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## Responsible Fisheries Management (RFM) standard v1.3

### **Alaska Flatfish Complex**

Certificate No.: 10000445829-MSC-ANSI-USA

## **2<sup>nd</sup> Surveillance Report**

<b>Certification Body (CB)</b>	MRAG Americas, Inc.
<b>Assessment team</b>	Amanda Stern-Pirlot (team lead), Dr. Giuseppe Scarcella, Erin Wilson
<b>Fishery client</b>	Alaska Seafood Cooperative
<b>Assessment type</b>	2 <sup>nd</sup> surveillance after reassessment, on-site
<b>Date</b>	May 9 <sup>th</sup> , 2022

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## 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 <b>fisheries</b> 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 on the 2021 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.
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.
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 2<sup>nd</sup> surveillance audit in relation to the AK flatfish bottom trawl fisheries. A remote surveillance audit was held January 17<sup>th</sup> – 21<sup>st</sup>, 2022, 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; and flatfish, and with the Responsible Fisheries Management (RFM) reassessment for BSAI & GOA Pacific cod and pollock. The AK flatfish complex was certified against the RFM standard in March 2021.

### Six species in the BSAI area

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

### Five species in the GOA

- Arrowtooth flounder (*Atheresthes stomias*), flathead sole (*Hippoglossoides elassodon*), Northern rock sole (*Lepidopsetta polyxstra*), Rex sole (*Glyptocephalus 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	<b>Fishery name</b>	
		Alaska Flatfish Complex
2	<b>Stock(s)</b>	
		Alaska plaice ( <i>Pleuronectes quadrituberculatus</i> ), BSAI Arrowtooth flounder ( <i>Atheresthes stomias</i> ), BSAI & GOA Flathead sole ( <i>Hippoglossoides elassodon</i> ), BSAI & GOA Greenland turbot ( <i>Reinhardtius hippoglossoides</i> ), BSAI Kamchatka flounder ( <i>Atheresthes evermanni</i> ), BSAI Northern rock sole ( <i>Lepidopsetta polyxstra</i> ), BSAI & GOA Yellowfin sole ( <i>Limanda aspera</i> ), BSAI Southern rock sole ( <i>Lepidopsetta bilineatus</i> ), GOA Rex sole ( <i>Glyptocephalus zachirus</i> ), GOA
3	<b>Date certified</b>	<b>Date of expiry</b>
	March 10, 2021	December 3, 2024
4	<b>Surveillance type</b>	
		remote
5	<b>Surveillance number</b>	
	1st Surveillance	
	2nd Surveillance	X
	3rd Surveillance	
	4th Surveillance	

	Other (expedited etc)
<b>6</b>	<b>Surveillance team details</b>
	<p><b>Ms. Erin Wilson (team leader)</b> 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.</p> <p><b>Ms. Amanda Stern-Pirlot</b> 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.</p> <p><b>Dr. Giuseppe Scarcella</b> 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 Università 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).</p>
<b>7</b>	<b>Audit/review time and location</b>
	A remote surveillance audit was January 17- 21 <sup>st</sup> , 2022.



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**

<b>Total Allowable Catch (TAC) and catch data UoA 1 BSAI Kamchatka flounder</b>				
TAC	Year	<b>2021</b>	Amount	<b>8,982 mt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>8,982 mt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>5,735 mt</b>
<b>Total Allowable Catch (TAC) and catch data UoA 2 BSAI Arrowtooth flounder</b>				
TAC	Year	<b>2021</b>	Amount	<b>15 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>15 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>7,366 mt</b>
<b>Total Allowable Catch (TAC) and catch data UoA 3 BSAI Flathead sole</b>				
TAC	Year	<b>2021</b>	Amount	<b>25 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>25 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>8,262 mt</b>



<b>Total Allowable Catch (TAC) and catch data UoA 4 BSAI Northern rock sole</b>				
TAC	Year	<b>2021</b>	Amount	<b>54.5 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>54.5 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>12,923 mt</b>

<b>Total Allowable Catch (TAC) and catch data UoA 5 BSAI Yellowfin sole</b>				
TAC	Year	<b>2021</b>	Amount	<b>200 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>200 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>106,284 mt</b>

<b>Total Allowable Catch (TAC) and catch data UoA 6 BSAI Alaska plaice</b>				
TAC	Year	<b>2021</b>	Amount	<b>24.5 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>24.5 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>13,864 mt</b>

<b>Total Allowable Catch (TAC) and catch data UoA 7 GOA Arrowtooth flounder</b>				
TAC	Year	<b>2021</b>	Amount	<b>97.372 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>97.372 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>5,425 mt</b>

<b>Total Allowable Catch (TAC) and catch data UoA 8 GOA Flathead sole</b>				
TAC	Year	<b>2021</b>	Amount	<b>28.392 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>28.392 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>234 mt</b>

<b>Total Allowable Catch (TAC) and catch data UoA 9 GOA Northern rock sole</b>				
TAC	Year	<b>2021</b>	Amount	<b>45.263 kt*</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>45.263 kt*</b>

UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%*</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>25 mt</b>

\* = Shallow-Water Flatfish

**Total Allowable Catch (TAC) and catch data UoA 10 GOA Rex sole**

TAC	Year	<b>2021</b>	Amount	<b>15.416 kt</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>15.416 kt</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>116 mt</b>

**Total Allowable Catch (TAC) and catch data UoA 11 GOA Southern rock sole**

TAC	Year	<b>2021</b>	Amount	<b>45.263 kt*</b>
UoA share of TAC	Year	<b>2021</b>	Amount	<b>45.263 kt*</b>
UoA share of total TAC	Year	<b>2021</b>	Amount	<b>100%*</b>
Total catch by UoC	Year (most recent)	<b>2021</b>	Amount	<b>25 mt</b>

\* = 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 17<sup>th</sup> – 21<sup>st</sup>.

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

**Responsible Fisheries Management 4<sup>th</sup> Surveillance Site Visit Agenda,  
Alaska Pollock and Pacific cod Fisheries  
Marine Stewardship Council 1<sup>st</sup> Surveillance Audit  
Alaska pollock, Pacific cod, Flatfish, Rockfish and Atka Mackerel  
January 17-21, 2022**

Date	City	Meeting Location	Activity	Key Personnel	All Times PST
January 18th	Seattle	At-Sea Processors Association Office 4039 21st Ave West, Suite 400	Meeting	<u>Opening Client Meetings pollock:</u> Austin Estabrooks (APA), Ruth Christiansen (UCB), Julie Bonney (AGDB)	9-10 am
		At-Sea Processors Association Office		<u>Opening Client Meetings Pacific cod:</u> Tommy Sheridan (AFDF), Julie Decker (AFDF), Jim Armstrong/Chad See (FLC), Ruth Christiansen (UCB), Mark Fina (GFF)	10-11 am

		4039 21st Ave West, Suite 400			
		Alaska Fishery Science Center 7600 Sand Point Way N.E., Building 4		Jim Ianelli (EBS Pollock and multispecies models) Steve Barbeaux (GOA Pacific cod, AI Pollock) Cole Monnahan (GOA Pollock) Steve Barbeaux (BS & AI Pacific cod) Lisa Thompson (FMA-Observer) Jeremy Sterling (NMML) Shannon Fitzgerald (Seabirds) Ecosystem Status Reports? Ecosystem Modeling?	11 am-5 pm
January 19th	Anchorage based staff	NPFMC 605 W 4 <sup>th</sup> Ave	Meeting	<u>NPFMC Staff</u> -Dave Witherell, Diana Stram, Diana Evans	9-10 am
		Federal Building 3601 C St.		<u>NMFS Office of Law Enforcement</u> -Nathan Lagerwey	10-11 am
		NMFS Habitat Offices 222 W 7 <sup>th</sup> Ave		<u>NMFS Habitat Division</u> -John Olson	11 am-12 pm
January 19th	Juneau based staff	Federal Building 709 W 9th Ave	Meeting	<u>NMFS In-Season Management Staff</u> -Mary Furuness, Steve Whitney	12-1pm
January 20 <sup>th</sup>	Seattle	Federal Building 709 W 9th Ave	Meeting	<u>United States Coast Guard</u> - CAPT Jason Brennell, LCDR Jedediah Raskie	9-10 am
		ADF&G HQ 1255 W 8 <sup>th</sup> Ave		<u>Alaska Dept of Fish &amp; Game</u> - Forrest Bowers, Tim Baker, Mark Stichert	10-11 am
				<u>Alaska Wildlife Troopers</u> - Lt. Jonathan Streife?	11-12 pm
		TBD		Stakeholder Meetings/Follow Up with Stock Author/Ecosystem/Habitat Experts	2-5pm
January 21 <sup>st</sup>	Seattle	At-Sea Processors Association Office 4039 21st Ave West, Suite 400	Meeting & Report Writing	<u>Closing Client Meetings pollock</u> : Austin Estabrooks (APA), Ruth Christiansen (UCB), Julie Bonney (AGDB)	9-10 am
		At-Sea Processors Association Office 4039 21st Ave West, Suite 400		<u>Closing Client Meetings Pacific cod</u> : Tommy Sheridan (AFDF), Julie Decker (AFDF), Jim Armstrong/Chad See (FLC), Ruth Christiansen (UCB), Mark Fina (GFF)	10-11 am
				Report Writing and Follow-Up Meetings as Necessary	1 pm-5 pm

## 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.

## 7 Assessment Outcome / Fundamental Clauses Summaries

Much of this text was adapted from DNV's 1<sup>st</sup> 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.

