Responsible Fishery Management (RFM)

Alaska Pacific Sablefish (Black Cod) Commercial Fishery

4th Surveillance Report

Certification Body (CB):	**Global Trust Certification**
Assessment team:	Dr. Ivan Mateo, Lead Assessor Dr. Robert Leaf, Assessor R.J. (Bob) Allain, Assessor
Fishery client:	'Eat on the Wild Side' (FVOA)
Assessment Type:	Surveillance 4
Report Code:	AK/SAB/002.4/2021
Report Date:	July 30th 2021

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Foreword

The Responsible Fisheries Management (RFM) Certification program is a third-party sustainable seafood certification program for wild capture fisheries owned by the Certified Seafood Collaborative (CSC), a 501(c)(3) non-profit foundation led by a diverse board of seafood and sustainability industry experts.

The program was previously owned by the Alaska Seafood Marketing Institute (ASMI) when it was known as the Alaska RFM program but when ownership passed to the CSC in July 2020, the scope of the program was expanded to include other North American fisheries beyond the State of Alaska.

The Responsible Fisheries Management (RFM) Standard is composed of Conformance Criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO. Further information on the RFM program may be found at: https://www.alaskaseafood.org/rfm-certification/

1 Contents

1.1 List of Tables

2 Glossary

ABC – Allowable Biological Catch
ADFG – Alaska Department of Fish and Game
AK – Alaska
AI – Aleutian Islands
AS – Alaska Statutes
AWT – Alaska Wildlife Trooper
BS – Bering Sea
CDQ – Community Development Quota
CFEC – Commercial Fisheries Entry Commission
DMR – Discard Mortality Rate
EEZ – Exclusive Economic Zone
EQS – Equal Quota Share
FMP – Fishery Management Plan
GHL – Guidance Harvest Level
GOA – Gulf of Alaska
IFQ – Individual Fishing Quota
IPHC – International Pacific Halibut Commission
MCS – Monitoring, Control and Surveillance
MSE - Management Strategy Evaluation
MSFCMA – Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA or MSA)
NMFS – National Marine Fishery Service
NOAA – National Oceanographic and Atmospheric Administration
NPFMC – North Pacific Fishery Management Council
NSEI – Northern Southeast Inside (sub-district)
OFL - Overfishing Limit
OLE – Office of Law Enforcement (NOAA)
PSC – Prohibited Species Catch
RFM – Responsible Fishery Management (Standard)
SAFE – Stock Assessment and Fishery Evaluation
SSEI – Southern Southeast Inside (sub-district)
TAC – Total Allowable Catch
USCG – United States Coast Guard
VMS – Vessel Monitoring System

3 Executive Summary

3.1 Introduction

This Surveillance Report documents the 4th Surveillance Assessment of the Alaska Pacific Sablefish (Black cod) Commercial Fishery (200nm EEZ) originally certified on 11th October 2011, and recertified 9th January 2017, and presents the recommendation of the Assessment Team for continued FAO-Based RFM Certification.

Unit of Certification

The Alaska Pacific Sablefish (Black cod) Commercial Fishery (200nm EEZ) legally employing demersal longline (mainly), pot and trawl gear within Alaska's jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) and Board of Fisheries (BOF)] management, underwent its 1st surveillance assessment against the requirements of the Alaska FAO-Based RFM Conformance Criteria Version 1.3 Fundamental clauses.

This Surveillance Report documents the assessment results for the continued certification of commercially exploited Alaska Pacific Sablefish (Black cod) fisheries to the Alaska RFM Certification Program. This is a voluntary program that has been supported by ASMI who wish to provide an independent, third-party certification that can be used to verify that these fisheries are responsibly managed.

The assessment was conducted according to the Global Trust procedures for Alaska RFM Certification using the fundamental clauses of the Alaska RFM Conformance Criteria Version (v1.3, May 2016) in accordance with ISO 17065 accredited certification procedures.

The assessment is based on 6 major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labelling of products from marine capture fisheries (2009); including:

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

These six major components are supported by 12 fundamental clauses (+ 1 in case of enhanced fisheries) that guide the AK RFM Certification Program surveillance assessment

A summary of the site meetings is presented in Section 6. Assessors included two externally contracted fishery expert and Global Trust Certification internal staff

3.2 Summary of Findings

The Audit team has determined that the commercial sablefish fishery operated within the defined Alaskan UoA remained in compliance with the RFM Fishery Standard's Fundamental Clauses for the Fisheries Management System component (Clauses 1, 2, and 3) and the Monitoring and Control component (Clauses 10 and 11). No evidence exists to indicate that non-conformance situations arose during the 4th Surveillance audit.

