groundfish Plan Team, then by the SSC and Advisory Panel, and finally by the full Council. Upon review and acceptance by the SSC, the SAFE report and any associated SSC comments constitute the best scientific information available for purposes of the MSRA. The AFSC periodically requests a more comprehensive external review of groundfish stock assessments by the Center of Independent Experts (CIE).

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 nears completion, a meeting with the Plan Team is held to review results and presentation material, to be sure that the assessment is ready for presentation to the Council's SSC. In a narrow sense only the final meeting of the NOAA 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. All technical aspects of the assessment and the coverage of issues by alternative model formulations and scenarios are reviewed by the SSC, which 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 CIE routinely conducts stock assessment reviews using leading international experts in stock assessments for Alaska fisheries.

Data collected by scientists from the many surveys and Alaska flatfish complex fisheries are analyzed and presented in peer reviewed meetings and/or in primary literature, following rigorous scientific protocols. Results of these analyses are disseminated in a timely fashion through numerous methods, including scientific publications, and as information on NMFS, ADFG, and Council websites, in order to contribute to fisheries conservation and management. Confidentiality of individuals or individual vessels (e.g., in the analysis of fishery catch-per-unit-effort data) is fully respected where necessary.

The Council receives comprehensive presentations on the status of the EBS, AI, and GOA marine ecosystems (see: https://access.afsc.noaa.gov/REFM/REEM/EcoWeb/) at its SSC and Advisory Panel meetings as part of its annual management process for Alaskan groundfish. These are prepared and presented by NMFS scientists and contain report cards which look at a wide range of environmental and ecosystem variables, such as physical and environmental trends, zooplankton biomass, predator and forage species biomass, and seabird and marine mammal data. EFH is identified for managed fish species, including flatfish stocks. NPRB and the National Science Foundation identifies research priorities and funds studies about the BS ecosystem from atmospheric forcing and physical oceanography to humans and communities, as well as socio-economic impacts of a changing marine ecosystem. Scientists and researchers from a number of agencies and universities are involved. Ecosystem modelling, sound data management, and education and outreach activities are included in the program. An integrated GOA Ecosystem project, also funded by the NPRB, is examining recruitment processes of major groundfish species.

The Oil Spill Recovery Institute was established by U.S. Congress in response to the 1989 Exxon Valdez oil spill and is administered through and housed at the Prince William Sound Science Center, a non-profit research and education organization located in Cordova, AK. The Center facilitates and encourages ecosystem studies in the greater PWS region.

U.S. cooperates through relevant international organizations, such as the North Pacific Marine Science Organization, to encourage research in order to ensure optimum utilization of all fishery resources. Although the fisheries for flatfish stocks are conducted entirely within the U.S. EEZ, there is also scientific cooperation with neighboring countries such as Canada. The Technical Subcommittee (TSC) of the Canada-U.S. Groundfish Committee (http://www.psmfc.org/tsc2) was formed in 1960 to coordinate fishery and scientific information resulting from the implementation of commercial groundfish fisheries operating in U.S. and Canadian waters off the West Coast. Representatives from Canadian and American state/provincial and federal agencies continue to meet annually to exchange information and to identify data gaps and information needs for groundfish stocks of mutual concern from California to Alaska. Not all of these are transboundary stocks (e.g., Pacific halibut). Each agency prepares a comprehensive annual report highlighting survey and research activities, including stock assessments. These reports are compiled into an annual TSC report that is published online.

There is no material change in compliance with any of the following supporting clauses. Clause 5.4 is not applicable.

5.1. An appropriate institutional framework shall be established to determine the applied research which is required and its proper use (i.e. assess/evaluate stock assessment model/practices) for fishery management purposes.

5.1.1 With the use of less elaborate methods for stock assessment frequently used for small scale or low value capture fisheries resulting in greater uncertainty about the state of the stock under consideration, more precautionary approaches to managing fisheries on such resources shall be required, including where appropriate, lower level of utilization of resources. A record of good management performance may be considered as supporting evidence of the adequacy and the management system.

5.1.2 States shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science. Results of analyses shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence is made available as a contribution to fisheries conservation, management and development. States shall also ensure the availability of research facilities and provide appropriate training, staffing and institution building to conduct the research, taking into account the special needs of developing countries.

5.2. There shall be established research capacity necessary to assess and monitor 1) the effects of climate or environment change on fish stocks and aquatic ecosystems, 2) the state of the stock under State jurisdiction, and for 3) the impacts of ecosystem changes resulting from fishing pressure, pollution or habitat alteration.

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

5.4 The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programs to improve understanding of the biology, environment and status of transboundary aquatic stocks. ***Not applicable to this fishery**

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

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

7.3 The Precautionary Approach (C)

Fundamental Clause 6.

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

No. supporting clauses	**4**
Applicable supporting clauses	4
Non-applicable supporting clauses	0
Overall level of conformity	Medium
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

The Council's groundfish FMPs for BSAI and GOA contain the details on the Council's precautionary approach, including the tier system, Harvest Control Rules (HCRs), and reference points. Extensive analysis (e.g., a series of standard projections) is conducted in each stock assessment to determine the current and projected biomass level relative to the target reference points. Based on the information in the 2022 SAFE documents, none of the target stocks had overfishing occurring, as per the standard definitions applied to each stock.

The 2022 SAFE documents (referenced in Fundamental Clause 4 above) provide the status of Alaska flatfish stocks relative to all available reference points. Extensive analysis is conducted in each stock assessment to determine the current and projected biomass level relative to the reference points, and to advise on the various catch levels appropriate to the HCRs. Comprehensive annual Ecosystem Reports for BSAI and GOA that look at numerous elements of the Alaskan ecosystems (see: https://access.afsc.noaa.gov/REFM/REEM/EcoWeb/) are presented to the Council.

The following section provides updates on stock assessment and status for each of the BSAI and GOA flatfish stocks, based, in most of the cases, on the 2022 SAFE documents:

<u>BSAI Arrowtooth Flounder</u>

The scheduled frequency for some stock assessments was recently changed in response to the National Stock Assessment Prioritization effort (Methot 2015; Hollowed et al. 2016). All Bering Sea and Aleutian Island (BSAI) flatfish stocks are now assessed on a biennial stock assessment schedule to coincide with the availability of new survey data. There was no change in this schedule for the Arrowtooth flounder stock. Shotwell et al. (2022a) presented a sensitivity analysis to the data cleaning exercise as requested by the BSAI Plan Team and the SSC and present this in the Response to SSC and Plan Team Comments Specific (see Spies et al. (2018) for more details on the 2018 assessment methodology (available online at: https://apps-afsc.fisheries.noaa.gov/REFM/Docs/2018/BSAI/BSAIatf.pdf).

The 2021 eastern Bering Sea (EBS) bottom trawl survey estimate decreased 21% from the 2019 survey and the 2022 EBS bottom trawl survey increased 14% from the 2021 estimate. The 2022 EBS estimate is now 14% above average. The 2022 Aleutian Islands (AI) bottom trawl survey estimate decreased 3% from the 2018 estimate and is now 18% below average. Catch for arrowtooth flounder is generally low and has been between 10-18% of the acceptable biological catch (ABC) since 2011 when speciation began in the catch accounting system for this stock. Current catch as of October 14, 2022 is at 9% of ABC. The total allowable catches (TACs) for arrowtooth flounder are generally set well below ABC and have been between 11-27% of ABC. The 2022 ratio of TAC to ABC was 25%.

For the 2023 fishery, Shotwell et al. (2022) recommend the maximum allowable ABC of 83,852 t from the 2018 accepted model. This is a 4% increase from last year's ABC of 80,389 t. The projected female spawning biomass for 2023 is 514,577 t and the projected age 1+ total biomass for 2023 is 929,274 t. Female spawning biomass is well above B40%, and projected to be stable.

The stock is not overfished and is not approaching a condition of being overfished. Reference values are in **Error! Reference source not found.**.

Table 1 - BSAI Arrowtooth Flounder assessment outputs. Source: Shotwell et al., 2022a

	As estimated or *specified last* year for:		*As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate)**	0.2, 0.35	0.2, 0.35	0.2, 0.35	0.2, 0.35
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	921,690	914,915	929,274	919,797
Projected Female spawning	509,672	528,725	514,577	537,999
$B_{100\%}$	558,826	558,826	561,219	561,219
$B_{40\%}$	223,530	223,530	224,487	224,487
$B_{35\%}$	195,589	195,589	196,427	196,427
F_{OFL}	0.160	0.160	0.174	0.174
$maxF_{ABC}$	0.135	0.135	0.146	0.146
F_{ABC}	0.135	0.135	0.146	0.146
OFL (t)	94,445	97,944	98,787	103,070
maxABC (t)	80,389	83,389	83,852	87,511
ABC (t)	80,389	83,389	**83,852**	**87,511**
	As determined *last* year for:		As determined *this* year for:	
Status	2020	2021	2021	2022
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	No
Approaching overfished	n/a	no	n/a	No

*Projections are based on estimated catches of 8,048 t for 2022, 8,507 t for 2023, and 7,977 t for 2024 to obtain more accurate two-year projections. Please see section on Specified Catch Estimation subsection in the Harvest Recommendations section for more details regarding these calculations.
**Natural mortality rate is 0.2 for females, 0.35 for males.

GOA Arrowtooth Flounder

Shotwell et al. (2022b) presented an assessment for GOA Arrowtooth Flounder carried out with a statistical age-structured model as the primary assessment tool, which qualifies as a Tier 3 stock. This assessment consists of a population model, which uses survey and fishery data to generate a historical time series of population estimates, and a projection model, which uses results from the population model to predict future population estimates and recommended harvest levels. The data sets used in this assessment include total catch biomass, fishery size compositions, bottom

trawl survey age compositions, and bottom trawl survey size compositions when age compositions are not available. For an off-cycle year, Shotwell et al. (2022b) do not re-run the assessment model, but do update the projection model with new catch information. This incorporates the most current catch information without re-estimating model parameters and biological reference points. As with last year, the full assessment is based on model from 2019.

There were no changes made to the assessment model inputs since this was an off-cycle year. New data added to the projection model included an updated 2021 catch estimate of 9,988 t and new catch estimates for 2022-2023. The 2022 estimated catch was quantified as an expansion factor of 1.12, which represents the average fraction of catch taken after October 15 in the last five complete years (2017-2021). This resulted in an estimated catch for 2022 of 12,233 t. To estimate future catches, the authors updated the yield ratio to 0.14, which was the average of the ratio of catch to ABC for the last five complete catch years (2017-2021). This yield ratio was multiplied by the projected ABCs from the updated projection model to generate catches of 16,382 t in 2023 and 14,292 t in 2024.

Based on the projection model results, recommended ABCs for 2023 and 2024 are 119,485 t and 118,014 t, respectively, and the OFLs are 142,749 t and 141,008 t. The new ABC and OFL recommendations for 2023 are similar to the 2022 ABCs and OFL developed using the 2021 full assessment model. The stock is not overfished, and is not approaching a condition of being overfished. Reference values are presented in **Error! Reference source not found.**.

Table 2 - GOA Arrowtooth Flounder assessment outputs. Source: Shotwell et al., 2022b.