<b>No. supporting clauses</b>	<b>13</b>
<b>Applicable supporting clauses</b>	6
<b>Non-applicable supporting clauses</b>	7 (1.3, 1.3.1, 1.4, 1.4.1, 1.5, 1.6.1, 1.9)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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 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.

<b>No. supporting clauses</b>	<b>10</b>
<b>Applicable supporting clauses</b>	9
<b>Non-applicable supporting clauses</b>	1 (2.7)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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**

<b>Applicable supporting clauses</b>	8
<b>Non-applicable supporting clauses</b>	0
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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 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:**

During the December 2021 Council Meeting, the Council made final recommendations on groundfish harvest specifications, prohibited species catch (PSC) limits, and halibut Discard Mortality Rates (DMRs) to manage the 2022 and 2023 BSAI groundfish fisheries. In setting Total Allowable Catch (TACs) for 2022 and 2023, the Council accounts for Guideline Harvest Levels (GHLs) for groundfish fisheries in State waters. 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). Full assessments were performed in 2021 for EBS and AI pollock, EBS and AI cod, sablefish, yellowfin sole, flathead sole, Alaska plaice, northern rockfish and Atka mackerel (NPFMC 2021).

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).

Additionally, crab PSC limits have all declined from 2021 levels due to the estimated abundances of red king crab, Tanner crab and snow crab. Federal regulations state that the Red King Crab Savings Subarea be closed to nonpelagic trawl gear if the ADFG does not set a TAC for red king crab in the Bristol Bay area in the previous year. A TAC has not been set for the 2021/2022 Bristol Bay red king crab season and therefore, the area will be closed to nonpelagic trawl gear in 2022 (NPFMC 2021).

#### GOA Specifications:

The Council approved the 2021 Gulf of Alaska (GOA) Groundfish Stock Assessment and Fishery Evaluation (SAFE) report and recommended final harvest specifications for the 2022 and 2023 GOA groundfish fisheries. For final rulemaking for the 2022 and 2023 fishing years, the Council recommended Overfishing Limits (OFLs) and Acceptable Biological Catch (ABC) levels consistent with SSC recommendations, and final Total Allowable Catch (TAC). For most stocks, the Council established TACs equal to ABCs. Exceptions where the TAC is set below ABC include pollock, Pacific cod, shallow water flatfish in the Western GOA, arrowtooth flounder, flathead sole in Western and Central GOA, other rockfish in the Eastern GOA, and Atka mackerel (NPFMC 2021). Full assessments were produced for all stocks in the GOA in 2021 with the following exceptions: partial assessments were produced for flathead sole, deep-water flatfish, northern rockfish, and dusky rockfish (NPFMC 2021).

The Council also reviewed the Ecosystem Status Report for the GOA, including a 4-page GOA ecosystem brief. The report provided information on ocean conditions, phytoplankton and zooplankton densities, forage fish abundance, and seabird and marine mammal trends. The report highlighted average temperatures for 2021, however, the GOA biological community is still adapting from the marine heatwaves in 2014-2016 and 2019. Examples of species populations that remain reduced include Pacific cod, Prince William Sound humpback whales, capelin, and common murre (NPFMC 2021c).

At the Council meeting that took place in February 2020, the Council took final action to recommend reauthorization of the Rockfish Program. The Council approved the current management framework with additional modifications designed to improve efficiency within the program, clarify existing regulations and remove unnecessary regulations. The intent is for the new regulations to be implemented before the current Rockfish Program expires on December 31, 2021 (NPFMC 2021b).

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/2021/assessments.htm](https://apps-afsc.fisheries.noaa.gov/Plan_Team/2021/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 11 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).

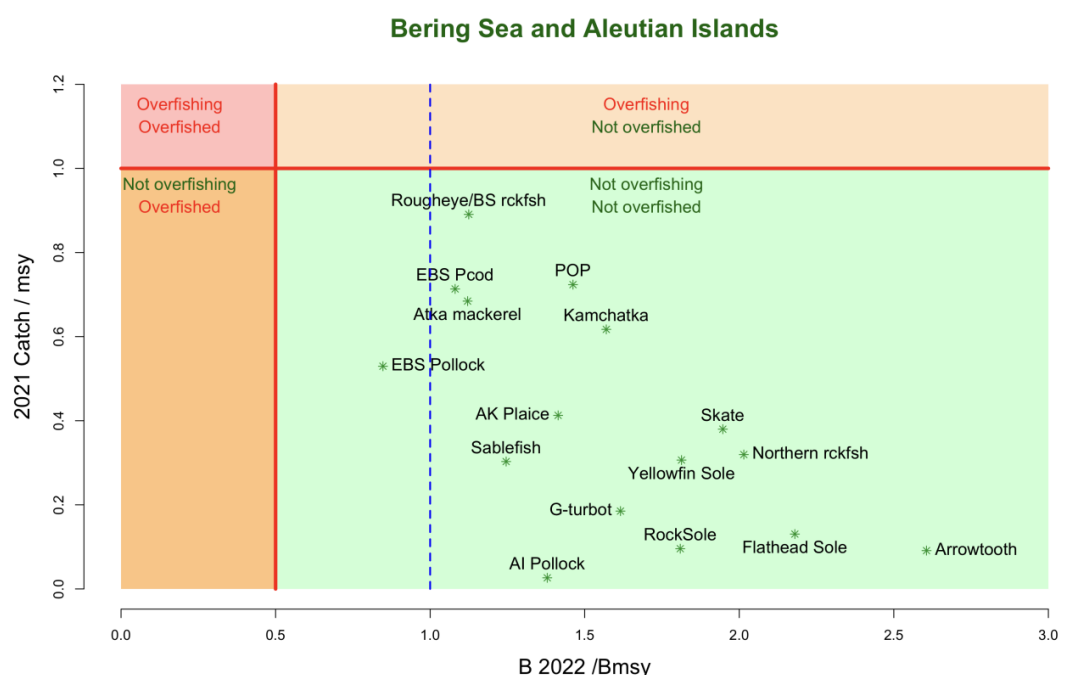


Figure 1 - Summary of Bering Sea and Aleutian Islands stock status next year (spawning biomass relative to  $B_{MSY}$ ; horizontal axis) and current year catch relative to fishing at  $F_{MSY}$  (vertical axis) where  $F_{OFL}$  is taken to equal  $F_{MSY}$ . Source: Aydin, et al., 2021

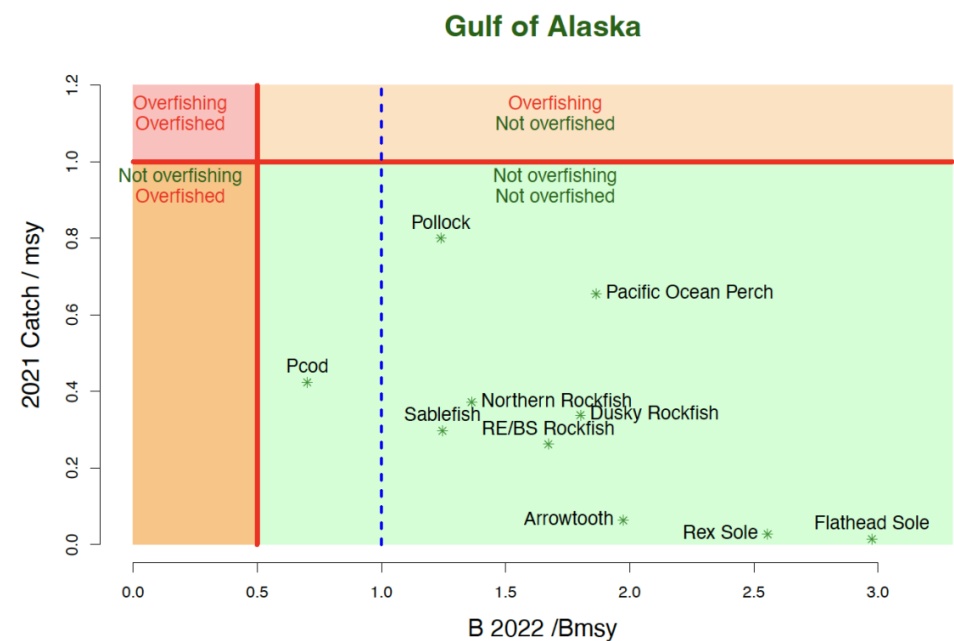


Figure 2 - Summary of Gulf of Alaska stock status next year (spawning biomass relative to  $B_{MSY}$ ; horizontal axis) and current year catch relative to fishing at  $F_{MSY}$  (vertical axis). Note that sablefish is for Alaska-wide values including the BSAI catches. Barbeaux, et al., 2021

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.

The assessment team received stakeholder comment and an update on the status of the current and previous Essential Fish Habitat 5-year review process. Currently, the new 5-year EFH review is officially underway. The species distribution modelling team at AFSC has done one round with the Science and Statistical Committee (SSC); no model results yet, only some examples so far. The outputs by species and life stage will go to stock assessment scientists, etc. The SSC will review species distribution model outputs in February. Dr Jim Thorsen and his team at AFSC are developing more advanced species distribution models than previously used. The Fishing Effects model is being re-run with updates to impact and recovery parameters, fishing gear parameters and fishing effort. He expects the modelling work will be further improved via the SSC review process.

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.