3.3 Recommendation of the Assessment Team

Following this 4th Surveillance Report the assessment team recommends that continued Certification under the Alaska Responsible Fisheries Management Certification Program is maintained for the management system of the applicant fishery, the sablefish (black cod) commercial federal and state fisheries, employing demersal longline, pot and trawl gear within Alaska jurisdiction (200 nautical miles EEZ) under federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) and Board of Fisheries (BOF)] management.

3.4 Assessment Team Details

The Assessment Team for this assessment was as follows; further details are provided in Appendix 1):

- Dr. Ivan Mateo – Lead Assessor, Responsible for Fundamental Clauses 8,9,12
- Dr. Robert Leaf – Assessor 1, Responsible for Fundamental Clauses 4,5,6,7
- R.J. (Bob) Allain – Assessor 2, Responsible for Fundamental Clauses 1, 2, 3, 10, 11

3.5 Details of Applicable RFM Documents

This assessment was conducted according to the relevant program documents outlined in Table 1 below.

Table 1. Relevant RFM program documents including applicable versions.

Document title	Version number, Issue Date	Usage
RFM Procedure 2: Application to Certification Procedures for the RFM Fishery Standard	Version 6, September 2020	Process
Responsible Fisheries Management Certification Program Fisheries Standard.	Version 1.3, May 2016	Standard
Responsible Fisheries Management Certification Program Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in North America	Version 1.3, May 2016	Guidance to Standard

4 Client contact details

Table 2. Client details and key contact information.

Applicant Information		
Organization/Company Name:		Eat on the Wild Side (Fishing Vessel Owners' Association (FVOA)
Address:	Street:	4005 - 20th Ave. West, Room 232
	City:	Seattle
	State:	Washington
	Country:	USA
	Zip code	98199
Applicant Key Contact Information		
Name:		Robert Alverson
Position:		Manager
E-mail:		robertalverson@msn.com

5 Unit(s) of Certification

5.1 Unit(s) of Certification

The Units of Certification (i.e. what is covered by the certificate) are as described in Table 3 below.

Table 3. Units of Certification.

Units of Certification		
Species:	Common name:	Sablefish (Black cod)
	Latin name:	*Anoplopoma fimbria*
Geographical area:		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands
Stock(s):		Eastern Pacific
Management system:		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: ▪ National Marine Fisheries Service (NMFS) ▪ North Pacific Fishery Management Council (NPFMC) ▪ Alaska Department of Fish and Game (ADFG) and Board of Fisheries (BOF)
Fishing gear/method:		Unique to each UoC
UoC 1		Benthic longline
UoC 2		Pots
UoC 3		Trawl
Client group:		Fishing Vessel Owner Association (FVOA)

5.2 Changes to the Unit(s) of Certification (if any)

There have not been any changes to the Units of Certification.

6 Summary of site visits and/or consultation meetings

Desktop reviews are the preferred assessment vehicle within the RFM program. In general, on-site/off-site audits are required only if the Certification Body deems that a desktop review may be inadequate for determining whether the fishery is continuing to comply with the RFM Fishery Standard, based on the performance of the fishery, status of non-conformances and related corrective actions.

Table 4. Summary of site visits and/or consultation meetings.

Meeting Date and Location	Personnel	Areas of discussion
Date: 05/19/2021 Location: Conference call	ADFG: Forrest Bowers Assessment Team Members: Ivan Mateo, Lead Assessor Robert Leaf, Assessor Robert Allain, Assessor	Topics Discussed: ▪ robustness of the estimates of the commercial landings; ▪ issue of vessels less than 40 ft LOA to be considered for the EM selection pool in the future; ▪ progress in developing EM systems on trawl vessels in the Bering Sea and Gulf of Alaska; ▪ tagging survey in Chatham Strait conducted by ADFG as part of a mark-recapture study to estimate population abundance? ▪ significant/strategic changes to organizational structure, mandate, and core responsibilities in 2020 that impacted the management framework for the fishery?
Date: 05/19/2021 Location: Conference call	AWT: Lt. Jon Streifel Assessment Team Members: Ivan Mateo, Lead Assessor Robert Leaf, Assessor Robert Allain, Assessor	Topics Discussed: ▪ enforcement legislation, rules, or proposals. Significant changes and updates over calendar years 2019 and 2020; ▪ enforcement of management measures that support the reduction of bycatch and discards, reduction of impacts on habitat, 2019 and 2020 updates; ▪ number of boarding, number of violations detected, types of violations for the species in question. General level of compliance overall. Updates for 2019 and 2020.
Date: 05/24/2021 Location: Conference call	NOAA Regional Office Mary Furuness Assessment Team Members: Ivan Mateo, Lead Assessor Robert Leaf, Assessor Robert Allain, Assessor	Topics Discussed: ▪ developments in the scientific assessment methodology of the stock; ▪ changes to the harvest strategy and control rules for the fishery; ▪ changes and updates on fishery data and information, ongoing research activities.
Date: 05/25/2021 Location: Conference call	NMFS AKFSC MESA group Chris Lunsford Dan Goethel Cara Rodgeveller Kari Femske Assessment Team Members: Ivan Mateo, Lead Assessor Robert Leaf, Assessor Robert Allain, Assessor	Topics Discussed: ▪ developments in the scientific assessment methodology of the stock; ▪ changes to the harvest strategy and control rules for the fishery; ▪ changes and updates on fishery data and information, ongoing research activities