Quantity	As estimated or *specified last* year for: 2022	2023	*As estimated or *recommended this* year for: 2023	2024
M (natural mortality rate)**	0.35, 0.2	0.35, 0.2	0.35, 0.2	0.35, 0.2
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	1,268,140	1,270,850	1,265,950	1,269,510
Projected Female spawning	703,853	691,941	702,074	690,799
$B_{100\%}$	1,018,700	1,018,700	1,018,700	1,018,700
$B_{40\%}$	407,478	407,478	407,478	407,478
$B_{35\%}$	356,544	356,544	356,544	356,544
F_{OFL}	0.225	0.225	0.225	0.225
$maxF_{ABC}$	0.185	0.185	0.185	0.185
F_{ABC}	0.185	0.185	0.185	0.185
OFL (t)	143,100	141,231	142,749	141,008
maxABC (t)	119,779	118,201	119,485	118,014
ABC (t)	119,779	118,201	119,485	118,014
Status	As determined *last* year for: 2020	2021	As determined *this* year for: 2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Projections are based on estimated catches of 12,233 t for 2022, 16,382 t for 2023, and 14,292 t for 202
**Natural mortality rate is 0.35 for males, 0.2 for males.

BSAI Kamchatka Flounder

BSAI Kamchatka flounder is assessed biennially according to the stock assessment prioritization schedule. During odd years, an executive summary is presented with recommendations of harvest levels for the next two years for this species. An age-structured assessment is presented for Kamchatka flounder by Bryan et al. (2022a) and is a full update of the 2020 stock assessment. Structural changes were not made to the model. Differences between the 2020 assessment and the current assessment were due to changes in the data inputs:

- Estimates of catch were updated for all years. The 2022 catch was estimated using an expansion factor of 1.045 that was derived from the 5-yr average proportion of Kamchatka flounder caught as of October 1st..
- The 2021 and 2022 fishery length composition data were added to the assessment.

- The 2021 and 2022 EBS shelf bottom trawl survey biomass and length composition estimates were added to the assessment. All years were updated.
- The 2022 Aleutian Island bottom trawl survey biomass and length composition estimated were added to the assessment.

The assessment methodology remained unchanged.

The Kamchatka stock is neither overfished nor approaching an overfished condition. With regard to assessing the current stock level, the expected stock size in the year 2022 is above $B_{35\%}$, 33,029 t. With regard to whether the stock is likely to be in an overfished condition in the near future, the expected stock size in the year 2035 is also greater than $B_{35\%}$. The assessment outputs show the relationship between the estimated time-series of female spawning biomass and fishing mortality and the tier 3 control rule for Kamchatka flounder. Given the results, Kamchatka flonderf is not currently overfished or approaching overfishing. The F that would have produced a catch for last year equal to last year's OFL was 0.126. Reference values are presented in **Error! Reference source not found.**.

Table 3 - BSAI Kamchatka Flounder assessment outputs. Source: Bryan et al., 2022a.

	Tier 3 assessment model			
	As estimated last year for		As estimated this year for	
Quantity	2022	2023	2023	2024
M (natural mortality rate)	0.11	0.11	0.11	0.11
Tier	3a	3a	3a	3a
Projected total (age 2+) biomass (t)	143,983	142,762	121,977	118,713
Projected female spawning biomass	55,701	57,082	47,877	47,387
Projected				
$B_{100\%}$	101,376	101,376	94,370	94,370
$B_{40\%}$	40,550	40,550	37,748	37,748
$B_{35\%}$	35,482	35,482	33,029	33,029
F_{OFL}	0.108	0.108	0.103	0.103
$maxF_{ABC}$	0.09	0.09	0.086	0.086
F_{ABC}	0.09	0.09	0.086	0.086
OFL (t)	10,903	11,115	8,946	8,776
maxABC (t)	9,214	9,393	7,579	7,435
ABC (t)	9,214	9,393	7,579	7,435
	As determined *last* year for:		As determined *this* year for:	
Status	2020	2021	2021	2022
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

**Based on model 16.0b. The 2022 preliminary catch was set equal to the extrapolated end of 2022 catch (8661 t) in place of maximum ABC.*

BSAI Yellowfin Sole

Relative to last year's BSAI SAFE report, the following substantive changes have been made to the BSAI yellowfin sole assessment relative to the 2021Bering Sea and Aleutian Islands (BSAI) SAFE report. In Spies et al (2022) the following changes in input data were carried out:

- The 2021 fishery and survey age compositions were added.
- The estimate of the total catch made through the end of 2021 was updated as reported by the NMFS Alaska Regional office. The catch through the end of 2022 was estimated based on available data to be 127,712 t. Catch for the 2023 and 2024 projections were assumed to be the mean of the past 5 years, 2018 - 2022, 126,157 t.
- The 2022 NMFS survey biomass estimate and standard error were included. A model-based (VAST) estimate of the EBS and NBS biomass estimates, standard error, and age composition were used in the final model.

The assessment method was also updated, three models were presented by Spes et al (2022):

1. Model 18.2 uses a fixed value for female natural mortality (M=0.12) and allows male natural mortality to be estimated within the model. This model was accepted by the BSAI Plan Team and the SSC in 2021. Survey index data (1982-2022) used design-based eastern Bering Sea estimates.

2. Model 22.0 is the same as Model 18.2 except a single-sex survey selectivity is used rather than a separate survey selectivity for males and females. Survey index data (1982-2022) and age compositions are based on design-based indices for the eastern Bering Sea.
3. Model 22.1 is the same as Model 22.0 except that the survey index data and age compositions (1982-2022) are based on model-based indices (VAST) for the combined Northern Bering Sea and eastern Bering Sea survey region. This is the authors' preferred model.

The three models presented in Speis et al (2022) include interpolated survey bottom temperature within the summer bottom trawl area < 100m as a covariate on survey catchability, as well as National Marine Fisheries Service eastern Bering Sea survey start date as an additional covariate within the model, as documented in Nichol et al. (2019) to be informative for yellowfin sole. These models also specify female natural mortality to be fixed at 0.12 while allowing the model to estimate male natural mortality. Model 22.0 builds upon Model 18.2 by collapsing survey selectivity into a single set of parameters for males and females. Model 22.1 further builds up on Model 22.0 by using model-based survey indices and age compositions from the combined EBS and NBS survey areas. Model 22.1 is the preferred model.

In the eastern Bering Sea (EBS) bottom trawl survey performed in 2022, the EBS yellowfin sole design-based biomass estimate was 25% higher than estimated by the 2021 EBS bottom trawl survey, at 2,039,970 t.

Spawning biomass estimated by Model 22.1 was 1.86 * B_{MSY}. Therefore, yellowfin sole continues to qualify for management under Tier 1a. The 1978-2016 age-1 recruitments and the corresponding spawning biomass estimates were used to fit the stock recruitment curve and determine the Tier 1 harvest recommendations. Tier 3 estimates were also conducted, which is typical for this assessment.

This assessment updates last year's model with total and spawning biomass estimates that are higher than the 2021 assessment. This year's recommended ABC and OFL are higher than the 2021 assessment, in part due to an increase in biomass estimates as well as the recommended use of the EBS+NBS survey area.

Catch of yellowfin sole as of October 1, 2022 in the Bering Sea and Aleutian Islands was 106,096 t. Over the past 5 years (2017 - 2021), approximately 83.1% of the catch has taken place by this date. Therefore, the full year's estimate of catch in 2022 was extrapolated to be 127,718 t. This is similar to the average catch over the past ten years, 134,698 t. Future catch for the next 10 years, 2023 - 2032, was estimated to be the mean of the catch from the past five years, 2018 - 2021, and the extrapolated full year's catch for 2022, which resulted in an estimate of 126,157 t.

Yellowfin sole female spawning biomass continues to be above B_{MSY} and the annual harvest remains below the ABC level. Management quantities are given in **Error! Reference source not found.** for the 2022 accepted model and the 2022 preferred model. The projected estimate of total biomass for 2023 was higher by 45% from the 2021 assessment of 2,284,820 t, to 3,321,640 t. The model projection of spawning biomass for 2023, assuming catch for 2022 as described above, was 885,444 t, 22% higher than the projected 2022 spawning biomass from the 2021 assessment of 727,101 t. The 2023 and 2024 ABCs using F_{ABC} from this assessment model were higher than last year's 2023 ABC of 326,235 t; 378,499 t and 462,890 t. The 2023 and 2024 OFLs estimated by Model 22.1 were 404,882 t and 495,155 t. Increases in management quantities for the preferred Model 22.1 are largely due to the increased survey area. The Risk Table indicates an overall risk level of 1 and there were no recommended reductions in ABC.

Table 4 – BSAI Yellowfin Sole assessment outputs. Source: Spies et al., 2022.

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate)	0.12, 0.135	0.12, 0.135	0.12, 0.125	0.12, 0.125
Tier	1a	1a	1a	1a
Projected total (age 6+) biomass (t)	2,479,370 t	2,284,820 t	3,321,640 t	4,062,230 t
Projected female spawning biomass (t)	857,101 t	727,101 t	885,444 t	897,062 t
B_0	1,489,190 t	1,489,190 t	1,407,000 t	1,407,000 t
B_{MSY}	495,904 t	495,904 t	475,199 t	475,199 t
F_{OFL}	0.152	0.152	0.122	0.122
$maxF_{ABC}$	0.143	0.143	0.114	0.114
F_{ABC}	0.143	0.143	0.114	0.114
OFL (t)	377,071 t	347,483 t	404,882 t	495,155 t
$maxABC$	354,014 t	326,235 t	378,499 t	462,890 t
ABC (t)	354,014 t	326,235 t	378,499 t	462,890 t
Status	2020	2021	2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Projections were based on estimated catches of 127,712 t in 2022 and 126,157 t used in place of maximum ABC for 2023. This estimate was based on the mean of the past 5 years, 2018 - 2022, which includes the extrapolated catch of 127,712 t for 2022.

BSAI Northern Rock Sole

Northern rock sole (*Lepidopsetta polyxystra*) are assessed on a biennial stock assessment schedule as part of the NMFS assessment prioritization plan implemented in 2017. For BSAI assessments, an executive summary is presented by McGilliard et al. (2022) to recommend harvest levels for the next two years (refer to last year's full stock assessment report for further information regarding the stock assessment model (McGilliard et al. 2020)).

In McGilliard et al. (2022), the following changes in assessment inputs were carried out:

- 2022 catch biomass through October 10, 2022 and 2021 catches were added to the model
- 2020 catch biomass was updated to reflect October – December 2020 catches
- 2020-2021 fishery age composition data were added to the model
- 2020-2021 survey age composition data were added to the model
- 2021-2022 Eastern Bering Sea (EBS) shelf survey biomass was added to the model

No changes were made to the assessment model methodology.

The key results of this year's assessment are compared to the key results of the accepted 2021 update assessment and are summarized in **Error! Reference source not found.**. The ABC is reduced from maxABC due model structural uncertainty indicating that a plausible alternative model exists for which the OFL is smaller than the base model's maxABC. Therefore, the ABC is reduced to the value of the OFL for this alternative model Therefore, the ABC is reduced to the value of the OFL for this alternative model.

Table 5 - BSAI Northern Rock Sole assessment outputs. Source: McGilliard et al., 2022

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2022	2023	2023	2024
M (natural mortality rate)	0.15 (f),0.17 (m)	0.15 (f),0.17 (m)	0.15 (f),0.19 (m)	0.15 (f),0.19 (m)
Tier	1a	1a	1a	1a
Projected age 6+ geometric mean biomass (t)	1,363,592	1,787,395	941,359	1,111,320
Projected Female spawning biomass (t)	287,600	320,399	260,887	291,774
B_0	476,820	476,820	447,795	447,795
B_{MST}	158,972	158,972	155,293	155,293
F_{OFL}	0.157	0.157	0.176	0.176
$maxF_{ABC}$	0.152	0.152	0.169	0.169
F_{ABC}	0.152	0.152	0.129	0.108
OFL (t)	214,084	280,621	166,034	196,011
maxABC (t)	206,896	271,199	158,935	187,631
ABC (t)	206,896	271,199	121,719	119,969
Status	As determined *last* year for:		As determined *this* year for:	
	2020	2021	2021	2022
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

* Projections are based on estimated catches of 16,0143 t used in place of maximum permissible ABC for 2022 and 40,760 t used in place of maximum permissible ABC for 2023 and 2024. The catch for 2022 was set equal to 2022 catch as of October 10, 2022. The 2021 and 2022 catch was estimated as the average over the past decade of final catches.