<b>No. supporting clauses</b>	<b>13</b>
<b>Applicable supporting clauses</b>	8
<b>Non-applicable supporting clauses</b>	5 (4.7, 4.8, 4.9, 4.10, 4.11)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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 about 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.

<b>No. supporting clauses</b>	<b>7</b>
<b>Applicable supporting clauses</b>	6
<b>Non-applicable supporting clauses</b>	1 (5.4)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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.

<b>No. supporting clauses</b>	<b>4</b>
<b>Applicable supporting clauses</b>	<b>4</b>
<b>Non-applicable supporting clauses</b>	<b>0</b>
<b>Overall level of conformity</b>	<b>High</b>
<b>Non-conformance</b>	<b>None</b>

**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 2020 SAFE documents, none of the target stocks had overfishing occurring, as per the standard definitions applied to each stock.

The 2020 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 2021 SAFE documents:

BSAI Arrowtooth Flounder

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). In previous years, all BSAI flatfish stocks were 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. For this off-cycle (odd) year, Shotwell et al. (2021) presented a partial assessment consisting of an executive summary with recent fishery catch and survey trends as well as recommend harvest levels for the next two years. For information regarding on-cycle (even) years, refer to last year’s full stock assessment and fishery evaluation (SAFE) report (Shotwell et al., 2020, available online at (<https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/BSAIfatf.pdf>)).

Shotwell et al. (2021a) used a statistical age-structured model as the primary assessment tool for the BSAI Arrowtooth flounder (ATF, *Atheresthes stomias*) stock 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 surveys abundance estimates (EBS shelf, EBS slope, and AI), 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. (2021a) did not re-run the assessment model but did update the projection model with new catch information. This incorporates the most current catch information without re-estimating model parameters and biological reference points. Shotwell et al. (2021a) continued to use the 2018 assessment model (18.9; Spies et al., 2018).

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 2020 catch estimate of 10,681 t and new catch estimates for 2021-2023. Shotwell et al. (2021a) estimated the 2021 catch by increasing the official catch as of October 30, 2021, by an expansion factor of 1.07, which represents the average fraction of catch taken after October 30<sup>th</sup> in the last five complete years (2016-2020). This resulted in an estimated catch for 2021 of 8,698 t. To estimate future catches, we updated the yield ratio to 0.13, which was the average of the ratio of catch to ABC for the last five complete catch years (2016-2020). This yield ratio was multiplied by the projected ABCs from the updated projection model to generate catch estimates of 9,272 t in 2022 and 8,806 t in 2023.

Based on the projection model results, recommended ABCs for 2022 and 2023 are 80,389 t and 83,389 t, respectively, and the OFLs are 94,445 t and 97,944 t. The new ABC and OFL recommendations for 2022 are similar to the 2021 ABCs and OFL developed using the 2020 full assessment model. The stock is not overfished and is not approaching a condition of being overfished. Reference values are in Table 1.

**Table 1 - BSAI Arrowtooth Flounder assessment outputs. Source: Shotwell et al., 2021a**

Quantity	As estimated or specified last year for:		*As estimated or recommended this year for:	
	2021	2022	2022	2023
<i>M</i> (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)	923,646	921,074	921,690	914,915
Projected Female spawning	497,556	509,208	509,672	528,725
<i>B</i> <sub>100%</sub>	558,826	558,826	558,826	558,826
<i>B</i> <sub>40%</sub>	223,530	223,530	223,530	223,530
<i>B</i> <sub>35%</sub>	195,589	195,589	195,589	195,589
<i>F</i> <sub>OFL</sub>	0.160	0.160	0.160	0.160
<i>maxF</i> <sub>ABC</sub>	0.135	0.135	0.135	0.135
<i>F</i> <sub>ABC</sub>	0.135	0.135	0.135	0.135
OFL (t)	90,873	94,368	94,445	97,944
maxABC (t)	77,349	80,323	80,389	83,389
ABC (t)	77,349	80,323	80,389	83,389
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
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 8,698 t for 2021, 9,272 t for 2022, and 8,806 t for 2023.

\*\*Natural mortality rate is 0.2 for females, 0.35 for males.

### GOA Arrowtooth Flounder

Shotwell et al. (2021b) presented an assessment for GOA Arrowtooth Flounder. The following substantive changes have been made in the assessment relative to last year's GOA SAFE report.

Changes in the input data:

1. Estimates of catch through October 17, 2021.
2. Fishery size compositions for 2019 (updated) and 2020.
3. Biomass point-estimates and standard errors from the 2021 GOA bottom trawl survey.
4. Age data from the 2019 GOA bottom trawl survey.
5. The recommended model includes but does not fit the non-standard GOA bottom trawl survey size compositions from 1985, 1986, and 1989. We also do not fit the most current survey size composition data (2021) as we anticipate ages from this year for the next full assessment.

Changes in the assessment methodology:

There were no changes in the assessment methodology as we continue to use the 2019 assessment model (Model 19.0) (Spies et al. (2019) for more details on the 2019 assessment methodology (available online at: <https://apps-afsc.fisheries.noaa.gov/refm/docs/2019/GOAatf.pdf>)).

The summarized results of the risk table for Arrowtooth flounder are in Table 2. All scores of Level 1 suggest no need to set the ABC below the maximum permissible. The stock is not being subject to overfishing, is not currently overfished, nor is it approaching a condition of being overfished.

**Table 2 - GOA Arrowtooth Flounder assessment outputs. Source: Shotwell et al., 2021b.**

Quantity	As estimated or <i>specified</i> <i>last year for:</i>		As estimated or <i>recommended</i> <i>this year for:</i>	
	2021	2022	2022	2023
<i>M</i> (natural mortality – Male, Female)	0.35, 0.2	0.35, 0.2	0.35, 0.2	0.35, 0.2
Specified/recommended Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	1,321,700	1,318,860	1,268,140	1,270,850
<b>Female spawning biomass (t)</b>				
Projected				
<i>B</i> <sub>100%</sub>	1,028,330	1,028,330	1,018,700	1,018,700
<i>B</i> <sub>40%</sub>	411,331	411,331	407,478	407,478
<i>B</i> <sub>35%</sub>	359,915	359,915	356,544	356,544
<i>F</i> <sub>OFL</sub>	0.234	0.234	0.225	0.225
<i>maxF</i> <sub>ABC</sub> (maximum allowable = <i>F</i> <sub>40%</sub> )	0.192	0.192	0.185	0.185
Specified/recommended <i>F</i> <sub>ABC</sub>	0.192	0.192	0.185	0.185
Specified/recommended OFL (t)	151,723	147,515	143,100	141,231
<i>max</i> ABC (t)	126,970	123,445	119,779	118,201
Specified/recommended ABC (t)	126,970	123,445	119,779	118,201
<b>Status</b>	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	2019	2020	2020	2021
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 an estimated catch of 10,052 t for 2021, and estimates of 16,991 t and 14,819 t used in place of maximum permissible ABC for 2022 and 2023 in response to a Plan Team request 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.

### 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. The most recent full assessment was conducted in 2020, information regarding the stock assessment model and results is available online (Bryan et. al, 2020; <https://www.fisheries.noaa.gov/resource/data/2020-assessment-kamchatka-flounder-stock-bering-sea-and-aleutian-islands>). A full stock assessment document with updated assessment and projection model results is scheduled for November 2022.

A forward projecting age structured model is the primary assessment tool for BSAI Kamchatka flounder, which qualifies as a tier 3 stock. The assessment model is not run during off-cycle years, 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.

Summary of changes in assessment input:



Changes in the input data: Changes were not made to the assessment model inputs. New data added to the projection model included a final 2020 catch estimate and a preliminary catch estimate for 2021-2023. The 2020 catch input was reduced to 7,422 t from 7,427 t. The 2021 catch input used in the projection model was set equal to 6,770.09 t. The 2021 catch was estimated by expanding the catch as of October 8th by a factor of 1.0493. This expansion factor represents the average proportion of catch after October 8th between 2016 and 2020. The 2021 catch estimate was also used as the catch value for 2022 and 2023.

Changes in the assessment methodology: Changes were not made to the assessment model.

The recommended maximum ABC for 2022 from the updated projection model is 9,214 t. This is 2.6% higher than the 2021 ABC and less than 1% higher than the 2022 ABC projected from last year's assessment. The corresponding reference values for BSAI Kamchatka flounder are summarized in Table 3. Overfishing is not occurring, the stock is not overfished, and it is not approaching an overfished condition. 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<sub>35%</sub>. The official Kamchatka flounder, total catch for 2020 (7,442 t) is less than the 2020 OFL (11,495 t) indicating overfishing is not occurring. Spawning biomass is projected to be above B<sub>35%</sub> for 2021-2023; hence, the stock is not overfished and it is not approaching an overfished condition.

Catch-biomass ratios were derived from the reported catch and total biomass estimated by the assessment model for 1991 through 2020. This ratio for 2021 was derived from the estimated catch in 2021 and the total biomass from the projection model. Kamchatka flounder were not distinguished from arrowtooth flounder prior to 2011. The catch estimates between 1991 and 2007 were assumed to be 10% of the total arrowtooth catch and this is associated with catch-biomass ratios that were stable at 0.01. The catch-biomass ratio increased to 0.15 in 2010. It was assumed that Kamchatka flounder made up 34%, 42%, and 54% of the total arrowtooth catch in 2008, 2009, and 2010, respectively. The catch biomass ratio declined from 0.08 in 2011 to 0.02 in 2018 and increased to 0.05 in 2020. Biomass estimates from the EBS shelf trawl survey, EBS slope trawl survey, and the AI trawl surveys are used in the assessment model. The EBS shelf trawl survey was conducted in 2021 and declined by 26% from 44,870 t in 2019 to 33,011 t in 2021. The EBS slope survey and AI survey were not conducted in 2021.