7 Summary findings

The Audit team has determined that the commercial sablefish fishery operated within the defined Alaskan UoA remained in compliance with the RFM Fishery Standard's Fundamental Clauses for the Fisheries Management System component (Clauses 1, 2, and 3) and the Monitoring and Control component (Clauses 10 and 11). No evidence exists to indicate that non-conformance situations arose during the 4th Surveillance audit.

7.1 Update on topics that trigger immediate failure

The following fisheries management issues cause a fishery to immediately fail RFM assessment:

- Dynamiting, poisoning, and other comparable destructive fishing practices.
- Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.
- Shark finning.
- Slavery and slave labor on board fishing vessels.
- Any significant lack of compliance with the requirements of an international fisheries agreement to which the U.S. is signatory. A fishery will have to be formally cited by the International Governing body that has competence with the international Treaty in question, and that the US has been notified of that citation of non-compliance.

The Audit team has, as part of this surveillance, carried out a review of any new evidence with respect to these issues and found no evidence that any of the above issues are occurring/describe any issues identified and the consequences for the fishery.

7.2 Changes in the management regime and processes

The core management regime and processes for the 2020 commercial sablefish fishery within Alaska's EEZ involving federal (NOAA, NPFMC, USCG) and state (ADFG) agencies remained largely unchanged from the 2019 core systems. The Audit Team noted that the NPFMC and NOAA continued their annual practice of amending specific regulatory provisions and rules so that changes to the FMPs' measures were legally binding and enforceable. Typically, these included changes to fleet and area allocation tables, quota sharing, bycatch provisions, area closures, opening and closing dates, at-sea observer coverage etc.

Similarly, a reading of the annual report for 2020 from the Legislative Affairs Agency of the State of Alaska indicated that there were no repeals or amendments of legislation in respect of the commercial sablefish fishery managed by the state (available at: http://akleg.gov/publications.php and select Summary of legislation 2020). However, some administrative changes were made to the state managed fishery as indicated at Section 7.9.5.3. (Fundamental Clause 3).

The Audit Team concludes that the outcome of certification or the effect of the fishery on resources were not negatively affected by annual adjustments to the fishery management measures and processes, including to existing federal and state legislation and regulations.

7.3 Changes to the organizational responsibility of the main management agencies

The organizational structures, mandates, and core responsibilities of the main agencies that comprise the management framework for the Alaskan commercial sablefish fishery have remained unchanged from the previous surveillance audit. However, there were a number of changes to federal staff professionals within the main agencies, including to some of their subordinate bodies. These changes were both rotational and replacement in nature. The Audit team concludes that the personnel changes did not have a material impact on the governance systems of the principle federal and state organizations.

7.4 New information on the status of stocks

Describe any new information on the status of stocks from recent surveys and assessments. Describe any new scientific advice or other information relevant to continued compliance with the RFM Fishery Standard.

7.5 Update on fishery catches

Provide an update on fishery catches.

7.6 Significant changes in the ecosystem effects of the fishery

Describe any significant changes in the ecosystem effects of the fishery (e.g., bycatch, discards, ETP species interactions, gear habitat interactions).

7.7 Violations and enforcement information

The 2020 fishing season marked the first full year in which the Enforcement Section of NOAA's Office of General Counsel's Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions (June 2019) was in effect. Like its predecessor, the revised policy is very comprehensive and prescriptive. All major federal statutes are embodied in the policy and it is believed that the quality of the guidance provided to prosecutors and law enforcement managers will result in ensuring that (i) penalties and permit sanctions decisions are assessed fairly and consistently, and are appropriate for the gravity of the violation, and (ii) economic incentives for non-compliance are eliminated.