GOA Northern and Southern Rock Sole

The GOA northern and southern rock sole assessment has been moved to a 4-year assessment cycle per the stock assessment prioritization schedule. During years when a full assessment is not completed a partial assessment will be done. This year represents an off-cycle year and during years when a full assessment is not completed a partial assessment is done (Bryan, 2022). For a partial assessment, the projection model uses the most current catch information without re-estimating the model parameters. The projection model results are then combined with the other shallow-water flatfish recommended harvest levels. The combined recommendations are used for the next two years. GOA northern rock and southern rock sole are classified as Tier 3 stocks and are assessed using age-structured stock assessment models that account for regional differences in growth. The western GOA and central-eastern GOA are modeled separately with estimated area-specific growth patterns. The species-specific projection model was run separately for each area using the results from the last accepted northern rock sole and southern rock sole assessment models and updated catch information for 2021-2022. The resulting ABC recommendations are for 2023 and 2024.

Changes were not made to the assessment model inputs since this was an off-cycle year. New data added to the projection model included final 2021 catch and catch estimates for 2022-2024.

Changes were not made to the assessment model since this was an off-cycle year.

An assumption of the northern and southern rock sole assessment models is that total rock sole catch is split evenly between the species. This was true for the 2021 full assessments and the catch updates for this year's partial assessment use this 50% split. Therefore, the area-specific catch updates were the same in the northern rock sole and southern rock sole projection models. The final 2021 catch in the central region was updated and increased to 663 t from 634 t. The 2022 end of year catch was derived as the product of the catch on September 28, 2022 (456.9 t) and an expansion factor of 1.205. The 2022 catch

input was changed from 634 t to 551 t and was used as the catch input for 2023 and 2024. The 2021 catch in the western region was updated and reduced to 9.95 t from 40.6 t and the 2022 end of year catch was derived as the product of the catch on September 28, 2022 (12.07 t) and an expansion factor of 1.083. The 2022 catch was changed from 40.6 t to 13.07 t and was used as the catch input for 2023 and 2024.

The recommended ABCs for northern rock sole in the central GOA for 2023 and 2024 are 4,214 t and 4,421 t. The recommended OFLs are 4,934 t and 5,175 t for 2023 and 2024 in the central GOA. The recommended ABCs for northern rock sole in the western GOA for 2023 and 2024 are 8,508t and 8,916 t.

The recommended OFLs are 10,259 t and 10,749 t. The 2023 advice from the updated projection models is similar to what was specified in 2021.

The recommended ABCs for southern rock sole in the central GOA for 2023 and 2024 are 14,246 t and 14,978 t. The recommended OFLs are 16,874 t and 17,733 t. The recommended ABCs for southern rock sole in the western GOA for 2023 and 2024 are 11,840 t and 12,430 t. The recommended OFLs are 14,029 t and 14,718 t. The 2023 advice from the updated projection models is similar to what was specified in 2021.

The results are presented separately for each species and by area in **Error! Reference source not found.** and Table 7.

Table 6 - GOA Northern Rock Sole assessment outputs. Source: Bryan, 2022.

Northern rock sole, Central GOA	As estimated or *recommended last* year for:		As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate; female, male)	0.2, 0.232*	0.2, 0.232*	0.2, 0.232*	0.2, 0.232*
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	35,089	36,945	37,080	38,502
Projected Female spawning biomass (t)	11,266	13,359	13,431	15,845
$B_{100\%}$	20,913	20,913	20,913	20,913
$B_{40\%}$	8,365	8,365	8,365	8,365
$B_{35\%}$	7,320	7,320	7,320	7,320
F_{OFL}	0.181	0.181	0.181	0.181
$maxF_{ABC}$	0.153	0.153	0.153	0.153
F_{ABC}	0.153	0.153	0.153	0.153
OFL (t)	4,541	4,913	4,934	5,175
maxABC (t)	3,877	4,197	4,214	4,421
ABC (t)	3,877	4,197	4,214	4,421
	As determined *last* year for:		As determined *this* year for:	
Status	2020	2021	2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Northern rock sole, central GOA: projections are based on an estimated catch of 551 t for 2022 and estimates of 551 t and 551 t used in place of maximum permissible ABC for 2023 and 2024.

Northern rock sole, Western GOA	As estimated or *recommended last* year for:		As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate; female, male)	0.2, 0.254*	0.2, 0.254*	0.2, 0.254*	0.2, 0.254*
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	65,271	66,465	66,512	67,083
Projected Female spawning biomass (t)	24,150	26,488	26,525	29,301
$B_{100\%}$	28,702	28,702	28,702	28,702
$B_{40\%}$	11,481	11,481	11,481	11,481
$B_{35\%}$	10,045	10,045	10,045	10,045
F_{OFL}	0.385	0.385	0.385	0.385
$maxF_{ABC}$	0.313	0.313	0.313	0.313
F_{ABC}	0.313	0.313	0.313	0.313
OFL (t)	9,628	10,248	10,259	10,749
maxABC (t)	7,986	8,498	8,508	8,916
ABC (t)	7,986	8,498	8,508	8,916
	As determined *last* year for:		As determined *this* year for:	
Status	2020	2021	2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Northern rock sole, western GOA: Projections are based on an estimated catch of 13 t for 2022 and estimates of 13 t and 13 t used in place of maximum permissible ABC for 2023 and 2024.

Table 7 - GOA Southern Rock Sole assessment outputs. Source: Bryan, 2022.

Southern rock sole, Central GOA	As estimated or *recommended last* year for:		As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate: female, male)	0.2, 0.253*	0.2, 0.253*	0.2, 0.253*	0.2, 0.253*
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	130,706	133,265	133,391	134,647
Projected Female spawning biomass (t)	37,555	43,470	43,530	40,696
$B_{100\%}$	53,430	53,430	53,430	53,430
$B_{40\%}$	21,376	21,376	21,376	21,376
$B_{35\%}$	18,703	18,703	18,703	18,703
F_{OFL}	0.268	0.268	0.268	0.268
$maxF_{ABC}$	0.224	0.224	0.224	0.224
F_{ABC}	0.224	0.224	0.224	0.224
OFL (t)	15,622	16,853	16,874	17,733
maxABC (t)	13,185	14,229	14,246	14,978
ABC (t)	13,185	14,229	14,246	14,978
Status	As determined *last* year for: 2020	2021	As determined *this* year for: 2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Southern rock sole, central GOA: projections are based on an estimated catch of 551 t for 2022 and estimates of 551 t and 551 t used in place of maximum permissible ABC for 2023 and 2024.

Southern rock sole, Western GOA	As estimated or *recommended last* year for:		As estimated or *recommended this* year for:	
Quantity	2022	2023	2023	2024
M (natural mortality rate: female, male)	0.2, 0.271	0.2, 0.271	0.2, 0.271	0.2, 0.271
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	113,153	114,371	114,420	114,480
Projected Female spawning biomass (t)	35,556	40,425	40,457	45,479
$B_{100\%}$	43,788	43,788	43,788	43,788
$B_{40\%}$	17,515	17,515	17,515	17,515
$B_{35\%}$	15,326	15,326	15,326	15,326
F_{OFL}	0.222	0.222	0.222	0.222
$maxF_{ABC}$	0.185	0.185	0.185	0.185
F_{ABC}	0.185	0.185	0.185	0.185
OFL (t)	12,842	14,021	14,029	14,718
maxABC (t)	10,833	11,834	11,840	12,430
ABC (t)	10,833	11,834	11,840	12,430
Status	As determined *last* year for: 2020	2021	As determined *this* year for: 2021	2022
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Southern rock sole, western GOA: Projections are based on an estimated catch of 13 t for 2022 and estimates of 13 t and 13 t used in place of maximum permissible ABC for 2023 and 2024.

<u>BSAI Alaska Plaice</u>

Alaska plaice are assessed on a biennial stock assessment schedule as part of the National Marine Fisheries Service assessment prioritization plan implemented in 2017. For Bering Sea/Aleutian Islands partial assessments, an executive summary is presented by Sullivan and Monnahan (2022) to recommend harvest levels for the next two years. A statistical age-structured model is used as the primary assessment tool for the Bering Sea/Aleutian Islands Alaska plaice assessment, a Tier 3 stock. This assessment consists of a population model that uses survey and fishery data to generate a historical time series of population estimates, and a projection model, which uses results from the population model to predict future population estimates and recommended harvest levels. The data sets used in this assessment include total catch biomass, fishery age compositions, eastern Bering Sea (EBS) shelf bottom trawl survey abundance estimates, and EBS shelf bottom trawl survey age compositions.

In a partial assessment year, the full assessment model is not rerun but instead a Tier 3 projection model with updated catch estimates is run to estimate the stock level in future years. This incorporates the most current harvest information without re-estimating model parameters and biological reference points. The Tier 3 projection operates outside the full assessment model by projecting estimates of future female spawning biomass, age 3+ total biomass, ABC and OFL from the full model estimate of 2021 numbersat-age, weight-at-age, maturity, and selectivity. Please refer to last year's full stock assessment report for further information regarding the stock assessment model (Ormseth 2021; available online at https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/).

In Sullivan and Monnahan (2022) new data were added to the Tier 3 projection model included an updated 2021 catch estimate (15,862 t) and new catch estimates for 2022 through October 15, 2022 (sourced October 24, 2022 from the NMFS Alaska Regional Office using the Alaska Fisheries Information Network [AKFIN] database). Following methods used in the 2021 full assessment, the full-year 2022 catch (12,226 t) was estimated by averaging the three weeks of catch prior to October 15 and using this value as the assumed weekly catch for the remaining 11 weeks in 2022.

There were no changes in assessment methodology since this was an off-cycle year.

For 2023, the recommended maximum allowable ABC from the Tier 3 projection model was 33,946 t. Reference values for BSAI Alaska plaice are summarized in **Error! Reference source not found.**, with the recommended ABC and OFL values for 2023 in bold.

The stock is not being subject to overfishing, is not currently overfished, nor is it approaching a condition of being overfished. The tests for evaluating these three statements on status determination require examining the official total catch from the most recent complete year (2021) and the current model projections of spawning biomass relative to $B_{MSY\%}$ for 2021 and 2022. The estimated total catch for 2021 is 15,862 t, far below the 2021 OFL of 37,924 t; therefore, the stock is not being subjected to overfishing. The

estimates of spawning biomass for 2023 and 2024 from the 2021 stock assessment projections are 149,987 t and 158,149 t, respectively. Both estimates are well above the estimate of $B_{35\%}$ of 100,306 t and therefore the stock is not currently overfished nor approaching an overfished condition.

Table 8 – BSAI Alaska Plaice assessment outputs. Source: Sullivan and Monnahan, 2022.