**Table 3 - BSAI Kamchatka Flounder assessment outputs. Source: Bryan et al., 2021.**

Quantity	As estimated or specified last year for		As estimated or recommended this year for	
	2021	2022	2022	2023
<i>M</i> (natural mortality rate)	0.11	0.11	0.11	0.11
Tier	3	3	3	3
Projected total (age 2+) biomass (t)	144,671	143,248	143,983	142,762
Projected female spawning biomass	54,341	55,256	55,701	57,082
Projected				
<i>B</i> <sub>100%</sub>	101,376	101,376	101,376	101,376
<i>B</i> <sub>40%</sub>	40,550	40,550	40,550	40,550
<i>B</i> <sub>35%</sub>	35,482	35,482	35,482	35,482
<i>F</i> <sub>OFL</sub>	0.108	0.108	0.108	0.108
<i>maxF</i> <sub>ABC</sub>	0.090	0.090	0.090	0.090
<i>F</i> <sub>ABC</sub>	0.090	0.090	0.090	0.090
OFL (t)	10,630	10,843	10,903	11,115
maxABC (t)	8,982	9,163	9,214	9,393
ABC (t)	8,982	9,163	9,214	9,393
	As determined last year for:		As determined this year for:	
<b>Status</b>	2019	2020	2020	2021
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 the final catch of 7,442 t in 2020 and estimated catch of 6,770.09 t in 2021-2023.

### BSAI Yellowfin Sole

Relative to last year's BSAI SAFE report, the following substantive changes have been made to the BSAI Yellowfin Sole assessment. Several models are presented in this document that incorporate new data since the last full assessment in 2020.

Changes in the data:

1. The 2020 fishery age composition was added.
2. The estimate of the total catch made through the end of 2020 was updated as reported by the NMFS Alaska Regional office. The catch through the end of 2021 was estimated based on available data to be 108,086 t. Catch for the 2022 and 2023 projections were assumed to be the mean of the past 5 years, 2017 - 2021, 126,929 t.
3. The 2021 NMFS survey biomass estimate and standard error was included. A VAST estimate of the EBS biomass estimate and standard error were used in Model 18.2a. The 2021 Northern Bering Sea (NBS) biomass estimate and standard error were combined with the 2021 EBS survey VAST estimate in Model 18.2b.

#### Changes in the assessment methods:

Three models are presented in this assessment. Model 18.2 is presented in full and is the preferred model. Models 18.2a and 18.2b are presented to promote discussion on the use of VAST biomass estimates and incorporation of the NBS survey.

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. Model 18.2 is the authors' preferred model.
2. Model 18.2a is the same as Model 18.2 except it incorporates VAST biomass estimates and standard error for the Eastern Bering Sea survey region, 1982-2021.
3. Model 18.2c is the same as Model 18.2 except it incorporates VAST biomass estimates and standard error for the EBS and NBS combined, 1982-2021. These estimates used all valid NBS survey data (1985, 1988, 1991, 2010, 2017, 2018, 2019, and 2021) and all valid EBS survey data estimates (1982-2021, except 2020).

The accepted 2021 Model 18.2 included survey mean bottom temperature across stations < 100m as a covariate on survey catchability, as well as NMFS EBS survey start date as an additional covariate within the model, based correlations documented in Nichol et al. (2019).

Model 18.2 specifies female natural mortality to be fixed at 0.12 while allowing the model to estimate male natural mortality. This model is presented in this year's assessment and is the preferred model. In the Eastern Bering Sea (EBS) bottom trawl survey performed in 2021, the EBS Yellowfin Sole biomass was estimated to be 19% lower than estimated by the 2019 EBS bottom trawl survey, at 1,622,910 t. Spawning biomass estimated by Model 18.2 was  $1.73 * B_{MSY}$ . Therefore, Yellowfin Sole continues to qualify for management under Tier 1a. The 1978-2015 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 2020 assessment with total and spawning biomass estimates that are lower than the 2020 assessment. This is due to a long-term decline in the stock. However, this year's ABC and OFL are higher than the 2020 assessment, due to revisiting calculations and assumptions for annual weight at age.

Increased management quantities are the result of increased growth rate, which translates into a stock that is more resilient to harvest. Catch of Yellowfin Sole as of October 1, 2021, in the BSAI was 88,895 t. Over the past 5 years (2016 - 2020), 82.2% of the catch has taken place by this date. Therefore, the full year's estimate of catch in 2021 was extrapolated to be 108,157 t. This is lower than the average catch over the past ten years 140,888 t. Future catch for the next 10 years, 2022 - 2031 was estimated to be the mean of the catch from 2017-2020 and the extrapolated full year's catch for 2021, which resulted in an estimate of 126,929 t. Catches in 2021 were likely impacted by a 25% tariff on exports to China; therefore, the estimate for future catches is somewhat precautionary.

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 Table 4 for the 2020 accepted model (Model 18.2 - 2020) and the 2021 preferred model (Model 18.2 - 2021). The projected estimate of total biomass for 2022 was lower by 18% from the 2020 assessment of 3,025,430 t, to 2,479,370 t. The model projection of spawning biomass for 2022, assuming catch for 2021 as described above, was 857,101 t, 14% lower than the projected 2021 spawning biomass from the 2020 assessment of 996,044 t. The 2022 and 2023 ABCs using  $F_{ABC}$  from this assessment model were higher than last year's 2022 ABC of 344,140 t: 354,014 t and 326,235 t. The 2022 and 2023 OFLs estimated by model 18.2 were 377,071 t and 347,483 t.

The Risk Table indicates some uncertainty in the status of Yellowfin Sole in 2021 and an ecosystem risk level 2. Together, the most recent data available suggest concerns of model uncertainty, continuing high temperatures, and fish condition in the NBS. Therefore Spies et al. (2021) recommended 2021 and 2022 ABCs that average the Tier 3 and Tier 1 ABCs, which resulted in 269,649 t for 2022 and 258,567 t for



2023. The Tier 3 reference points are more precautionary than Tier 1 because Tier 3 methodology does not assume a known spawning-recruitment relationship.

**Table 4 – BSAI Yellowfin Sole assessment outputs. Source: Spies et al., 2021.**

Quantity	As estimated or <i>specified</i> <i>last year for:</i>		As estimated or <i>recommended</i> <i>this year for:</i>	
	2021	2022	2022	2023
<i>M</i> (natural mortality rate)	0.12, 0.135	0.12, 0.135	0.12, 0.135	0.12, 0.135
Tier	1a	1a	1a	1a
Projected total (age 6+) biomass (t)	2,755,870 t	3,025,430 t	2,479,370 t	2,284,820 t
Projected female spawning biomass (t)	1,040,900 t	996,044 t	857,101 t	727,101 t
<i>B</i> <sub>0</sub>	1,528,700 t	1,528,700 t	1,489,190 t	1,489,190 t
<i>B</i> <sub>MSY</sub>	559,704 t	559,704 t	495,904 t	495,904 t
<i>F</i> <sub>OFL</sub>	0.124	0.124	0.152	0.152
<i>maxF</i> <sub>ABC</sub>	0.114	0.114	0.143	0.143
<i>F</i> <sub>ABC</sub>	0.114	0.114	0.109	0.110
OFL (t)	341,571 t	374,982 t	377,071 t	347,483 t
<i>maxABC</i>	313,477 t	344,140 t	354,014 t	326,235 t
ABC (t)	313,477 t	344,140 t	269,649 t	258,567 t
Status	2019	2020	2020	2021
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 126,929 t in 2021 and 126,929 t used in place of maximum ABC for 2022. This estimate was based on the mean of the past 5 years, 2017-2021, which includes an extrapolated catch of 108,157 t for 2021.

### BSAI Northern Rock Sole

Northern rock sole (*Lepidopsetta polyxystra*) are assessed on a biennial stock assessment schedule as part of the National Marine Fisheries Service assessment prioritization plan implemented in 2017. For BSAI partial assessments, an executive summary is presented by McGilliard (2021) 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)). A full stock assessment document with updated assessment and projection model results is scheduled to be presented in next year's SAFE report.

A statistical age-structured model is used as the primary assessment tool for the BSAI northern rock sole assessment, a Tier 1 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 age compositions, trawl survey abundance estimates and trawl survey age compositions. In a partial assessment year, the full assessment model is not rerun but instead a Tier 1 projection model with an assumed future catch is used to estimate the stock level in the next two years. This incorporates the most current catch information for ABC and OFL recommendations without re-estimating model parameters and biological reference points.

The Tier 1 projection operates within the full assessment model by projecting estimates of the female spawning biomass, age 6+ total biomass, ABC and OFL ahead two years. Since the full assessment model is not rerun in this assessment, the projected values from the 2020 assessment are used to provide ABC and OFL.

#### Summary of Changes in Assessment Inputs:

The 2020 catch was updated to realized year-end catch (25,318 t), which was very close to the projected 2020 catch used in the 2020 assessment (25,800 t). The projected catch in 2021-2023 was very close to the projected future catches used in the 2020 assessment. Catch in 2021-2023 used in the 2021 projections was updated to 45,300 t from 45,700 t to reflect changes in the average catches over the most recent decade.