The Monitoring, Control and Surveillance (MCS) components in effect for Alaska's 2020 commercial sablefish fishery for both the GOA and BSAI Areas were, for all intent and purpose, similar to those that were in place for the 2019 commercial fishery. Adjustments to the fisheries management measures and allocations did not materially affect how the MCS aspects were planned and implemented by federal and state enforcement agencies. The COVID-19 pandemic did impact the at-sea operations of some agencies during the early months of 2020.

Alaska Wildlife Troopers (2019 and 2020)
Aleutian Islands/Western Gulf of Alaska
3 violations involving Hook and Line commercial vessels landing Sablefish in State Waters without a CFEC Permit Landing Card.
Southeast Alaska
2 violations of Hook and Line commercial vessels retaining Lingcod while targeting Sablefish when the Lingcod season was closed.
6 violations of Hook and Line commercial vessels targeting Sablefish in State Waters closed to Sablefish retention.
1 Log book violation
1 violation involving Hook and Line commercial vessel landing Sablefish in State Waters without a CFEC Permit Landing Card.
Central Gulf of Alaska/Prince William Sound
1 violation of Hook and Line/Pot vessel having the wrong gear type of CFEC Permit Card for the gear being operated for Sablefish.

USCG Enforcement Information (2019 and 2020)
The Coast Guard reported 46 vessel boardings in the commercial sablefish fishery in 2019 with no infractions. In 2020, the agency conducted 57 vessel boardings that resulted in 4 violations. Typically, violations are referred to NOAA OLE who will assign a case officer; offences deemed to be of a minor nature are processed either by way of compliance assistance or summary settlement. Serious offences are referred to NOAA OGC for prosecution.

NOAA - OLE Enforcement Information (2019 and 2020)
Annual reports provided to the NPFMC by the OLE contained only passing references to the status and disposition of MCS activities targeting the commercial sablefish fishery in federal waters. Several attempts were made to engage a representative of the agency.

7.8 Other information that may affect the outcome of certification

Describe any other information that may affect the outcome of certification including an update on any new fishery developments since certification not already covered in other sections.

7.9 Update on consistency to the fundamental clauses of the RFM Fishery Standard

This statement includes a brief update on changes in the fishery relevant to the fundamental clauses of the RFM Fishery Standard and a statement of continuing consistency (or not) to those fundamental clauses.

7.9.1 Section A. The Fisheries Management System

7.9.1.1 Fundamental Clause 1

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.**
Summary of relevant changes:	The Alaska commercial sablefish fishery continues to be managed by the North Pacific Fishery Management Council (NPFMC) and the NOAA's National Marine Fisheries Service (NMFS) in federal waters (3-200 nm); and by the Alaska Department for Fish and Game (ADFG) and the Board of Fisheries (BOF) in state waters (0-3 nm). In federal waters, the fishery is managed through the NPFMC's GOA and BSAI Groundfish Fishery Management Plans (FMPs) subject to the *Magnuson-Stevens Fishery Conservation and Management Act* (MSA). The management systems for the commercial sablefish fishery remained highly structured and legally supported by local and state statutes and regulations, Changes to the management systems in 2020 were essentially those required to implement new or amended rules, and year-over-year adjustments to FMP measures, including allocative formulae (OFLs, ABCs, PSCs, GHLs, IFQ temporary transfers), opening and closing dates, bycatch monitoring, at-sea observer coverage levels, and VMS requirements. The State's sablefish fishery continued to be managed outside the IFQ program using a Guideline Harvest Level (GHL). As is the case for most federal groundfish fisheries, ADFG issues emergency orders governing state sablefish fisheries that duplicate NMFS management actions, except that gear or other restrictions may vary. These emergency orders establish parallel fishing seasons (termed "parallel fisheries") allowing vessels to fish for groundfish in state waters with the same seasons as the federal fisheries. Where there is a federal and parallel fishery for a species, the state waters fishery usually opens after the parallel fishery closes.
References:	1.Federal statutes: Lacey Act, Magnuson-Stevens Fishery Conservation and Management Reorganization Act, Sustainable Fisheries Act, Marine Mammal Protection Act, Coastal Zone Management Act, Sustainable Fisheries Act, Endangered Species Act, National Environmental Policy Act, National Marine Sanctuaries Act, Northern Pacific Halibut Act. 2. State statutes: Alaska Administrative Code, Alaska Statutes. 3. Management Agencies: annual reports, committees meeting minutes, press releases (2019-2020). 4. Site visit (virtual): May 18, 2012 with IPHC official Ian Stewart. 5. Site visit (virtual): May 19, 2021 with AFDFG staff - Forrest Bowers, Andrew Olson, Jan Rumble. 6. Site visit (virtual): May 19, 2021 with AWT official - Lt. Jonathan Streifel. 7. Site visit (virtual): May 24, 2021 with NOAA ARO official - Mary Furuness. 8. Site visit (virtual): May 25, 2021 with NOAA FSC staff - Chris Lunsford, Kari Fenske, Dan Goethel and Cara Rodgveller.