Quantity	As estimated or *specified last* year for: 2022	2023	As estimated or *recommended this* year for: 2023	2024
M (natural mortality rate)	0.13	0.13	**0.13**	0.13
Tier	3a	3a	**3a**	3a
Projected total (3+) biomass (t)	442,946	454,030	**461,992**	477,701
Female spawning biomass (t)	141,838	144,767	**149,987**	158,149
$B_{100\%}$	286,587	286,587	**286,587**	286,587
$B_{40\%}$	114,635	114,635	**114,635**	114,635
$B_{35\%}$	100,306	100,306	**100,306**	100,306
F_{OFL}	0.17	0.17	**0.17**	0.17
$maxF_{ABC}$	0.14	0.14	**0.14**	0.14
F_{ABC}	0.14	0.14	**0.14**	0.14
OFL (t)	39,305	39,685	**40,823**	43,328
maxABC (t)	32,697	32,998	**33,946**	36,021
ABC (t)	32,697	32,998	**33,946**	36,021
Status	As determined *last* year for: 2020	2021	As determined *this* year for: 2021	2022
Overfishing	no	n/a	No	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

GOA Flathead Sole

The GOA flathead sole stock is typically assessed every four years and was last assessed in 2017. In years without a full assessment, an executive summary is presented to recommend harvest levels for the next two years (see the 2017 full stock assessment report for further information regarding the assessment model available online at https://www.afsc.noaa.gov/REFM/Docs/2017/GOAflathead.pdf).

Flathead sole is assessed using an age-structured model and Tier 3 determination. Thus, the single species projection model was run using parameter values from the accepted 2017 flathead sole assessment model (Turnock et al. 2017), together with updated catch information for 2017-2020, and estimated catches for 2021 and 2022-2023 to predict stock status for flathead sole in 2022 and 2023 and to make ABC recommendations for those years. Projections are conducted using numbers-at-age for flathead sole from age 3-21+, and historical recruitment of age 3 individuals is used to calculate OFLs and ABCs.

In Kapur and Monnahan (2022), the following changes in input data were carried out:

- Added catch data: finalized catch for 2017-2021, estimated catch biomass for 2022 using observed catches through October 13, 2022 added to average catches thereafter;
- Added design-based Gulf of Alaska Trawl Survey biomass data for 2019 and 2021;
- Added Gulf of Alaska Trawl Survey length composition data for 2019 and 2021;
- Added Fishery length composition data from 2018-2022, current through October 13, 2022.
- Updated all historical data to reflect what is currently available in AFSC and AKFIN databases.
- Updated aging error matrix using Punt et al. (2008) method for GOA Flathead Sole double reads.

No new models were considered Kapur and Monnahan (2022). The previously accepted model, referred to herein as Model 17.0 (2017) was updated with new data, as described above, and the modeling software was bridged from Stock Synthesis v3.24u to v3.30.17. The present model is referred to as Model 17.1a (2022).

The key results of the assessment, based on the author's preferred model (Model 17.1a (2022)), are compared to the accepted 2021 partial update assessment (Kapur 2021) in the table **Error! Reference source not found.**.

Projections are based on catches of 687 t used in place of maximum permissible ABC for 2022 and 1908 t used in place of maximum permissible ABC for 2023 and 2024. The 2022 catch was estimated using the

true observed catches from AKFIN (through October 13, 2022), plus the average weekly catches from Oct 14-Dec 31 from the last five years. The 2023 and 2024 catch was estimated as the average of the total catch in each of the last 5 years (2017-2021).

Table 9 - GOA Flathead Sole assessment outputs. Source: Kapur and Monnahan, 2022.

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2022	2023	2023	2024
M (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	279,975	276,796	294,188	293,277
Projected Female spawning biomass (t)	97,614	97,876	94,059	95,932
$B_{100\%}$	91,551	91,551	92,582	92,582
$B_{40\%}$	36,620	36,620	37,033	37,033
$B_{35\%}$	32,043	32,043	32,404	32,404
F_{OFL}	0.36	0.36	0.36	0.36
$maxF_{ABC}$	0.28	0.28	0.29	0.29
F_{ABC}	0.28	0.28	0.29	0.29
OFL (t)	48,928	48,757	48,161	49,073
maxABC (t)	40,175	40,046	39,480	40,222
ABC (t)	40,175	40,046	39,480	40,222
Status	As determined *last year* for:		As determined *this year* for:	
	2020	2021	2021	2022
Overfishing	no	NA	no	NA
Overfished	NA	no	NA	no
Approaching Overfished	NA	no	NA	no

BSAI Flathead Sole

"Flathead sole" as currently managed by the NPFMC in the BSAI represents a two-species complex consisting of true flathead sole (*Hippoglossoides elassodon*) and its morphologically-similar congener Bering flounder (*H. robustus*).

In 2012, the BSAI Groundfish Plan Team moved flathead sole to a biennial stock assessment schedule because it has historically been lightly exploited. A full stock assessment report was produced in 2020 (Monnahan and Haehn, 2020, available online at https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/BSAIflathead.pdf). This year, a partial assessment is presented. In partial assessment years, an executive summary is presented to recommend harvest levels for the next two years, along with trends in catch and biomass.

Flathead sole is assessed using an age-structured model and Tier 3 determination. The single species projection model is run using parameter values from the accepted 2020 assessment model, together with updated catch information for 2020-2021 and estimated catches for 2022 and 2023-2024, to predict stock status for Flathead sole in 2023-2024, and to make ABC recommendations and set OFL for those years.

2022 assessment (Kapur, 2022) used a single survey index of “total” Hippoglossoides spp. biomass that included the EBS “standard” survey areas and AI survey areas for the years 1982-2019. As was done in the 2020 full assessment (Monnahan et. al. 2020) and the 2021 partial assessment (Kapur 2021), Kapur (2022) estimated a relationship between EBS shelf *Hippoglossoides* spp. survey biomass estimates and AI survey biomass estimates in years when no AI survey occurred. The estimation method uses the linear regression to find an AI biomass estimate in a particular year based on the EBS biomass estimate for that year. There were no AI surveys conducted in 2020 nor 2021, and AI biomass was estimated with the linear equation. An Aleutian Islands survey was conducted in 2022, and the 2022 total BSAI estimate was 710,804 t, a roughly 6% increase over the 2021 regression estimate of 670,091 t.

To run the projection model to predict ABCs for 2023 and 2024, Kapur (2022) used true, updated catches for 2020 and 2021 and estimates for the total catches in 2022-2024. Note that the 2020 catch used in the last benchmark model was itself an estimate (8,556), about 9% less than the finalized observation used for projections here. The catch for 2022 (14,659 t) was estimated by adding the average catch between Oct 19 and December 31 over the years 2017-2021 to the 2022 catch as of Oct 19, 2022. The 2023 and 2024 catches (11,130 t) were estimated as the average catch over the previous 5 years (2017-2021).

To ensure consistency with the most recent full assessment (Monnahan and Haehn, 2020), the projection model was parameterized using mean recruitment and stock spawning biomass for all years included in the assessment model (1964 onwards). Future full assessments for BSAI Flathead sole can consider updating

these inputs in light of the determination of a regime shift in 1977, and subsequent recommendation that projections of future stock states should be based on year classes 1977 and forward.

Based on the updated projection model results, the recommended ABCs for 2023 and 2024 are listed in **Error! Reference source not found.**. The ABC and OFL for 2023 are only slightly below those projected from the last partial assessment (2021). Estimated catches for 2021 and 2022 are higher than those used last year.

Table 10 - BSAI Flathead Sole assessment outputs. Source: Kapur, 2022.

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2022	2023	2023*	2024*
M (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	608,631	612,001	606,522	606,080
Projected Female spawning biomass (t)	155,379	160,748	158,962	164,594
$B_{100\%}$	203,658	203,658	203,658	203,658
$B_{40\%}$	81,463	81,463	81,463	81,463
$B_{35\%}$	71,280	71,280	71,280	71,280
F_{OFL}	0.46	0.46	0.46	0.46
$maxF_{ABC}$	0.37	0.37	0.37	0.37
F_{ABC}	0.37	0.37	0.37	0.37
OFL (t)	77,967	80,034	79,256	81,167
maxABC (t)	64,288	65,988	65,344	66,927
ABC (t)	64,288	65,988	65,344	66,927
Status	As determined last year for:		As determined this year for:	
	2020	2021	2021	2022
Overfishing	no	NA	no	NA
Overfished	NA	no	NA	no
Approaching Overfished	NA	no	NA	no

*Projections are based on estimated catches of 14,659t used in place of maximum permissible ABC for 2022 and 11,130 t used in place of maximum permissible ABC for 2023-2024. The final catch for 2022 was estimated by taking the average tons caught between Oct 19 and December 31 over the previous 5 years (2017-2021) and adding this average amount to the catch-to-date as of Oct 19, 2022 which is shown at the bottom of Table 1. The 2023 and 2024 catch was estimated as the average of the total catch in each of the last 5 years.

GOA Rex Sole

The Gulf of Alaska rex sole stock is assessed every four years and was last assessed in 2021. In between the full assessment years, McGilliard (2022) presents an executive summary to recommend harvest levels for the next two years. The 2021 full stock assessment report (McGilliard and Palsson, 2021) is available online at https://apps-afsc.fisheries.noaa.gov/Plan_Team/2021/GOArex.pdf. A full stock assessment document with updated assessment and projection model results will be presented in 2025.

Rex sole is assessed using an age-structured model and Tier 3 determination within the context of a two-area model. The Western-Central GOA and Eastern GOA are modeled as separate areas with distinct growth patterns estimated by area. Thus, the single species projection model was run separately for the two areas using parameter values from the accepted 2021 rex sole assessment model (McGilliard and Palsson 2021), together with updated catch information for 2021-2022, to predict stock status for rex sole in 2023 and 2024 and to make ABC recommendations for those years. Projections are conducted using numbers-at-age for rex sole from age 3-20+ by area and historical recruitment of age 3 individuals by area to calculate OFL's and ABC's.

Based on the updated projection model results, the recommended ABC's for 2023 and 2024 in the Western-Central GOA are 16,346 t and 16,739 t, and the OFL's are 19,865 t and 20,335 t. The new ABC recommendation and OFL for the Western-Central GOA in 2022 are similar to those developed in 2021

(16,276 t and 19,779 t). The recommended ABC's for 2023 and 2024 in the Eastern GOA are 4,318 t and 4,358 t, and the OFL's are 5,270 t and 5,317 t. The new ABC recommendation and OFL for the Eastern GOA in 2022 are almost exactly the same as those developed in 2021 because realized and projected catches as estimated last year and this year were approximately 2 t. The principal reference values are shown in Table 11.

Table 11 – GOA Rex Sole assessment outputs. Source: McGilliard, 2022.

Quantity	As estimated or *specified this* year for:		As estimated or *recommended this* year for:	
	2022	2023	2023	2024
M (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	124,543	126,939	127,297	128,207
Female spawning biomass (t)	51,713	56,777	56,965	59,734
$B_{100\%}$				
$B_{40\%}$				
$B_{35\%}$	See area-specific tables below		See area-specific tables below	
F_{OFL}				
$maxF_{ABC}$				
F_{ABC}				
OFL (t)	23,302	25,049	25,135	25,652
maxABC (t)	19,141	20,594	20,664	21,097
ABC (t)	19,141	20,594	20,664	21,097
Status	As determined *last* year for:		As determined *this* year for:	
	2020	2021	2021	2022
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

<u>BSAI Greenland turbot</u>

BSAI Greenland turbot is assessed biennially according to the stock assessment prioritization schedule. During odd years, an executive summary is presented with recommendations of harvest levels for the next two years for this species. Information regarding the 2020 stock assessment model and results is available online (Bryan et. al, 2020; https://www.fisheries.noaa.gov/resource/data/2022-assessment-greenland-turbot-stock-bering-sea-and-aleutian-islands). A full stock assessment document with updated assessment and projection model results will be presented in November 2022.