For the 2022 fishery, McGilliard (2021) recommended the maximum allowable ABC of 206,896 t from the updated projection model. This ABC is higher than last year's ABC of 140,306 t and slightly more than last year's projected 2022 ABC of 206,605 t. Reference values are summarized in Table 5.

**Table 5 - BSAI Northern Rock Sole assessment outputs. Source: McGilliard, 2021**

Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2021	2022	2022	2023
<i>M</i> (natural mortality rate)	0.15 (f),0.17 (m)	0.15 (f),0.17 (m)	0.15 (f),0.17 (m)	0.15 (f),0.17 (m)
Tier	1a	1a	1a	1a
Projected total (age 6+) biomass (t)	923,197	1,359,440	1,361,360	1,784,460
Projected Female spawning biomass (t)	294,627	286,381	287,600	320,399
<i>B<sub>0</sub></i>	476,820	476,820	476,820	476,820
<i>B<sub>MSY</sub></i>	158,972	158,972	158,972	158,972
<i>F<sub>OFL</sub></i>	0.157	0.157	0.157	0.157
<i>maxF<sub>ABC</sub></i>	0.152	0.152	0.152	0.152
<i>F<sub>ABC</sub></i>	0.152	0.152	0.152	0.152
OFL (t)	145,180	213,783	214,084	280,621
maxABC (t)	140,306	206,605	206,896	271,199
ABC (t)	140,306	206,605	206,896	271,199
Status	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2019	2020	2020	2021
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 realized catches of 25,318 t used in place of maximum permissible ABC for 2020 and 45,300 t used in place of maximum permissible ABC for 2021-2023. The 2021-2023 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 marks a full assessment year. The last full assessment was completed in 2017. The biomass, OFL and ABC values for northern and southern rock sole are added into the shallow-water flatfish complex values to estimate OFL and ABC for the complex.

#### Summary of Changes in Assessment Inputs

1. 2017 catch data were updated to the final estimate from the catch accounting system, final catch estimates for 2018-2020 were also added to the model, and 2021 catch was extrapolated to include expected catch in October-December 2021.
2. 2019 and 2021 GOA trawl survey biomass estimates were added to the model.
3. 2018-2021 fishery lengths were added to the model.
4. 2019 and 2021 GOA trawl survey length composition data were added to the model.
5. 2017 GOA trawl survey conditional-age-at-length (CAAL) data were added to the northern rock sole model. Northern rock sole otoliths were not collected in 2019. 2017 and 2019 GOA trawl survey conditional-age-at-length (CAAL) data were added to the southern rock sole model.

#### Changes to the assessment model:

1. The 2017 accepted assessment model was run assuming that fishery selectivity was asymptotic
2. Growth was poorly estimated in the 2017 assessment model, this was largely due to the overestimation of the coefficient of variation of the distribution of length at the maximum age. This was an estimated parameter that was fixed at a reasonable value determined through sensitivity analysis.
3. The authors demonstrated that there were growth differences in the central and western GOA for both northern and southern rock sole. The model was split into 2-areas that accounted for differences in growth between the western and central Gulf. A recruitment allocation parameter was estimated to distribute the population between the two areas. Growth was estimated in the model for each area. Catch, survey biomass, length composition data, and conditional age-at-

length data were split between areas and used in the model. Survey catchability was assumed to be 1 in each area and area- and sex-specific survey selectivity was estimated. Area- and sex-specific fishery selectivity was also estimated.

Bryan and Palssons (2021) showed that there is evidence that northern and southern rock sole growth differs in the central and western GOA. As such, several single area and 2-area growth morph models were evaluated as part of this assessment. Given the more appropriate accounting of growth differences in the assessment model, and better estimation of growth for the central Gulf, the area where the majority of catch is taken, model 21.2 is the recommended model for this year's assessment of northern rock sole rather than model 17.1. The results were similar among the single area models and the 2-area, growth morph models for southern rock sole. Given the more appropriate accounting of growth differences in the western and central GOA model 21.1 is the recommended model for southern rock sole.

The northern rock sole models estimate an increasing trend in total and spawning biomass and relatively low fishing mortality rates in recent years. The 2021 northern rock sole SSB estimates were above  $B_{35\%}$  and the 2021 fishing mortality estimates were below  $F_{35\%}$ . The southern rock sole models estimates the start of an increasing trend in total biomass and SSB, and fishing mortality rates have remained relatively low. The 2021 southern rock sole SSB estimates were above  $B_{35\%}$  and the fishing mortality estimates were below  $F_{35\%}$ .

The key management results of the assessment, based on the author's preferred model (model 21.2 for northern rock sole and model 21.1 for southern rock sole), are compared to the 2020 projection results of the accepted 2017 update assessment in the tables below. The results are presented separately for each species in Table 6.

**Table 6 - GOA Norther and Southern Rock Sole assessment outputs. Source: Bryan and Palssons, 2021.**

**Southern Rock Sole**

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2021	2022	2022	2023
<i>M</i> (natural mortality rate; female, male)	0.2, 0.248*	0.2, 0.248*	See area specific rates	
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	144,833	148,917	243,860	247,635
Projected Female spawning biomass (t)	72,973	73,930	73,112	83,895
$B_{100\%}$	93,518	93,518	See area specific estimates	
$B_{50\%}$	37,407	37,407		
$B_{35\%}$	32,731	32,731		
$F_{ori}$	0.326	0.326		
$maxF_{abc}$	0.271	0.271		
$F_{abc}$	0.271	0.271		
OFL (t)	27,204	27,943	28,464	30,874
maxABC (t)	22,990	23,614	24,018	26,062
ABC (t)	22,990	23,614	24,018	26,062
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

\*Male natural mortality was estimated. \*Estimates represent the combined results from the area-specific model presented below.

**BSAI Alaska Plaice**

The BSAI Alaska Plaice is assessed by Ormseth (2021) and the stock is not being subject to overfishing, is not currently overfished, nor is it approaching a condition of being overfished (Table 7).

**Changes in the input data**

- 1) The catch data have been fully updated through October 17, 2021. For purposes of modelling and projection, the full-year 2021 catch was estimated by projecting the remaining annual catch based on the average weekly catch during September & October.
- 2) The 2021 EBS shelf bottom trawl survey biomass estimates, uncertainty, and length composition were included in the assessment. There was no survey in 2020 due to the coronavirus pandemic.

- 3) The 2019 survey ages were read and were added to the assessment; no otoliths were collected in 2020.
- 4) The 2019 and 2020 fishery length compositions were also added.

No modifications were made in the assessment model.

The survey biomass estimate for 2021 (333,830 t) was 9% lower than the 2019 estimate and is the lowest value in the survey time series. Similarly, model estimates of female spawning biomass (158,090 t in 2021) continued their decline since 2013. In contrast, model estimates of total biomass (455,187 t in 2021) show an increasing trend since 2019. These results are likely due to estimates of relatively strong recruitment since 2017, a pattern which began to emerge in the 2019 assessment. There is substantial uncertainty surrounding these recruitment estimates, reflected in the large confidence intervals and the reduced model fit to some recent age and length compositions. The 2021 projection model indicates slightly higher reference fishing mortality rates; combined with higher total biomass estimates they result in slightly increased OFL and ABC recommendations relative to 2019 despite the decline in the survey biomass estimates. Alaska plaice continue to be found in high abundance in the NBS; the 2021 NBS estimate of 344,578 t exceeded the EBS estimate for the first time.

**Table 7 – BSAI Alaska Plaice assessment outputs. Source: Ormseth, 2021.**

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2021	2022	2022	2023
<i>M</i> (natural mortality rate)	0.13	0.13	<b>0.13</b>	0.13
Tier	3a	3a	<b>3a</b>	3a
Projected total (3+) biomass (t)	427,587	430,164	<b>442,946</b>	454,030
Female spawning biomass (t)	166,528	160,150	<b>141,838</b>	144,767
<i>B</i> <sub>100%</sub>	335,172	335,172	<b>286,587</b>	286,587
<i>B</i> <sub>40%</sub>	134,069	134,069	<b>114,635</b>	114,635
<i>B</i> <sub>35%</sub>	117,310	117,310	<b>100,306</b>	100,306
<i>F</i> <sub>OFL</sub>	0.160	0.160	<b>0.170</b>	0.170
<i>maxF</i> <sub>ABC</sub>	0.132	0.132	<b>0.140</b>	0.140
<i>F</i> <sub>ABC</sub>	0.132	0.132	<b>0.140</b>	0.140
OFL (t)	37,924	36,928	<b>39,305</b>	39,685
maxABC (t)	31,657	30,815	<b>32,697</b>	32,998
ABC (t)	31,657	30,815	<b>32,697</b>	32,998
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
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, we present an executive summary 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>). A full stock assessment was scheduled for 2021, but due to limited staff resources, the full stock assessment was postponed.

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.

#### Changes in input data:

The updated information for this partial assessment includes replacing the estimated 2020 catch with the final catch value from the Alaska Regional Office ([https://www.fisheries.noaa.gov/sites/default/files/akro/car110\\_goa2020.html](https://www.fisheries.noaa.gov/sites/default/files/akro/car110_goa2020.html)) (1,911 t), and estimating the 2021-2023 catches. The 2021 projected catch was calculated as the current catch of 10/28/2021 added to the average 10/28/2021 – December 31 catches over the previous 5 years (totaling 673 t). The 2022 and 2023 projected catches were calculated as the average catch over the previous 5 years (2,251 t). Note that in the projection model, the estimated catches for the present and two future years are input in place of



maxABC, which is appropriate given that recent catches are much less than the maximum ABC for this stock.