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.**
	9. Site visit (virtual): May 27, 2021 with FVOA representative - Bob Alverson.
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 1 of the RFM Fishery Standard.

7.9.1.2 Fundamental Clause 2

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.**
Summary of relevant changes:	The Covid-19 pandemic required that management organizations and their subordinate bodies carry out their activities and decision-making processes in a virtual setting as required by public health directives. In some cases, a planned activity was either cancelled or re-scheduled. Nonetheless, the many web-posted documents examined by the Audit team are proof positive that the organizations and their committees were successful in adapting their processes and activities to a different reality all the while meeting the standards as prescribed in regulations or in policy and procedure guidelines. Users and stakeholders were equally able to continue their participation in the processes through different internet communications platforms. The operations of the main organizations continued to be guided by multi-year strategic plans that span their various programs, and by internal policies and practices that govern all aspects of their operations. There was no evidence to indicate that the decisions rendered in 2020 led to conflicts between users or others. All major agencies at the federal and state levels participate in the NEPA processes that are intended to manage coastal area resources in a transparent, responsible and sustainable manner.
References:	1. Management organizations and committees: various technical and scientific reports, meeting minutes, formal operational policies and practices (2019 and 2020). 2. Site visit (virtual): May 18, 2012 with IPHC official Ian Stewart. 3. Site visit (virtual): May 19, 2021 with AFDFG staff - Forrest Bowers, Andrew Olson, Jan Rumble. 4. Site visit (virtual): May 19, 2021 with AWT official - Lt. Jonathan Streifel. 5. Site visit (virtual): May 24, 2021 with NOAA ARO official - Mary Furuness. 6. Site visit (virtual): May 25, 2021 with NOAA FSC staff - Chris Lunsford, Kari Fenske, Dan Goethel and Cara Rodgveller. 7. Site visit (virtual): May 27, 2021 with FVOA representative - Bob Alverson.
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 2 of the RFM Fishery Standard.

7.9.1.3 Fundamental Clause 3

3.	**Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.**
Summary of relevant changes:	The management objectives attributed to Alaska's commercial sablefish fishery remained unchanged in 2020. Formal FMPs are in place for both the Northern Southeast Inside subdistrict (NSEI) and the Southern Southeast Inside subdistrict (SSEI). **State Waters - Northern Southeast Inside subdistrict:** Of note, there were two key advancements to the ABC determination process that were implemented for the 2020 NSEI sablefish assessment: - A new statistical catch-at-age model replaced past methodology that partitioned a mark–recapture abundance estimate to numbers-at-age using fishery age compositions; and