A statistical catch-at-age model configured in Stock Synthesis 3 (Methot and Wetzel, 2013) is used as the primary assessment tool for BSAI Greenland turbot, which qualifies as a Tier 3 stock. The assessment model is not run during an off-cycle year, but the projection model is updated with new catch information. This incorporates the most current catch information without re-estimating model parameters and biological reference points.

Changes were not made to the assessment model inputs and methodology since this was an off-cycle year. New data added to the projection model included a final 2020 catch estimate from the NMFS Alaska Regional Office Catch Accounting System and a preliminary catch estimate for 2021. The 2020 catch input was reduced to 2,326 t from 3,321 t. The 2021 catch input of 3,309 t was calculated as the product of the 2021 total allowable catch (TAC, 6,025 t) and the average proportion of the TAC caught between 2016 and 2020 (54.925%). This follows the procedure used in previous assessments. In previous assessments, the maximum ABC was used as the catch input in the years following the current year. For the purposes of this assessment, the 2021 catch estimate was also used as the catch input for 2022. This was done in response to the SSC request to use a catch value that is more representative of the current fishery, which has caught 35% of the ABC, on average, over the past 5 years.

The recommended maximum ABC for 2022 from the updated projection model is 6,572 t. This is 10.3% lower than the 2021 ABC and 7.1% higher than the 2022 ABC projected from last year's assessment. The corresponding reference values for BSAI Greenland turbot are summarized in the table below. Status is determined by comparing from the most recent complete year (2020) of official catch to the OFL and comparing the projected spawning biomass relative to $B_{35\%}$. The official Greenland turbot, total catch for 2020 (2,326 t) is less than the 2020 OFL (11,319 t) indicating overfishing is not occurring. Spawning biomass is projected to be above $B_{35\%}$ for 2021-2023; hence, the stock is not overfished, and it is not approaching an overfished condition.

New data for the assessment carried out in 2022 (see Bryan et al., 2022b) included the 2021 and 2022 NMFS shelf bottom trawl survey biomass estimates and size compositions and the Alaska Fisheries Science Center (AFSC) longline survey relative population numbers for 2021 and 2022. Length at age data from the 2021 and 2022 NMFS shelf bottom trawl surveys were also available and were used in this assessment. Fishery catch estimates were updated and include a preliminary estimate for 2022. Data on fishery size composition from 2021 and 2022 were also included.

Model changes were minor. The AFSC longline survey length data were included in models 16.4b and 16.4c and its selectivity was estimated. The EBS slope bottom trawl survey mean length at age data were also included in Model 16.4c.

The principal reference values are shown in the **Error! Reference source not found.**.

Table 12 - BSAI Greenland turbot assessment outputs. Source: (Bryan et al., 2022b)

Quantity	As estimated or *specified last* year for: 2022	2023	As estimated or *recommended this* year* for: 2023	2024
M (natural mortality rate)	0.112	0.112	0.112	0.112
Tier	3a	3a	3a	3a
Projected total (age 1+)	84,341	80,404	53,907	48,850
Female spawning biomass	50,361	47,376	33,554	30,484
Projected				
$B_{100\%}$	89,054	89,054	67,647	67,647
$B_{40\%}$	35,622	35,622	27,058	27,058
$B_{35\%}$	31,169	31,169	23,676	23,676
F_{OFL}	0.22	0.22	0.20	0.20
$maxF_{ABC}$	0.18	0.18	0.17	0.17
F_{ABC}	0.18	0.18	0.17	0.17
OFL (t)	7,687	6,698	4,645	3,947
maxABC (t)	6,572	5,724	3,960	3,364
ABC (t)	6,572	5,724	3,960	3,364
Status	As determined *last* year for: 2020	2021	As determined *this* year for: 2021	2022
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 model 16.4c and preliminary catches of 2,918 t was used in place of maximum permissible ABC for 2023. The preliminary catch for 2023 and 2024 was estimated as the product of the average proportion of the TAC captured over the previous 5 years (2017-2021) and the 2022 TAC.*

There is no material change in compliance with any of the following supporting clauses.

6.1. States shall establish safe target reference point(s) for management.

6.2 States shall establish safe limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.

6.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, taking into account that long term changes in productivity can occur due to natural variability and/or impacts other than fishing.

6.4 Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 7.

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

No. supporting clauses	**5**
Applicable supporting clauses	4
Non-applicable supporting clauses	1 (7.2)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

The status of U.S. fish stocks is determined by two metrics. The first is the relationship between the actual exploitation level and the OFL. If the exploitation level (or fishing mortality) exceeds the FOFL, the stock is considered to be subject to overfishing. The second is the relationship between the stock size and the MSST. If the stock size is below the MSST it is considered to be overfished. A stock is considered to be approaching an overfished condition when it is projected that there is more than a 50% chance that the biomass of the stock or stock complex will decline below the MSST within two years. Harvest specifications for each of the target stocks are made annually by the Council and include the OFL, ABC, and TAC. In the December 2022 NPFMC meeting, the Council recommended Total Allowable Catch (TACs) with specified overfishing limit (OFL) and Acceptable Biological Catch (ABC) for the 2023 – 2024. In setting TACs for 2023 and 2024, the Council accounts for Guideline Harvest Levels (GHLs) for groundfish fisheries in State waters. The Council's OFLs, ABC, and TACs take the GHLs into account (NPFMC 2022). The BSAI harvest specifications for flatfish can be found at the following link: 2023 - 2024 BSAI harvest specifications. The GOA harvest specifications for flatfish can be found at the following link: 2023 - 2024 GOA harvest specifications.

The Council's management plans classify each stock based on a tier system (Tiers 1-6) with Tier 1 having the greatest level of information on stock status and fishing mortality relative to MSY considerations. The Tier system specifies the maximum permissible ABC and the OFL for each stock in the complex (usually individual species but sometimes species groups). Alaska flatfish complex stocks are mostly classified in Tier 3. The BSAI and GOA groundfish FMPs have pre-defined HCRs that define a series reference points for groundfish covered by these plans. The overall objectives of the management plans are to prevent overfishing and to optimize the yield from the fishery through the promotion of conservative harvest levels while considering differing levels of uncertainty.

The precautionary approach (PA) reference points are established by the Council's PA documented in their FMPs, and stock status is evaluated against these calculated reference points in the annual stock assessment SAFE reports. Where possible, projections are carried out as part of the stock assessments to determine future trajectories of biomass, and related risks of overfishing. There are numerous references and examples of how uncertainty is dealt with in the stock assessment in the annual SAFE reports. Also, the FMPs for groundfish in GOA and BSAI regions are explicit in how different levels of uncertainty are accounted for in the management process. Environmental data and socioeconomic data are also well

documented through annual SAFE reports. The SAFE reports and FMPs have been referenced in previous sections.

The FMPs also have another reference point, B20%, defined as follows: “For groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below B20% in the coming year. However, this does not change the specification of ABC or OFL.”

Stock assessments are comprehensive and reviewed on a number of levels, including externally by CIE. Where data gaps have been identified, and these are outlined in the SAFE reports, the NMFS/AFSC has ongoing research programs capable of addressing these needs. Organizations such as NPRB enable scientists from a number of disciplines and agencies to work collaboratively on a variety of fishery related studies in Alaskan waters. There are pre-agreed Council HCRs in place to ensure overfishing does not occur on the AK flatfish complex and to reduce fishing mortality if reference points are approached or exceeded, as outlined in the Tiered PA system described previously. Extensive provisions exist in the NMFS fishery regulations for in-season adjustments (e.g., gear modifications, fishery closures) where necessary to protect the resource from biological harm. FMPs contain the following specific clause: “In the event that a stock or stock complex is determined to be approaching a condition of being overfished, an in-season action, an FMP amendment, a regulatory amendment or a combination of these actions will be implemented to prevent overfishing from occurring.”

Clause 7.2 is not applicable, as fisheries for Alaska flatfish complex fisheries are well established and are not exploratory fisheries. There are no concerns with the use of introduced or translocated species.

Evidence of continuous compliance with the applicable supporting clauses:

There is no material change in compliance with any of the following supporting clauses. Clause 7.2 is not applicable.

7.1. The precautionary approach shall be applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment. This should take due account of stock enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk assessment, including those associated with the use of introduced or translocated species.

7.1.1 In implementing the precautionary approach, States shall take into account, inter alia, of uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities, including discards, on non-target and associated or dependent species as well as environmental and socio-economic conditions.

7.1.2 In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.

7.2 In the case of new or exploratory fisheries, States shall adopt as soon as possible cautious conservation and management measures, including, inter alia, catch limits and effort limits. Such measures should remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. The latter measures should, if appropriate, allow for the gradual development of the fisheries. ***Not applicable to this fishery**

7.3 Contingency plans shall be agreed in advance for the appropriate management response to serious threats to the resource as a result of overfishing or adverse environmental changes or other phenomena adversely affecting the fishery resource. Such measures may be temporary and shall be based on best scientific evidence available.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

7.4 Management Measures (D)

Fundamental Clause 8.

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

No. supporting clauses	17
Applicable supporting clauses	15
Non-applicable supporting clauses	2 (8.11, 8.14)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

The MSRA requires that conservation and fisheries management measures prevent overfishing while achieving optimum yield on a continuing basis and sets out the standards (e.g., optimal use and avoiding overfishing) which are followed in managing the Alaska flatfish complex fisheries. The Council uses a multi-tier PA, which includes OY and MSY reference points. NMFS and the Council follow a multi-faceted PA (OFL, ABC, TAC, OY) to manage the federal target stocks fisheries, based on targets, limits, and pre-defined HCRs, as well as overall ecosystem considerations. These systems are described extensively in Fundamental Clauses 6 and 7 above. The objectives are spelled out clearly in FMPs for BSAI and GOA regions, and both FMPs contain long-term management objectives for the Alaska flatfish complex fisheries. The state of Alaska flatfish complex fisheries are managed by ADFG and BOF. Extensive cooperation exists between federal and state authorities in assessing and managing the Alaska flatfish complex stocks.

AFSC runs the Economic and Social Sciences Research Program in Alaska. The aim of the Program is to provide economic and sociocultural information to assist NMFS in meeting its stewardship responsibilities with activities being conducted in support of this mission. The Council has established the Social Science Planning Team to improve the quality and application of social science data that informs management decision-making and program evaluation. The FMPs include a substantial section on the economic and socioeconomic characteristics of the fisheries and communities in Alaska. There is a detailed annual SAFE report on economic status of Alaskan fisheries (Fissel et al. 2022) and a section on economics in the SAFE reports. Harvest levels for each groundfish species or species group that are set by the Council for a new fishing year are based on the best biological, ecological, and socioeconomic information available, and follow a rigorous and public peer-reviewed process. The 2023-2024 harvest levels are specified by the Council (see links given in Fundamental Clause 7 above).

As listed in the FMPs and in NMFS regulations, the only legal gears for taking Alaska flatfish complex fisheries are pelagic trawl, bottom trawl, jig, longline, and pot. Regulations pertaining to vessel and gear markings in the fishery are established in NMFS and ADFG regulations as prescribed in the annual management measures published in the Federal Register. There was no evidence that indicated the marking of gear is not being followed or is not effective. No destructive gears such as dynamite or poison are permitted, nor is there any evidence that such methods are being used illegally. There is no evidence that regulations involving gear selectivity in Alaska flatfish complex fisheries are being circumvented either by omission, or through the illegal use of gear technology. Evidence provided by fishing fleets indicates that lost fishing gear is minimal. A NOAA (2015) study shows ghost fishing mortality and gear loss for derelict trawl (and other gears such as longline) are likely to be lower in comparison to gillnets and trap gears, although less is known of the effects of derelict trawls and longlines.