The ABC for flathead sole is 40,175 t in 2022 and 40,046 t in 2023 and the OFL is 48,928 t in 2022 and 48,757 t in 2023. The new ABC recommendation and OFL values are similar to those developed in 2020 for 2022 (39,851 t and 48,534 t, respectively). The principal reference values are shown in Table 8.

**Table 8 - GOA Flathead Sole assessment outputs. Source: Kapur, 2021a.**

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2021	2022	2022*	2023*
<i>M</i> (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	280,980	278,418	279,975	276,796
Projected Female spawning biomass (t)	95,338	96,833	97,614	97,876
<i>B</i> <sub>100%</sub>	91,551	91,551	91,551	91,551
<i>B</i> <sub>40%</sub>	36,620	36,620	36,620	36,620
<i>B</i> <sub>35%</sub>	32,043	32,043	32,043	32,043
<i>F</i> <sub>OFL</sub>	0.36	0.36	0.36	0.36
<i>maxF</i> <sub>ABC</sub>	0.28	0.28	0.28	0.28
<i>F</i> <sub>ABC</sub>	0.28	0.28	0.28	0.28
OFL (t)	47,982	48,534	48,928	48,757
maxABC (t)	39,377	39,851	40,175	40,046
ABC (t)	39,377	39,851	40,175	40,046
Status	As determined <i>this</i> year for:			
	2019	2020	2020	2021
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 673 t used in place of maximum permissible ABC for 2021 and 2,251 t used in place of maximum permissible ABC for 2022 and 2023. The 2021 projected catch was calculated as the current catch as of October 28, 2021 added to the average October 28 – December 31 catches over the 5 previous years. The 2022 and 2023 projected catch was calculated as the average catch over the previous 5 years.

### 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 and estimated catches for 2021 and 2022-2023, to predict stock status for flathead sole in 2022 and 2023 and make ABC recommendations for those years.

#### Changes in input data:

The updated information for this partial assessment includes replacing the estimated 2020 catch with the final catch value from the Alaska Regional Office ([https://www.fisheries.noaa.gov/sites/default/files/akro/car110\\_goa2020.html](https://www.fisheries.noaa.gov/sites/default/files/akro/car110_goa2020.html)) (9,392 t), and estimating the 2021-2023 catches. The 2021 projected catch was calculated using the current catch as of 10/28/2021 added to the average October 28 – December 31 catches over the previous 5 years (totaling 9,807 t). The 2022 and 2023 projected catches were calculated as the average catch over the years 2016-2020 (11,141 t).

The ABC for the BSAI flathead Sole complex is 64,288 t in 2022 and 65,988 t in 2023 and the OFL is 77,967 t in 2022 and 80,034 t in 2023. The new ABC recommendation and OFL values are similar to those developed in 2020 for 2022 (64,119 t and 77,763 t, respectively). The principal reference values are shown in the Table 9.

**Table 9 - BSAI Flathead Sole assessment outputs. Source: Kapur, 2021b.**

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2021	2022	2022*	2023*
<i>M</i> (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	602,497	608,576	608,631	612,001
Projected Female spawning biomass (t)	150,433	154,906	155,379	160,748
<i>B</i> <sub>100%</sub>	203,658	203,658	203,658	203,658
<i>B</i> <sub>40%</sub>	81,463	81,463	81,463	81,463
<i>B</i> <sub>35%</sub>	71,280	71,280	71,280	71,280
<i>F</i> <sub>OFL</sub>	0.46	0.46	0.46	0.46
<i>maxF</i> <sub>ABC</sub>	0.37	0.37	0.37	0.37
<i>F</i> <sub>ABC</sub>	0.37	0.37	0.37	0.37
OFL (t)	75,863	77,763	77,967	80,034
maxABC (t)	62,567	64,119	64,288	65,988
ABC (t)	62,567	64,119	64,288	65,988
<b>Status</b>	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
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 9,807 t used in place of maximum permissible ABC for 2021 and 11,141 t used in place of maximum permissible ABC for 2022 and 2023. The final catch for 2021 was estimated by taking the average tons caught between October 28 and December 31 over the previous 5 years (2016-2020) and adding this average amount to the catch-to-date as of October 28, 2021. The 2022 and 2023 catch was estimated as the average of the total catch in each of the last 5 years (2016-2020).

### GOA Rex Sole

A full, age-structured assessment is presented for GOA rex sole (McGilliard and Palsson, 2021). Prior to 2017, the biomass estimates of the assessment were used to calculate OFLs and ABCs using a Tier 5 management approach because FOFL and FABC reference points estimated from the assessment were thought to be unreliable. In September 2017, newly available historical fishery age data were added to the assessment that substantially improved reliability of estimates of FOFL and FABC. Therefore, all estimates from the assessment were used to calculate OFLs and ABCs using a Tier 3a management approach for the 2017 subsequent assessments, including the 2021 assessment.

The following data sources were updated with newest years of data:

1. 2018-2021 catch biomass was added to the model
2. 2017 catch biomass was updated to reflect final (rather than projected) 2017 catches
3. 2018-2021 fishery length composition data were added to the model and 2017 fishery length composition data were updated to reflect October – December 2017 catches
4. 2017-2020 fishery age composition data were added to the model
5. 2019 and 2021 GOA trawl survey biomass estimates were added to the model
6. 2019 and 2021 GOA trawl survey length composition data were added to the model
7. 2019 GOA trawl survey age-at-length data were added to the model
8. Iterative data weighting (Francis 2011) was conducted and updated after the addition of new data.

### Summary of Changes in Assessment Methodology

1. Iterative data weighting was conducted using methodology described in Francis 2011.
2. Survey data from 1984 and 1987 were excluded
3. Catchability was estimated using a normal prior with a mean of 1.2 and a standard deviation of 0.175. The model assumes that the survey catchability is the same in the Western-Central GOA as for the Eastern GOA.

The key results of the assessment, based model, are compared to the key specifications from 2020 in the table below. A Tier 3a approach was used to calculate recommended quantities for the 2021 assessment. Three tables are presented. The first shows quantities for the entire GOA, showing quantities as specified in 2020 assessment and quantities recommended for the 2021 assessment using a Tier 3a approach. The second table describes the Western-Central GOA where length-at-age is larger than for the Eastern GOA, based on a Tier 3a approach. The third table shows quantities for the Eastern GOA, also based on a Tier 3a approach. The principal reference values are shown in the Table 10.

**Table 10 – GOA Rex Sole assessment outputs. Source: McGilliard and Palsson, 2021.**

Quantity	As estimated or specified this year for:		As estimated or recommended this year for:	
	2021	2022	2022*	2023*
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	101,244	101,244	124,543	126,939
Female spawning biomass (t)	44,500	44,500	51,713	56,777
<i>B</i> <sub>100%</sub>	See area-specific tables below		See area-specific tables below	
<i>B</i> <sub>40%</sub>				
<i>B</i> <sub>35%</sub>				
<i>F</i> <sub>OFL</sub>				
<i>maxF</i> <sub>ABC</sub>				
<i>F</i> <sub>ABC</sub>				
OFL (t)	18,779	18,779	23,302	25,049
maxABC (t)	15,416	15,416	19,141	20,594
ABC (t)	15,416	15,416	19,141	20,594
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

### BSAI Greenland turbot

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/2020-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*<sub>35%</sub>. 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*<sub>35%</sub> for 2021-2023; hence, the stock is not overfished, and it is not approaching an overfished condition. The principal reference values are shown in the Table 11.



**Table 11 - BSAI Greenland turbot assessment outputs. Source: (Bryan et al., 2021)**

Quantity	As estimated or specified last year for:		As estimated or recommended this year* for:	
	2021	2022	2022	2023
M (natural mortality rate)	0.112	0.112	0.112	0.112
Tier	3a	3a	3a	3a
Projected total (age 1+)	87,849	79,382	84,341	80,404
Female spawning biomass	51,914	47,197	50,361	47,376
Projected				
$B_{100\%}$	89,054	89,054	89,054	89,054
$B_{40\%}$	35,622	35,622	35,622	35,622
$B_{35\%}$	31,169	31,169	31,169	31,169
$F_{OFL}$	0.22	0.22	0.22	0.22
$maxF_{ABC}$	0.18	0.18	0.18	0.18
$F_{ABC}$	0.18	0.18	0.18	0.18
OFL (t)	8,568	7,181	7,687	6,698
maxABC (t)	7,326	6,139	6,572	5,724
ABC (t)	7,326	6,139	6,572	5,724
Status	As determined last year for:		As determined this year for:	
	2019	2020	2020	2021
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 the final catch of 2,326 t in 2020 and estimated catch of 3,309 t in 2021 - 2023. The catch value for 2021-2023 was derived as the product of the 5-year average (2016-2020) proportion of captured TAC and the 2021 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.

<b>No. supporting clauses</b>	<b>5</b>
<b>Applicable supporting clauses</b>	<b>4</b>
<b>Non-applicable supporting clauses</b>	<b>1 (7.2)</b>
<b>Overall level of conformity</b>	<b>High</b>

<b>Non-conformance</b>	None
<p><b>Evidence of continuous compliance with the fundamental clause:</b></p> <p>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. Links to these documents from the December 2020 Council meeting, with harvest specifications adopted for 2021 and 2022, are as follows: <a href="https://www.npfmc.org/goa-specs-2/">https://www.npfmc.org/goa-specs-2/</a> and <a href="https://www.npfmc.org/bsai-specs-2/">https://www.npfmc.org/bsai-specs-2/</a>.</p> <p>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.</p> <p>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.</p> <p>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."</p> <p>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."</p> <p>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.</p>	
<p><b>Evidence of continuous compliance with the applicable supporting clauses:</b></p> <p>There is no material change in compliance with any of the following supporting clauses. Clause 7.2 is not applicable.</p> <p>7.1. The precautionary approach shall be applied widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment. 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.</p>	

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.