3.	Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.
	▪ A new management procedure was implemented that constrains the recommended ABC to a 15% annual maximum change to increase fishing stability and maximize catch. With these changes, the recommended 2020 ABC was 1,216,743 round lb (F_{ABC} = 0.0659), a 15% increase from the 2019 ABC. The increase in ABC is attributed to the large 2014 year class, which is estimated to be roughly 50% mature in 2020 and includes 27.5% of the forecasted female spawning stock biomass. The annual harvest objective was allocated to 75 limited entry Commercial Fisheries Entry Commission longline (C61A) permits through an equal quota share (EQS) system, resulting in a 2020 EQS of 14,773 round lb for each permit holder. Management measures in effect for the 2019 FMP were carried over to 2020 and included: (i) fisher registration and logbook requirements, (ii) sablefish possession and landing requirements, (iii) bycatch allowances for other species, (iv) specific prohibitions. **State Waters - Southern Southeast Inside subdistrict:** The 2020 SSEI sablefish commercial fishery annual harvest objective (AHO) was 572,639 round lb (a 3% reduction from the 2020 AHO) and was allocated among the 19 limited entry Commercial Fisheries Entry Commission (CFEC) longline/pot (C61C) and three pot (C91C) permits through an equal quota share (EQS) system, resulting in a 2020 EQS of 26,029 round pounds for each permit holder. Management measures in effect for the 2019 FMP were carried over to 2020, and included: (i) legal gear specifications, (ii) registration and logbook requirements, (iii) fish ticket requirements, (iv) possession and landing requirements, (v) bycatch allowances, and (vi) specific prohibitions. **Federal Groundfish FMP – Alaska EEZ** As is the past, sablefish FMPs are not stand-alone plans, rather they are a subset of annual multi-species integrated Groundfish FMPs. The status of groundfish stocks and federally-managed fisheries in the GOA and BSAI areas are summarized in annual stock assessment and fishery evaluation (SAFE) reports. Both FMPs have nearly an identical overarching management policy and a comprehensive set of objectives (45 for the GOA and 46 for the BSAI). Administrative and regulatory changes to the federal FMPs for the 2020 fishery included: <u>October 2019</u> ▪ Observer Program Draft 2020 Annual Deployment Plan and Observer Fee Analysis (for 2021) (NPFMC) <u>December 2019</u> ▪ BSAI Groundfish Specifications for 2020 and 2021 (NPFMC) ▪ GOA Groundfish Final Harvest Specifications for 2020 and 2021 (NPFMC) ▪ BSAI Halibut Abundance-based Management (NPFMC) ▪ Small Sablefish Discarding/Release (NPFMC) <u>February 2020</u> ▪ Amendment 118 to the FMP for the Groundfish of the Bering Sea and Aleutian Islands Management (NOAA) <u>March 2020</u> ▪ Fisheries of the Exclusive Economic Zone Off Alaska; Bering Sea and Aleutian Islands; Final 2020 and 2021 Harvest Specifications for Groundfish (NOAA) ▪ Season Opening of the Sablefish Fixed Gear Fisheries (NOAA) ▪ 2020 Groundfish Bycatch Regulations for State Waters and State Managed Groundfish taken in the Federal Commercial Halibut and Sablefish Fisheries in the Eastern Gulf of Alaska (ADFG) <u>May 2020</u> ▪ 2020 Southern Southeast Inside Subdistrict Sablefish Fishery Management Plan (ADFG) <u>June 2020</u> ▪ Prohibition against Retention of Non-CDQ Sablefish by Vessels Using Trawl Gear in the Bering Sea Subarea of the Bering Sea and Aleutian Islands (NOAA)

3.	Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.
	✚ 2020 Northern Southeast Inside (NSEI) Subdistrict Sablefish Fishery Annual Harvest Objective Announcement (ADFG) July 2020 ✚ Prohibition against Retention of Non-CDQ Sablefish by Vessels Using Trawl Gear in the Aleutian Islands subarea of the Bering Sea and Aleutian Islands (NOAA) ✚ Alaska Statewide Commercial Groundfish Regulations 2020-2021 (ADFG) August 2020 ✚ Prohibition against Retention of Sablefish by Vessels using Trawl Gear and not Participating in the Rockfish Program in the Central Regulatory Area of the Gulf of Alaska (NOAA)
References:	1. Observer Program Draft 2020 Annual Deployment Plan: https://www.npfmc.org/draftadp/ 2. Observer Fee Analysis (for 2021): https://www.npfmc.org/observer-fee-analysis-3/ 3. BSAI Groundfish Specifications for 2020 and 2021: https://www.npfmc.org/bsai-specs-2/ 4. GOA Groundfish Final Harvest Specifications for 2020 and 2021 https://www.npfmc.org/goa-specs-2/ 5. BSAI Halibut Abundance-based Management https://www.npfmc.org/halibutabmworkplan/ 6. Small Sablefish Discarding/Release https://www.npfmc.org/small-sablefish/ 7. Alaska NSEI sablefish FMP for 2020: https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1162363215.pdf 8. Alaska SSEI sablefish FMP for 2020: http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1150381833.pdf. 9. ADFG Statewide Commercial Groundfish Fishing Regulations, 2019-2020: https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf 10. Federal 2020 FMP for Groundfish of the GOA ; https://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf 11. Federal 2020 FMP for Groundfish of the BSAI: https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf 12. NSEI sablefish FMP for 2020: https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1162363215.pdf 13. SSEI sablefish FMP for 2020: http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1150381833.pdf https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2020.10.pdf 14. ADFG Statewide Commercial Groundfish Fishing Regulations, 2019-2020: https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf 15. 2020 Northern Southeast Inside (NSEI) Subdistrict Sablefish Fishery: Annual Harvest Objective Announcement: https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2020.05.pdf 16. Northern Southeast Inside Subdistrict Sablefish Management Plan and Stock Assessment for 2020 : https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2020.05.pdf
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 3 of the RFM Fishery Standard.