According with the information provided by the client, gear loss is rare and lost gear is usually recovered, but this information is not generally collected by the client.

The Council and BOF have extensive processes in place to allow for identifying and consulting with domestic parties having interest in the Alaska flatfish complex fisheries. The Council is responsible for allocation of the target stocks resource among user groups in Alaskan waters, and the BOF public meeting process provides a regularly scheduled public forum for all interested individuals, fishermen, fishing organizations, environmental organizations, Alaskan Native organizations and other governmental and non-governmental entities that catch target stocks off Alaska to participate in the development of legal regulations for fisheries. Organizations and individuals involved in the fishery and management process

have been identified. The Alaska management process has many stakeholders, including license holders, processors, fishermen's organizations, cooperatives, coalitions, the states of Alaska, Washington, and Oregon, CDQ groups, and environmental groups. The Council's process is the primary means for soliciting stakeholder information important to the fisheries, and this is fully transparent and open to the public. Proposals for management measures may come from the public, state and federal agencies, advisory groups, or Council members. Fishing industry stakeholders work extensively with fishery scientists, managers, and other industry members on various initiatives to ensure sustainability of Alaska flatfish complex fisheries. The Council established a Rural Outreach Committee in 2009 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 Western Alaska CDQ Program, established by the Council in 1992, allocates a percentage of all BSAI quotas for groundfish, prohibited species, halibut, and crab to eligible communities. There are approximately 65 communities within a 50-mile radius of the BS coastline who participate in the program.

Mechanisms have been established to reduce capacity to levels commensurate with sustainable use of the fishery resources in Alaska. These include harvest control rules regarding catch and effort management, an overall OY cap in GOA and BSAI regions, a license limitation and restricted access program, and reduction of the number of vessels through industry-based initiatives. The industry-based measures have been taken to rationalize effort, eliminate derby-style fisheries, improve retention and utilization and reduce bycatch, and include the formation of groundfish cooperatives under Amendment 80, aimed at reduction of bycatch and further rationalization of the fishery. Fleet capacity and regularly updated data on all fishing operations are presented in the annual SAFE documents, as well as in various cooperative reports. Each cooperative is responsible for its own target catch and bycatch, and when any allocation is reached, the cooperative must stop fishing. This provides a strong incentive for cooperatives to keep bycatch rates low and to fish efficiently.

The gear regulations also contain details on mesh sizes permitted, biodegradable panels in pot gears, types of hook and line gear allowed, etc. The use of bottom contact gear is prohibited in the Gulf of Alaska Coral and Alaska Seamount Habitat Protection Areas year-round. Fishing with trawl vessels is not permitted year-round in the Crab and Halibut Protection Zone and the Pribilof Island Habitat Conservation Area. As well, a number of closure zones for trawl gears are described in the FMPs for GOA and BSAI. A suite of measures specific to seabird avoidance in hook and line fisheries in Alaskan waters also exists, and data on seabirds are collected by observers, and included in the SAFE documents. Various measures to reduce bycatches of PSC species (e.g., crabs, halibut, Chinook) in BSAI and GOA, including gear modifications and closed areas and seasons, have been adopted in recent years. Other industry-driven measures taken to reduce halibut catch include use of excluder devices, improved communication and data sharing among vessels to avoid halibut, and enhanced deck sorting to reduce mortality of halibut returned to the sea (Gauvin 2013). In 2016, NMFS reduced the MRA of skates using groundfish and halibut as basis species in the GOA from 20% to 5%, as a necessary measure to limit the incidental catch and discards of skates in GOA groundfish and halibut fisheries.

The FMPs for BSAI and GOA groundfish state that "For groundfish species identified as key prey of Steller sea lions (i.e., walleye pollock, Pacific cod, and Atka mackerel), directed fishing is prohibited in the event that the spawning biomass of such a species is projected in the stock assessment to fall below B20% in the coming year" (NPFMC 2018a, 2019). The Council has acted in a precautionary manner to place protections around Steller sea lion rookeries and haulouts and close areas where fishing may impact Steller sea lion prey. ADFG has also implemented areas closed to fishing in PWS around SSL rookeries. ADFG notes that co-management agreements have been established between the NMFS and the Aleut Marine Mammal Commission, the Traditional Council of St. George Island, and the Traditional Council of St. Paul Island.

None of the Alaska flatfish complex fisheries stocks are classified as overfished or undergoing overfishing and no destructive fishing practices are allowed in GOA or BSAI which would adversely impact habitat. With regard to other resources taken in the fishery, considerable work has been done to reduce catches of species such as halibut and Chinook salmon in trawl catches, as there are concerns with the status of Chinook in many rivers. Extensive work on deck sorting (Gauvin 2013) has occurred in recent years in certain trawl fisheries to improve the survival rates of halibut discarded at sea (required under regulation). Exempted fishing permits have been issued for deck sorting on Amendment 80 C/Ps to reduce halibut mortality. Numerous measures to protect Steller sea lion populations and habitat affect are implemented in the FMPs for GOA and BSAI groundfish. NMFS and the Council must describe and identify EFH in FMPs, minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Further details on this are described under Fundamental Clause 12 below.

Amendment 97 established annual Chinook salmon PSC limits for the groundfish trawl fisheries, except for pollock trawl fisheries, in the Western and Central GOA. This action established annual Chinook salmon PSC limits for various fleet sectors and also established incentives for reducing Chinook salmon PSC for

the trawl C/P and Non-Rockfish Program CV sectors and established seasonal Chinook salmon PSC limits for the trawl C/P sector. The majority of chinook by-catch in GOA is from the pollock fishery, and a recent supplementary Biological Opinion concluded that groundfish fisheries in the GOA were not likely to jeopardize the continued existence of threatened Chinook stocks. Amendment 103 to the GOA FMP, passed in September 2016, allows NMFS to reapportion unused Chinook salmon PSC within and among specific trawl sectors in the Central and Western GOA, based on specific criteria and within specified limits. This rule does not increase the current combined annual PSC limit of Chinook salmon that applies to Central and Western GOA trawl sectors and promotes more flexible management of GOA trawl Chinook salmon PSC.

In Alaska flatfish complex fisheries, gear loss is rare and lost gear is usually recovered, but this information is not generally collected by the client.

The fishery for Alaska flatfish complex is carried out by U.S. vessels only. In adjacent waters of the GOA cooperation on research and management between Canada and the United States occurs as part of the science and management process.

There are numerous measures implemented in Alaskan fisheries to minimize non-utilized catches, such use prohibition of discarding (Improved Retention/Improved Utilization Program), use of salmon and halibut excluder devices in trawl nets, and use of streamers on longline gear to reduce seabird bycatch. Many of the studies and subsequent implementation have involved cooperative efforts between researchers at institutions in NMFS, ADFG, universities, and industry, and are introduced into regulations only after extensive testing has occurred. Key studies include research on excluder devices, deck sorting of halibut, and research on pots to reduce Tanner crab bycatch. Additional information on bycatch is presented in Fundamental Clause 12 below.

Evidence of continuous compliance with the applicable supporting clauses:

There is no material change in compliance with any of the following supporting clauses. Clauses 8.11 and 8.14 are not applicable.

8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization and be based on verifiable and objective scientific and/or traditional, fisher or community sources.

8.1.1 Management targets are consistent with achieving maximum sustainable yield (MSY) (or a suitable proxy) on average, or a lesser fishing mortality if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or to avoid severe adverse impacts on dependent predators.

8.1.2 In the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact shall be considered.

8.1.3 Studies shall be promoted which provide an understanding of the costs, benefits and effects of alternative management options designed to rationalize fishing, in particular, options relating to excess fishing capacity and excessive levels of fishing effort.

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

8.3 States shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.

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

8.5 Technical measures shall be taken into account, where appropriate, in relation to:

- fish size
- mesh size or gear
- closed seasons
- closed areas
- areas reserved for particular (e.g. artisanal) fisheries

- protection of juveniles or spawners

8.6 Fishing gear shall be marked in accordance with national legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.

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

8.8 States and relevant groups from the fishing industry shall measure performance and encourage the development, implementation and use of selective, environmentally safe and cost effective gear, technologies and techniques that sufficiently selective as to minimize catch, waste and discards of non-target species - both fish and non-fish species and impacts on associated or dependent species. The use of fishing gear and practices that lead to the discarding of catch shall be discouraged and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices and gears shall be phased out accordingly.

8.9 Technologies, materials and operational methods or measures including, to the extent practicable, the development and use of selective, environmentally safe and cost effective fishing gear and techniques shall be applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution and waste.

8.10 The intent of fishing selectivity and fishing impacts related regulations shall not be circumvented by technical devices and information on new developments and requirements shall be made available to all fishers.

8.11 Assessment and scientific evaluation shall be carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the introduction on a commercial scale of new fishing gear, methods and operations. Accordingly, the effects of such introductions shall be monitored. ***Not applicable to this fishery**

8.12 International cooperation shall be encouraged with respect to research programs for fishing gear selectivity and fishing methods and strategies, dissemination of the results of such research programs and the transfer of technology.

8.13 States and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species in relation to such fishing gear as an aid for management decisions and with a view to minimizing non utilized catches.

8.14 Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. States shall ensure that, when selecting the materials to be used in the creation of artificial reefs as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed. ***Not applicable to this fishery**

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 9.

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

No. supporting clauses	**3**

Applicable supporting clauses	3
Non-applicable supporting clauses	0
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

NMFS, the Council and ADFG have rules and regulations governing AK fisheries available on their websites. The BSAI and GOA FMPs also contain a summary of management measures that apply to these fisheries. These also cover legal definitions such as quota shares, individual fishing quotas, etc.

Data on the number and location of Alaskan fishers, permits issued, etc. can be found in the annual SAFE documentation. Information on Alaska sport fish and crew license holders has been compiled through the Alaska Fisheries Information Network. Data on fishing in Alaskan state-managed fisheries can be found in the State of Alaska's Commercial Fisheries Entry Commission (CFEC) website. Fishermen in the state-managed fisheries must register prior to fishing and are required to keep a logbook during the fishery. Completed logbook pages must be attached to the ADFG copy of the fish ticket at the time of delivery. USCG also maintains records and issues credentials on licenses for crewmembers, including engineers, captains, mates, deckhands, etc. The State of Alaska issues commercial fishing licenses for all crew.

There is no material change in compliance with any of the following supporting clauses.

9.1. States shall enhance through education and training programs the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.

9.2 States, with the assistance of relevant international organizations, shall endeavor to ensure through education and training that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF (1995), as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.

9.3 States shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

7.5 Implementation, Monitoring and Control (E)

Fundamental Clause 10.

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

No. supporting clauses	6
Applicable supporting clauses	2
Non-applicable supporting clauses	4 (10.3, 10.3.1, 10.4, 10.4.1)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

Under the Federal North Pacific Groundfish Observer Program a comprehensive monitoring, control and surveillance system has been implemented. All the UoAs' vessels are required to carry observers as requested, and most carry two observers at all times to collect data on fishing effort, total catch by species, and biological data; characterize marine mammal and sea bird interactions. Vessels carry VMS to monitor location. At-sea and shore-side enforcement is carried out by the Alaska State Troopers, NMFS OLE, and the USCG (NOAA 2019b; USCG 2019).
Monitoring, control and surveillance actions include:

- Fishing permit requirements
- Fishing permit and fishing vessel registers
- Vessel and gear marking requirements
- Fishing gear and method restrictions
- Reporting requirements for catch, effort, and catch disposition
- Vessel inspections
- Record keeping requirements
- Auditing of licensed fish buyers
- Control of transshipment
- Monitored unloads of fish
- Information management and intelligence analysis
- Analysis of catch and effort reporting and comparison with landing and trade data to confirm accuracy
- Boarding and inspection by fishery officers at sea
- Aerial and surface surveillance

All vessels participating in a parallel groundfish fishery, except those using jig or hand troll gear, must have a NMFS-approved VMS (NOAA 2019c).