<b>No. supporting clauses</b>	<b>17</b>
<b>Applicable supporting clauses</b>	15
<b>Non-applicable supporting clauses</b>	2 (8.11, 8.14)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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. 2020) 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 2020-2021 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 re 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 as 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**



<b>Applicable supporting clauses</b>	3
<b>Non-applicable supporting clauses</b>	0
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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.

<b>No. supporting clauses</b>	<b>6</b>
<b>Applicable supporting clauses</b>	2
<b>Non-applicable supporting clauses</b>	4 (10.3, 10.3.1, 10.4, 10.4.1)
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	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 first half of 2021 (NOAA 2021).

Current enforcement updates and violations are reported in the OLE Report to the Council. According to the December 2021 Report to the Council, there were no violations directly linked to the AK flatfish fisheries, and there is no evidence that specifically implicates this fishery. Personal interviews with AWT and the USCG confirm overall compliance with the AK flatfish complex, noting only minor infractions.

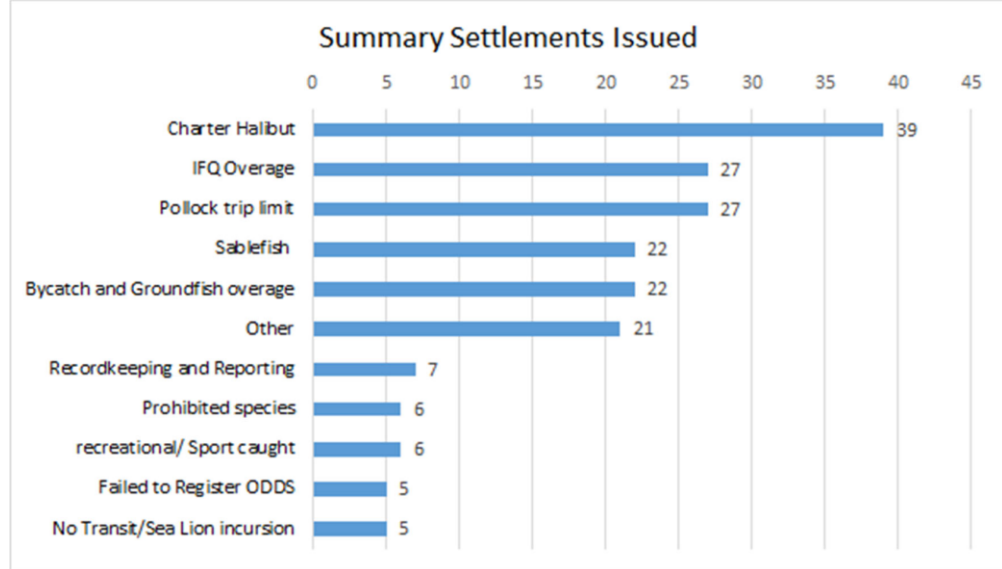


Figure 3. Summary of Settlements from October 1, 2020, to September 30, 2021, Source: NOAA 2021

There have been extensions to observer deployment contracts due to COVID-19, but this has not changed the level of monitoring.

**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.

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

**Evidence of continuous compliance with the fundamental clause:**

Penalties for 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.

<b>No. supporting clauses</b>	<b>16</b>
<b>Applicable supporting clauses</b>	16
<b>Non-applicable supporting clauses</b>	0
<b>Overall level of conformity</b>	High
<b>Non-conformance</b>	None

### Evidence of continuous compliance with the fundamental clause:

#### BSAI

Monitoring is carried out through the Observer Program operated by the NMFS. In 2020, the Program was dramatically scaled back due to Covid-19 and related precautions. Industry worked closely with the Program to maintain data collection.

The groundfish, Prohibited Species Catch (PSC), and non-target species catch composition for each area was updated for the most recent five full years and is given in the tables below. 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. Sculpins, including yellow Irish lord, were moved from FMP species to ecosystem components in 2021, hence appearing in the groundfish tables until then, and the “non-managed species” tables in 2021. The same is the case for giant grenadier in the BSAI starting in 2019.

**Table 12. Groundfish catch composition in the BSAI flatfish fishery from 2017-2021 shown all stocks comprising at least 0.1% of the catch. Green rows indicate target stocks. Source: NMFS 2022, AK region, Catch Accounting System**

Species	2017	2018	2019	2020	2021	Percentage	Total
Yellowfin sole	129,756	127,119	126,729	131,666	106,284	49.26%	621,554
Pollock	32,651	36,612	34,119	40,904	31,840	13.96%	176,126
Rock sole	31,960	24,503	23,537	24,412	12,923	9.30%	117,334
P. cod	24,280	19,464	19,186	17,726	11,518	7.30%	92,173
AK plaice	16,181	20,233	15,693	19,471	13,864	6.77%	85,442
Flathead sole	7,436	9,330	13,901	6,710	8,262	3.62%	45,638
Arrowtooth flounder	5,111	5,474	8,445	8,896	7,367	2.80%	35,293
Kamchatka flounder	3,566	2,168	3,444	6,301	5,735	1.68%	21,213
Alaska skate	2,227	3,288	4,632	3,169	4,313	1.40%	17,630
Starry flounder	2,921	5,261	2,365	2,438	1,220	1.13%	14,205
Turbot	2,566	1,595	2,574	1,920	1,367	0.79%	10,022
Sablefish	445	196	1,148	1,297	1,340	0.35%	4,427
POP	307	325	613	1,575	1,550	0.35%	4,370
Great sculpin	1,067	731	1,068	679		0.28%	3,544
Plain sculpin	642	963	1,033	808		0.27%	3,446

Rex sole	674	123	538	543	600	0.20%	2,478
yellow Irish lord	293	262	275	319		0.09%	1,149
Thornyhead rockfish	155	65	438	158	203	0.08%	1,019
Aleutian skate	94	38	211	149	166	0.05%	657
Skate	144	77	165	86	70	0.04%	542
Bigmouth Sculpin	71	122	180	120		0.04%	493
Atka mackerel	16	196	89	84	107	0.04%	492
Shorthead rockfish	29	60	95	66	194	0.04%	444
Wht bltchd skate	55	47	59	148	126	0.03%	436
Butter sole	23	27	44	213	48	0.03%	355
Warty Sculpin	92	76	59	50		0.02%	277
Rougeye rockfish	16	10	26	59	72	0.01%	182
Big skate	21	58	58	5	34	0.01%	177
Sculpin	33	36	30	73		0.01%	172
sculpin unidentified	11	31	43	26		0.01%	111
Misc fldr	13	17	32	15	25	0.01%	102
Squid	62	33				0.01%	95
Northern rockfish	21	4	24	29	5	0.01%	83

**Table 13. Prohibited Species Catch (PSC) in the BSAI flatfish fishery. Crab and salmon species are listed in numbers of individuals, herring and halibut are given in mt. NMFS 2022, AK region, Catch Accounting System**

<b>PSC Species (Numbers)</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Average</b>
Opilio Tanner Crab	154,348	1,557,384	886,539	733,328	229,914	712,303
Bairdi Tanner Crab	334,692	176,368	334,336	581,269	566,010	398,535
Red King Crab	58,596	28,579	68,263	63,476	63,983	56,579
Golden King Crab	5,756	2,271	12,210	7,395	12,823	8,091
non-Chinook	1,714	10,756	4,762	845	1,851	3,986
Chinook	2,345	1,205	3,401	1,546	1,147	1,929
Blue King Crab	336	389	629	115	437	381
<b>PSC Species (Metric Tons)</b>						
Herring	58	64	77	72	170	88
Halibut	873	768	1,648	1,237	1,095	1,124

**Table 14. Non-target species catch in the BSAI flatfish fishery (mt). Note sculpins, including yellow Irish lord, were moved out of the FMP into the ecosystem component in 2021, hence appearing in this table from 2021. NMFS 2021, AK region, Catch Accounting System**

<b>Non-managed species</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Benthic urochordata					2,377.64
Bivalves	2,067.60	1,792.18	2,261.40	2,147.16	2,029.57
Brittle star unidentified			1,188.75	1,672.05	1,921.64
Capelin	150.41	273.66	871.10	397.57	695.55