7.9.2 Section B. Science and Stock Assessment Activities

7.9.2.1 Fundamental Clause 4

4.	**There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**
Summary of relevant changes:	4.1 All fishery removals and mortality of the target stock(s) shall be considered by management. Data collection activities and the data developed are a critical part of the management of the stock management unit in the Federal waters off Alaska and state managed areas. No significant changes have occurred in the procedures to determine fishery removal and mortality of the target stock since the full assessment final report in January 2017. Monitoring of fishery removals and mortality of the target stock is considered by management in the quantitative statistical peer reviewed stock assessment and there is an effective monitoring system to collect these data. These systems include fishery-independent and fishery-dependent data collection activity. All data sources used in the stock assessment to inform management are outlined in the federal (NMFS) stock assessments and are disseminated on the ADF&G website. The scope of the sampling that is performed to determine fishery removals are outlined in the most recent assessment of the Sablefish Stocks in Alaska. Commercial fishery catch data are collected from fixed gear vessel that deploy longline, pot, and the relatively new 'slinky pot' designs, which target sablefish in the IFQ fishery. The time series of available commercial catch is from 1960 to the present. Catch from mobile gear (trawl) is also collected and the time series available is from 1960 to 2020. The catches used in most recent (2020) NMFS assessment represent total catch (landings plus bycatch or discards assuming 100% mortality) and include catches from minor State-managed fisheries in the northern GOA and in the AI region. Fisheries that retain bycatch of sablefish in other fisheries, such as those for rockfish andsole, are monitored and NMFS tracks in-season catches and IFQ balances. Commercial fishery landings are reported through two different data collection portals. The first is the "eLandings" system, an electronic fish ticket system. All catch data are required to be reported, including IFQ/CDQ sablefish and halibut. Each industry report submitted via eLandings is evaluated (quality control and quality assurance are performed) and entered along with observer data into the catch accounting system (CAS) maintained by NMFS. The CAS integrates observer and industry information to determine estimates of total catch. The CAS procedures complement the sampling procedures established under the observer program. Cahalan et al. (2014), Hanselman *et al.* (2018), and Goethel et al. (2020) provide details on the catch reporting and estimation processes of commercial sablefish catches. The second data collection mechanism in the commercial fishery is the Alaska Fisheries Information Network (AKFIN, https://akfin.psmfc.org/). This was established in 1997 in response to an increased need fordetailed, organized fishery information to aid decision-making by managers with the aims of consolidating, managing and dispensing information related to commercial fishing in Alaska. The AFKIN maintains a query able database of both state and federal commercial landings data for which is Alaska relevant to the needs of scientists and other users. Upon request, AKFIN provides that data in usable formats. AKFIN does not collect data but maintains this library comprised of data from agency sources that includes NMFS Alaska Region, NMFS Alaska Fisheries Science Center, and the Alaska Department of Fish and Game. By-catch in the directed sablefish fishery are recorded by observers, reported through the CAS, and presented in the annual stock assessments. The primary by-catch species in sablefish longline and pot fisheries include grenadier, halibut, rockfish, sharks, and flatfish. More information on bycatch species is contained in Clause 12.4 below. Removals from the recreational fishery are relatively minor for sablefish but have been increasing in recent years, primarily in state-managed waters. Total removals from activities other than the directed fishery have been between 239 and 359 t since 2006. These estimates represent a very small portion (1.5%) of the recommended ABC and are considered a low risk to the sablefish stock (Goethel et al. 2020).

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	The catches used in the 2020 assessment include catches from minor state-managed fisheries in the northern GOA and in the AI region. State fisheries catches averaged 180 t from 1995 - 1998, about 1% of the average total catch. Most of the catch (80%) is from the AI region. Catches from state areas that conduct their own assessments and set Guideline Harvest levels (e.g., Prince William Sound, Chatham Strait, and Clarence Strait), are not included in this assessment (Goethel et al. 2020). Catches from state areas that conduct their own assessments and set Guideline Harvest Levels (GHLs, e.g. Prince William Sound[1] ,Chatham_Strait[2] and Clarence Strait), are not included in the 2020 assessment. Three state fisheries are "limited entry" and are located in Prince William Sound, Chatham, and Clarence Strait. The Prince William Sound sablefish fishery is managed using a guideline harvest level (GHL) and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population (https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management). In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance. Sablefish are caught primarily with longline gear in Alaska; however, the Clarence Strait area has both a season for pot and longline gear. The Aleutian Islands state fishery allows longline, pot, jig, and hand troll gear, and one trawl vessel qualifies for the limited entry program in Prince William Sound. In federal waters, sablefish are primarily caught in directed fisheries on longline gear; however, an increasing trend toward pot gear exists due to whale depredation of sablefish on longline gear. In addition, sablefish are caught as bycatch in trawl fisheries. Information on the state fisheries in the Southeast Region (Chatham Strait and Clarence Strait), as well asthe Prince William Sound area, with comparisons to recent years, can be found in separate reports on the ADFG website. In addition to the removals by the fishery, the management system accounts for whale depredation (the predation of sperm and killer whales of fish from the longline fishery (and the longline survey). Two studies (one for the survey and one for the fishery) that provide estimates and methods for these adjustments are published (Peterson and Hanselman 2017; Hanselman et al. 2018). Depredation impacts are included in the stock assessment (Goethel et al. 2020). Killer whale depredation has been recorded by observers since 1995. Killer whales typically depredate on longline gear in the BS, AI, and WG areas and at low levels in the CG. These sets were excluded from catch rate analyses in the observer data set. The percent of sablefish directed sets that are depredated by killer whales is on average 12% in the BS, 2% in the AI, 3% in the WG, and 1% in the CG. Although the rate is high in the BS, the average number of sets observed is only 21. Likely because of this small sample size, the annual range in the rate of depredation is 3 - 26%. In the EBS, there were high depredation rates from 2000 - 2002 (19%), a decrease from 2003 - 2014 (7%), and then an increase to an average rate of 20% from 2015 - 2019. In the CG, 1% of sets were depredated by killer whales, which is average. Observers also record sperm whale depredation. However, determining if sperm whales are depredating can be subjective, because they do not take a majority of the catch like killer whales do. Sperm whale depredation has been recorded by observers since 2001. It is most prominent in the CG, WY, and EY/SE areas, and less common in the WG. The average percent of sets that are depredated is 6% in the CG and EY/SE areas and 7% in WY. In EY/SE there were high rates