The USCG, NMFS OLE, and AWT conduct at-sea and shore-based inspections. At-sea, dockside monitoring, aerial surveillance, and satellite VMS are in operation within the fisheries and developmental of electronic monitoring is ongoing. There are three entities that provide enforcement for Alaska fisheries: NOAA Office of Law Enforcement (OLE), US Coast Guard (USCG) and Alaska Wildlife Troopers (AWT). There is a Joint Enforcement Agreement (JEA) between NOAA-OLE and the AWT to enable AWT to support and enforce federal laws and regulations under the Magnuson Stevens Act (MSA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Lacey Act and Northern Pacific Halibut Act (NPHA). Monitoring, control, and surveillance (MCS) is carried out at-sea and shore-side for the federal fisheries by the OLE and the USCG. The AWT fulfils the MCS function for the state water fisheries. Outreach was conducted by AK OLE throughout the year to meet with fleet representatives for the various AK fisheries and discuss issues and potential violations reported in the December 2022 Report to the NPFMC.
From October 1, 2021, to September 18, 2022, NOAA officers and agents opened 1354 incidents including 867 Magnuson Stevens Act, 301 Northern Pacific Halibut Act, 65 Marine Mammal Protection Act, 46 Endangered Species Act, 27 State Law/Regulations, and 48 regarding other statutes and regulations (High Seas Fisheries Compliance Act, International Trade Program, Lacey Act, etc). Most incidents were closed or completed: of 1152 closed incidents, 724 recorded no violation and required no enforcement action. 158 incidents remain under investigation (NOAA 2022).

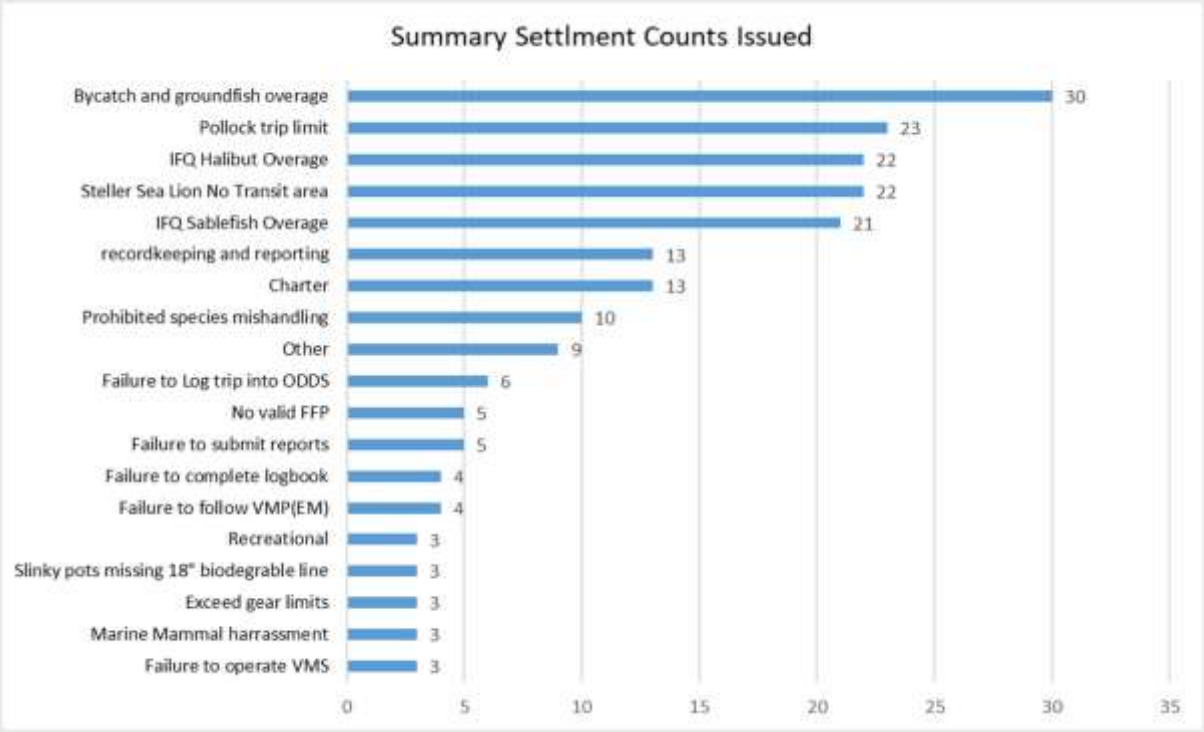

Figure 3 Summary Settlements Counts Issued from October 1, 2021, to September 30, 2022. Source: NOAA 2022.

There was no specific citations or violations in the OLE Enforcement reports that implicated or suggested non-compliance for the BSAI and GOA flatfish fisheries.

Evidence of continuous compliance with the applicable supporting clauses:

There is no material change in compliance with any of the following supporting clauses. Clauses 10.3, 10.3.1, 10.4, and 10.4.1 are not applicable.

10.1 Effective mechanisms shall be established for fisheries monitoring, surveillance, control and enforcement measures including, where appropriate, observer programs, inspection schemes and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher or community approaches, provided their performance could be objectively verified.

10.2 Fishing vessels shall not be allowed to operate on the resource in question without specific authorization.

10.3 States involved in the fishery shall, in accordance with international law, within the framework of sub-regional or regional fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their national jurisdiction. ***Not applicable to this fishery**

10.3.1 States which are members of or participants in sub-regional or regional fisheries management organizations or arrangements shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants which engage in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, Port States shall also proceed, as necessary, to assist other States in achieving the objectives of the FAO CCRF (1995) and should make known to other States

details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State. ***Not applicable to this fishery**

10.4 Flag States shall ensure that no fishing vessels entitled to fly their flag fish on the high seas or in waters under the jurisdiction of other States unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish. ***Not applicable to this fishery**

10.4.1 Fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State shall be marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels. ***Not applicable to this fishery**

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 11.

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

No. supporting clauses	**3**
Applicable supporting clauses	2
Non-applicable supporting clauses	1 (11.3)
Overall level of conformity	High
Non-conformance	None

Evidence of continuous compliance with the fundamental clause:

Penalties for fisheries related fisheries related violations include fines; forfeiture of fish, vessels, other property and quota; and imprisonment. With respect to permit sanctions, where applicable, the statutes that NOAA enforces generally provide broad authority to suspend or revoke permits. OLE agents and officers can assess civil penalties directly to the violator in the form of a summary settlement or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation who can impose a sanction on the vessels permit or further refer the case to the U.S. Attorney's Office for criminal proceedings. The low proportion of violations encountered during at-sea patrols of the Alaska fisheries demonstrates effective deterrence.

Alaska state law 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. The option of pursuing criminal action is also available to the state.

Evidence of continuous compliance with the applicable supporting clauses:

There is no material change in compliance with any of the following supporting clauses. Clause 11.3 is not applicable.

11.1 National laws of adequate severity shall be in place that provide for effective sanctions.

11.2 Sanctions applicable in respect of violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures.

11.3 Flag States shall take enforcement measures in respect of fishing vessels entitled to fly their flag which have been found by them to have contravened applicable conservation and management measures, including, where appropriate, making the contravention of such measures an offence under national legislation. ***Not applicable to this fishery**

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

7.6 Serious Impacts of the Fishery on the Ecosystem (F)

Fundamental Clause 12.

Considerations of fishery interactions and effects on the ecosystem shall be based on best available science, local knowledge where it can be objectively verified and using a risk-based management approach for determining most probable adverse impacts. Adverse impacts on the fishery on the ecosystem shall be appropriately assessed and effectively addressed.

No. supporting clauses	**16**
Applicable supporting clauses	
Non-applicable supporting clauses	
Overall level of conformity	
Non-conformance	

Evidence of continuous compliance with the fundamental clause:

The catch composition for landed and discarded primary and secondary species (and in a few cases, habitat components) for the past five years was reviewed for both the BSAI and GOA (tables below), with target species in this or one of the other certified fisheries in Alaska given in green, minor species (either secondary or primary) given in white, and habitat-forming species given in orange. Catch composition has been relatively stable, with no notable trends to report. Reporting for sculpins has changed such that sculpins are now reported en masse as “ecosystem component” species, therefore, through 2020 they are listed separately by species and starting in 2021 they are counted simply as sculpins. Yellowfin sole continue to dominate the catches in the BSAI, whereas Arrowtooth flounder comprises the largest proportion of the catch in the GoA.

Table 13. Catch composition of primary and secondary species (and some habitat-forming species) in the BSAI flatfish fishery. Weights are given in tons.

Species	2018	2019	2020	2021	2022	5-year total	% of total
Yellowfin sole	127,119	126,729	131,666	106,284	152,543	644,341	49.79%
Pollock	36,612	34,119	40,904	31,840	36,127	179,602	13.88%
Rock sole	24,503	23,537	24,412	12,923	16,889	102,264	7.90%
P. cod	19,464	19,186	17,726	11,518	14,217	82,111	6.34%
AK plaice	20,233	15,693	19,471	13,864	11,106	80,366	6.21%
Flathead sole	9,330	13,901	6,710	8,262	12,984	51,186	3.96%
Arrow fldr	5,474	8,445	8,896	7,367	6,109	36,291	2.80%
Kamchatka fldr	2,168	3,444	6,301	5,735	7,520	25,167	1.94%
Alaska skate	3,288	4,632	3,169	4,313	4,080	19,482	1.51%
Starry fldr	5,261	2,365	2,438	1,220	921	12,205	0.94%
Turbot	1,595	2,574	1,920	1,367	1,219	8,674	0.67%
Bivalves	1,792	2,261	2,147	2,030	1	8,232	0.64%
Sablefish	196	1,148	1,297	1,340	1,902	5,884	0.45%
POP	325	613	1,575	1,550	1,347	5,410	0.42%
Brittle star unidentified		1,189	1,672	1,922	6	4,788	0.37%
Plain sculpin	963	1,033	808			2,804	0.22%
Benthic urochordata				2,378	253	2,631	0.20%
Great sculpin	731	1,068	679			2,478	0.19%
Rex sole	123	538	543	600	489	2,293	0.18%
Capelin	274	871	398	696		2,238	0.17%
Sculpin	0	1	1	1	1,987	1,989	0.15%

Sea star			0		1,635	1,635	0.13%
Giant Grenadier	6	10	18	9	1,375	1,417	0.11%
Thornyhead rf	65	438	158	203	312	1,176	0.09%
yellow irish lord	262	275	319			857	0.07%
Corals Bryozoans - Corals Bryozoans Unidentified	231	232	129	191	4	787	0.06%
Aleutian skate	38	211	149	166	108	672	0.05%
Atka mackerel	196	89	84	107	172	647	0.05%
Butter sole	27	44	213	48	238	570	0.04%
Eelpouts		137	171	210	40	558	0.04%
Wht bltchd skate	47	59	148	126	167	548	0.04%
Shortraker rf	60	95	66	194	77	492	0.04%
Grenadier - Rattail Grenadier Unidentified	31	48	53	85	275	491	0.04%
Skate	77	165	86	70	73	471	0.04%
Bigmouth Sculpin	122	180	120			421	0.03%

Table 14. Primary and secondary species catches in the Gulf of Alaska flatfish trawl fishery from 2019-2022. Weights are given in tons.