Corals Bryozoans - Corals Bryozoans Unidentified	352.97	231.08	232.42	128.82	190.90
Eelpouts			137.37	170.54	210.21
Eulachon			201.23	17.48	5.42
Hermit crab unidentified	37.36	39.07	39.74	65.76	110.44
Grenadier - Rattail Grenadier Unidentified	58.54	30.82	47.63	52.92	84.61
Greenlings	31.29	36.34		28.80	42.77
Invertebrate unidentified	32.92	17.04	30.64	40.36	50.17
Misc crabs	18.58	7.52	11.98	13.35	10.60
Misc fish	8.96	3.44	14.14	7.80	15.28
Giant Grenadier	6.06	6.21	9.98	17.74	8.95
Misc crustaceans	3.48	3.40	12.18	11.44	11.32
Misc inverts (worms etc)	4.05	1.39	21.22	7.93	1.35
Lanternfishes (myctophidae)	11.45	3.67	2.31	1.31	2.24
Misc deep fish	3.51	1.29	3.37	4.61	4.07
Pacific Sand lance	1.28	0.87	2.36	1.67	8.41
Other osmerids	1.34	1.23	2.35	3.43	3.91
Pandalid shrimp			3.79	0.80	0.32
Polychaete unidentified	0.38	1.10	1.35	1.95	1.82
Pacific Sandfish	0.43	1.76	1.40	0.54	1.62
Saffron Cod	0.40	3.65	0.31	0.34	0.28
Sea anemone unidentified	1.11	0.15	0.17	0.61	1.08
Sculpin	0.60	0.21	0.53	0.75	0.77
Scypho jellies			0.10	1.25	0.22
Sea pens whips			0.86	0.13	0.14
Sea star				0.26	
Smelt (Family Osmeridae)				0.06	0.45
Snails			0.37	0.09	
Sponge unidentified	0.04	0.08	0.15	0.27	0.51
Squid			0.03	0.26	
State-managed Rockfish			0.06	0.09	0.21
Stichaeidae					0.10
urchins dollars cucumbers					0.02

### Monitoring and management regarding aquatic ecosystems

The EBS and AI Ecosystem Status Reports include continuing monitoring of a range of ecosystem indicators, all considered by the Council in the decision-making process (Siddon 2020; Ortiz and Zador 2020). However, Covid-19 has impacted many surveys and data collections. The team concludes that the risk is low though since the fishery has had a high level of monitoring in the past.

No changes that would affect the existing confidence ratings are evident.

### Monitoring and management regarding essential habitats

The most recent five-year review of EFH took place in 2016 using a new Fishing Effects model to assess the impacts of fishing activities on EFH (Simpson et al. 2017). The average percentage impact for 2003-2016 was 4.5% in the BS and 1.9% in the AI, which is well below the 10% habitat impact that was established as the trigger for further analysis (<https://www.npfmc.org/habitat-protections/essential-fish-habitat-efh/>). On this basis, the Council agreed that the effects of fishing on EFH do not currently meet the threshold of more than minimal and not temporary, and mitigation action is not needed at this time. In addition, the final environmental assessment for EFH Omnibus Amendments was published in June 2018. Amendment 115 is the relevant omnibus amendment to the

FMP for the groundfish fishery of the BSAI (NMFS 2018). Based on the most recent five-year review of EFH, the Council determined that new habitat and life history information is available to revise many of the EFH descriptions and maps. These amendments (115 for the BSAI) to the EFH provisions in the Council's FMPs would not substantively change the impacts of EFH as analyzed in the 2005 EFH EIS.

Currently, the new 5-year EFH review is officially underway. The species distribution modelling team at AFSC has done one round with SSC, no model results yet, some examples so far. The outputs by species and life stage will go to stock assessment scientists, etc. The SSC will review species distribution model outputs in February. Dr. Jim Thorsen and his team at AFSC are developing more advanced species distribution models than previously used.

The Fishing Effects model is being re-run with updates to impact and recovery parameters, fishing gear parameters and fishing effort. He expects the modelling work will be further improved via the SSC review process.

No changes that would affect the existing confidence ratings are evident.

## GOA

**Table 15. Groundfish catch composition in the GOA flatfish fishery from 2017-2021 shown all stocks comprising at least 0.1% of the catch. Green rows indicate Principle 1 target stocks. Source: NMFS 2022, AK region, Catch Accounting System**

Species	2017	2018	2019	2020	2021	Percentage
Arrowtooth flounder	23,639	15,209	20,632	16,615	5,425	62.8%
POP	3,441	907	1,696	956	673	5.9%
Flathead sole	1,631	1,834	2,058	1,318	234	5.5%
unidentified rockfish	1,397	1,303	1,457	1,237	376	4.4%
Pollock	1,224	2,146	1,519	579	182	4.4%
Rex sole	1,274	1,459	935	710	116	3.5%
Sablefish	689	1,365	959	494	274	2.9%
Rock sole	1,059	1,816	447	268	25	2.8%
Big skate	354	534	593	498	24	1.5%
Dusky rockfish	310	153	291	105	210	0.8%
Longnose skate	206	297	292	176	21	0.8%
Northern rockfish	163	136	420	66	67	0.7%
Butter sole	136	365	80	96	1	0.5%
English sole	49	107	197	304	9	0.5%
Spiny dogfish	206	83	308	35	6	0.5%
Atka mackerel	79	182	266			0.4%
Rougheye rockfish	81	132	106	87	22	0.3%
Sleeper shark	106	193	16	18	30	0.3%
Aleutian skate	133	88	77	29	14	0.3%
yellow Irish lord	100	87	92	3		0.2%
Dover sole	101	61	23	48	29	0.2%
Starry flounder	98	86	26	10		0.2%
Thornyhead rockfish	17	55	77	37	24	0.2%
Skate	54	44	52	16	5	0.1%
Octopus	3	21	32	32		0.1%
Great sculpin	40	15	12	4		0.1%
Shortraker rockfish	19	13	21	13		0.1%

**Table 16. Prohibited Species Catch (PSC) in the GOA flatfish fishery. Crab and salmon species are listed in numbers of individuals, herring and halibut are given in mt. NMFS 2022, AK region, Catch Accounting System**

<b>PSC Species (Numbers)</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Average</b>
Bairdi Tanner Crab	119,874	233,699	203,204	601,043	10,548	162,135
Chinook	736	1,528	2,313	231	1,005	2,337
non-Chinook	466	627	968	438	778	792
Golden King Crab	1	4	132	0	1	40
Opilio Tanner Crab	-	-			131	15
Blue King Crab	-	-				-
Red King Crab	-	-				-
<b>PSC Species (Metric Tons)</b>						
Herring	1	3	15	7	2	3
Halibut	1,356	1,177	826	609	121	1,060

**Table 17. Non-target species catch in the GOA flatfish fishery (mt). Note sculpins, including yellow Irish lord, were moved out of the FMP into the ecosystem component in 2021, hence appearing in this table from 2021. NMFS 2021, AK region, Catch Accounting System**

<b>Non-managed species</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Sculpin					146.94
Misc fish	80.45	120.60		151.78	40.71
Giant Grenadier				80.07	1.34
Sea star	34.56	45.05	26.93	10.05	12.25
Squid			4.66	44.97	4.96
Scypho jellies	1.10	1.84	17.86	6.82	1.88
Pandalid shrimp	2.26	4.99		12.94	0.11
Eelpouts	2.34	0.78	1.03	2.56	0.69
Sea anemone unidentified	1.52	1.88	5.44	2.67	
State-managed Rockfish	0.76	1.62	1.63	0.77	4.54
Eulachon				2.49	
Snails	1.03	0.56	1.94	0.31	
urchins dollars cucumbers	2.34	1.27	1.32	0.95	0.76
Other osmerids	1.76		0.02	0.22	
Sponge unidentified	0.28	0.04		0.23	0.13
Greenlings	0.60	1.56	1.29	1.06	0.39
Benthic urochordata	1.72	0.80	0.09	0.26	
Smelt (Family Osmeridae)					0.71
Invertebrate unidentified	0.13	0.36	0.02	0.00	0.02
Stichaeidae			0.88	0.51	0.16
Misc crustaceans	0.49	0.11	2.21	0.08	0.00
Bivalves	0.03	0.35	0.47	0.10	
Misc crabs	0.16	0.08	0.17	0.05	
Pacific Hake	0.49			0.04	
Capelin			0.47	0.03	
Grenadier - Rattail Grenadier Unidentified					0.24
Corals Bryozoans - Corals Bryozoans Unidentified	0.13	0.17	0.20	0.20	0.37

Saffron Cod			0.21		
Hermit crab unidentified	0.12	0.17	0.07		0.08
Pacific Sandfish			0.13	0.12	

**Monitoring and management regarding aquatic ecosystems**

The GOA Ecosystem Status Report includes continuing monitoring of a range of ecosystem indicators, all considered by the Council in the decision-making process (Ferriss and Zador 2020). Covid-19 has impacted many surveys and data collections in 2020. The team concludes that the risk is low though since the fishery has had a high level of monitoring in the past.

No changes that would affect the existing confidence ratings are evident.

**Monitoring and management regarding essential habitats**

The most recent five-year review of EFH took place in 2016 using a new Fishing Effects model to assess the impacts of fishing activities on EFH (Simpson et al. 2017). The final environmental assessment (for EFH Omnibus Amendments) was published in June 2018. Amendment 105 is the relevant omnibus amendment to the FMP for the groundfish fishery of the GOA (NMFS 2018). Based on the most recent five-year review of EFH, the Council determined that new habitat and life history information is available to revise many of the EFH descriptions and maps. These amendments (105 for the GOA) to the EFH provisions in the Council's FMPs would not substantively change the impacts of EFH as analyzed in the 2005 EFH EIS. Currently, the new 5-year EFH review is officially underway. The species distribution modelling team at AFSC has done one round with SSC, no model results yet, some examples so far. The outputs by species and life stage will go to stock assessment scientists, etc. The SSC will review species distribution model outputs in February. Dr. Jim Thorsen and his team at AFSC are developing more advanced species distribution models than previously used.

The Fishing Effects model is being re-run with updates to impact and recovery parameters, fishing gear parameters and fishing effort. He expects the modelling work will be further improved via the SSC review process.

No changes that would affect the existing confidence ratings are evident.

**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.

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