Species	2018	2019	2020	2021	2022	Total last 5	Percent of total
Arrow fldr	15,209	20,632	16,615	5,953	7,416	65,824	60.9%
Flathead sole	1,834	2,058	1,318	440	408	6,058	5.6%
POP	907	1,696	956	697	843	5,099	4.7%
Pollock	2,146	1,519	579	385	251	4,879	4.5%
unidentified rockfish	1,303	1,457	1,237	376		4,373	4.0%
Rock sole	1,816	447	268	1,062	725	4,318	4.0%
Rex sole	1,459	935	710	147	536	3,787	3.5%
Sablefish	1,365	959	494	327	478	3,623	3.4%
Big skate	534	593	498	31	39	1,695	1.6%
Butter sole	365	80	96	288	127	956	0.9%
Longnose skate	297	292	176	38	15	817	0.8%
Dusky rf	153	291	105	215	45	809	0.7%
English sole	107	197	304	124	70	802	0.7%
Northern rf	136	420	66	67	82	771	0.7%
Atka mackerel	182	266		258	12	718	0.7%
Spiny dogfish	83	308	35	16	7	449	0.4%
Misc fish	120.60		151.78	40.71	41.34	354	0.3%
Rougheye rf	132	106	87	22	3	350	0.3%
Sculpin				146.94	142.80	290	0.3%
Sleeper shark	193	16	18	30	18	274	0.3%
Dover sole	61	23	48	31	65	228	0.2%
Aleutian skate	88	77	29	14	15	223	0.2%
Thornyhead rf	55	77	37	24		194	0.2%
yellow irish lord	87	92	3		3	185	0.2%
Starry fldr	86	26	10		40	163	0.2%
Skate	44	52	16	7	9	128	0.1%
Sea star	45.05	26.93	10.05	12.25	12.23	107	0.1%
Octopus	21	32	32			85	0.1%

Giant Grenadier			80.07	1.34	1.34	83	0.1%
Squid		4.66	44.97	4.96	4.97	60	0.1%
Shortraker rf	13	21	13		10	57	0.1%

Catches of Prohibited Species (PSC; species that must be discarded if caught) were also reviewed for both the BSAI and GoA fisheries. Decreased bycatch of PSC crabs and salmon in the Bering Sea and Aleutian islands reflects the decreasing stock abundances of these species groups. These declines prompted a complete closure of the Red King Crab and snow crab fisheries in the Bering Sea, as well as disaster relief responses in coastal western Alaska, where chinook and other salmon runs have been experiencing unprecedented declines (NOAA Fisheries 2022).

Table 15. Catches of crab and salmon species in the BSAI flatfish trawl fishery from 2018-2022. Units are numbers of individuals.

Crab or Salmon spp (Numbers)	2018	2019	2020	2021	2022
Opilio Tanner Crab	1,557,384	886,539	733,328	226,687	201,881
Bairdi Tanner Crab	176,368	334,336	581,269	563,319	429,762
Red King Crab	28,579	68,263	63,476	40,000	8,290
Golden King Crab	2,271	12,210	7,395	9,167	7,049
non-Chinook	10,756	4,762	845	1,851	581
Chinook	1,205	3,401	1,546	1,851	258
Blue King Crab	389	629	115	361	453

Table 16. Catches of crab and salmon species in the GoA flatfish trawl fishery from 2018-2022. Units are numbers of individuals.

Crab or Salmon spp (Numbers)	2018	2019	2020	2021	2022
Bairdi Tanner Crab	233,699	203,204	601,043	9,439	5,226
Chinook	1,528	2,313	231	1,005	206
non-Chinook	627	968	438	779	205
Golden King Crab	4	132	0	1	
Opilio Tanner Crab				131	

Habitats and Ecosystems

During the NPFMC February 2023 meeting, The Council reviewed the summary report of a 5-year review of essential fish habitat (EFH) components of the Council's FMPs, and initiated an analysis at this meeting to update the Council's BSAI Groundfish, GOA Groundfish, BSAI King and Tanner Crab, Salmon, and Arctic FMPs' descriptions and maps of Essential Fish Habitat (EFH). The Council elected not to initiate additional habitat-specific processes at this time (NPFMC 2023).

The Council is considering a Programmatic EIS (PEIS) with the purpose of providing a comprehensive analysis of the cumulative impacts of Alaska's Federal groundfish fisheries on the human environment given both management and ecosystem changes that have occurred since the last review. The Council indicated that adoption of a final alternative would include updating the Council's current management policy objectives, noting that it may not be necessary to update every objective. The process of considering a PEIS is intended to incorporate ongoing Council efforts specifically tasked to create more climate-resilient federal fisheries, as applicable (NPFMC 2023).

Evidence of continuous compliance with the applicable supporting clauses:

There is no material change in compliance with any of the following supporting clauses.

12.1 States shall assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks and assess the relationship among the populations in the ecosystem.

12.2 Adverse environmental impacts on the resources from human activities shall be assessed and, where appropriate, corrected.

12.3 The most probable adverse impacts of the fishery on the ecosystem/environment shall be considered, taking into account available scientific information, and local knowledge. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.

12.4 Impacts that are likely to have serious consequences shall be addressed. This may take the form of an immediate management response or a further analysis of the identified risk. In this context, full recognition should be given to the special circumstances and requirements in developing countries and countries in transition, including financial and technical assistance, technology transfer, training and scientific cooperation.

12.5 Appropriate measures shall be applied to minimize:

- catch, waste and discards of non-target species (both fish and non-fish species).
- impacts on associated, dependent or endangered species

12.5.1 There shall be management objectives that seek to ensure that endangered species are protected from adverse impacts resulting from interactions with the unit of certification and any associated culture or enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

12.6 Non target catches, including discards, of stocks other than the “stock under consideration” shall be monitored and shall not threaten these non-target stocks with serious risk of extinction, recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action shall be taken.

12.7 The role of the “stock under consideration” in the food web shall be considered, and if it is a key prey species in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.

12.8 States shall introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).

12.9 There shall be knowledge of the essential habitats for the “stock under consideration” and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved shall be avoided, minimized or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just that part of the spatial range that is potentially affected by fishing.

12.10 Research shall be promoted on the environmental and social impacts of fishing gear and, in particular, on the impact of such gear on biodiversity and coastal fishing communities.

12.11 There shall be outcome indicator(s) consistent with achieving management objectives for non-target stocks (i.e. avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).

12.12 There shall be outcome indicator(s) consistent with achieving management objectives that seek to ensure that endangered species are protected from adverse impacts resulting from interactions with the unit of certification and any associated culture or enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

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

12.14 There shall be outcome indicator(s) consistent with achieving management objectives that seek to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species.

12.15 There shall be outcome indicator(s) consistent with achieving management objectives that seek to minimize adverse impacts of the unit of certification, including any enhancement activities, on the structure, processes and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem’s structure, processes and function.

Changes to Fundamental Clause Confidence Ratings.

There are no changes in the management of fisheries that would detrimentally affect performance against the confidence ratings for the fundamental clauses and any supporting clauses.

Fundamental Clause 13.

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

No. supporting clauses	19
Applicable supporting clauses	0
Non-applicable supporting clauses	19
Overall level of conformity	NA
Non-conformance	NA

Evidence of continuous compliance with the fundamental clause:

Not applicable

Evidence of continuous compliance with the applicable supporting clauses:

Not applicable

13.1 State shall promote responsible development and management of aquaculture, including an advanced evaluation of the effects of aquaculture development on genetic diversity and ecosystem integrity, based on the best available scientific information (and/or traditional, fisher or community objective and verifiable knowledge). Significant uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including culture and enhancement activities. This issue can be addressed by taking a risk assessment/risk management approach.

13.1.1 In the case of enhanced fisheries, the fishery management system should take due regard of the natural production processes and be appropriate for the conservation of genetic diversity, biodiversity, protection of endangered species, maintenance of integrity of aquatic communities and ecosystems, minimizing adverse impacts on ecosystem structure and function.

13.2 State shall produce and regularly update aquaculture development strategies and plans, as required, to ensure that aquaculture development is ecologically sustainable and to allow the rational use of resources shared by aquaculture and other activities.

13.2.1 State shall ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by aquaculture developments.

13.3 Effective procedures specific to aquaculture of fisheries enhancement shall be established to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes such as those caused by inputs from enhancement activities and related economic and social consequences.

13.4 With due regard to the assessment approach employed, stock assessment of fisheries that are enhanced through aquaculture inputs shall consider the separate contributions from aquaculture and natural production.

13.5 Any modification to the habitat for enhancing the stock under consideration is reversible and do not cause serious or irreversible harm to the natural ecosystem’s structure and function.

13.5.1 Efforts shall be undertaken to minimize the harmful effects of introducing non-native species or genetically altered stocks used for aquaculture including culture-based fisheries into waters.

13.5.2 Steps shall be taken to minimize adverse genetic disease and other effects of escaped farmed fish on wild stocks.

13.5.3 Research shall be promoted to develop culture techniques for endangered species to protect, rehabilitate and enhance their stocks, taking into account the critical need to conserve genetic diversity of endangered species.

13.6 State shall protect transboundary aquatic ecosystems by supporting responsible aquaculture practices within their national jurisdiction and by cooperation in the promotion of sustainable aquaculture practices.

13.7 State shall, with due respect to their neighboring States and in accordance with international law, ensure responsible choice of species, siting and management of aquaculture activities which could affect trans boundary aquatic ecosystems.

13.8 State shall consult with their neighboring States, as appropriate, before introducing non-indigenous

species into trans-boundary aquatic ecosystems.

13.9 State shall establish appropriate mechanisms, such as databases and information networks to collect, share and disseminate data related to their aquaculture activities to facilitate cooperation on planning for aquaculture development at the national, subregional, regional and global level.

13.10 State shall cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms.

13.11 States shall, in order to minimize risks of disease transfer and other adverse effects on wild and cultured stocks, encourage adoption and promote the use of appropriate practices/procedures in the selection and genetic improvement of broodstocks, the introduction of non-native species, and in the production, sale and transport of eggs, larvae, fry, broodstock or other live materials. States shall facilitate the preparation and implementation of appropriate national codes of practice and procedures to this effect.

13.12 Enhanced fisheries may be supported in part by stocking of organisms produced in aquaculture facilities or removed from wild stocks other than the “stock under consideration”. Aquaculture production for stocking purposes should be managed and developed according to the above provisions, especially in relation to maintaining the integrity of the environment, the conservation of genetic diversity, disease control, and quality of stocking material.

13.13 Regarding the enhanced components of the “stock under consideration”, provided that a natural reproductive stock component is maintained and fishery production is based primarily on natural biological production within the ecosystem of which the “stock under consideration” forms a part, enhanced fisheries shall meet the following criteria:

- the species shall be native to the fishery’s geographic area or introduced historically and have subsequently become established as part of the “natural” ecosystem;
- there shall be natural reproductive components of the “stock under consideration;
- the growth during the post-release phase shall be based upon food supply from the natural environment and the production system shall operate without supplemental feeding.

13.14 In the case of enhanced fisheries, “stock under consideration” may comprise naturally

reproductive components and components maintained by stocking. In the context of avoiding significant negative impacts of enhancement activities on the natural reproductive components of “stock under consideration”:

- naturally reproductive components of enhanced stocks shall not be overfished;
- naturally reproductive components of enhanced stocks shall not be substantially displaced by stocked components.

In particular, displacement shall not result in a reduction of the natural reproductive stock component below abundance-based target reference points (or their proxies) defined for the regulation of harvest.

Changes to Fundamental Clause Confidence Ratings.

Not applicable

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