[1] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.pws_groundfish_sablefish_harvest
[2] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.groundfish

4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
	mid-time series and then again in recent years (Figure below). In WY there have also been increases since 2012. 4.2 An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established. An extensive industry-funded cooperative on-board observer program[3] exists in Alaskan waters to cover various fisheries, including sablefish, and provide fishery catch, length- and age-composition. Beginning January 1, 2013, amendment 86 (BSAI) and amendment 76 (GOA) were added to the Federal Fisheries Regulations 50 CFR Part 679:Fisheries of the Exclusive Economic Zone Off Alaska. In compliance with the MSA, these amendments restructuredthe funding and deployment system for observers in the North Pacific groundfish and halibut fisheries and include some vessels less than 60 ft. in length, as well as halibut vessels in the North Pacific Groundfish Observer Program. Fishery information is available from longline sets that target sablefish in the IFQ fishery. Records of catch and effort for these vessels are collected by observers and by vessel captains in voluntary and required logbooks. Fishery data from the Observer Program is available since 1990. Logbooks are required for vessels over 60 feet beginning in 1999. Since 2000, a longline fishery catch rate index has been derived from observed sets and logbook data for use in the model and in apportionment calculations. Based on data from NMFS/AFSC/NPFMC, less than 2.5% of the sablefish catch since 2014 was taken by vessels < 40' LOA. The lack of observer coverage in this fishery sector is not a major data gap and does not pose a large risk. The NPFMC intends to integrate electronic monitoring (EM)[4] into the Observer Program for the fixed gear small-boat groundfish and halibut fisheries, so that EM may be used to collect data to be used in catch estimation (retained and discarded) for this fleet. A fixed gear EM Workgroup (EMWG) provides a forum forall stakeholders, including the commercial fishing industry, agencies, and EM service providers, to cooperatively and collaboratively design, test, and develop EM systems, consistent with NPFMC's goal to integrate EM into theObserver Program. In April 2018, the Council reconstituted membership on the EM Workgroup to reflect a transition from the development and recent implementation of EM for fixed gear, to a new focus on developing EM systems on trawl catcher vessels in the Bering Sea and Gulf of Alaska. At its June 2018 meeting[5], the Council received an update about fixed gear and trawl EM development from the Electronic Monitoring Workgroup (whichhas now been renamed the EM Committee) and endorsed preliminary monitoring objectives for trawl EM development. As part of the 2017 Annual Deployment Plan (ADP) and recognizing the challenging logistics of putting observerson small vessels, NMFS recommended that vessels less than 40' LOA be in the no selection pool for observer coverage but be considered for testing of electronic monitoring since NMFS has no data from this segment of thefleet. NMFS recommended continuing to allow hook-and-line and pot vessels <57.5 ft LOA, where taking an observer is problematic, an opportunity to 'opt-in' to the EM selection pool to participate in the EM cooperativeresearch under the 2017 EM pre-implementation plan developed by the EM workgroup. NMFS also recommended that vessels participating in the EM

[3] https://www.npfmc.org/electronic-monitoring-3/
[4] https://www.npfmc.org/observer-program/
[5] https://www.npfmc.org/electronic-monitoring-3/

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	selection pool be required to log trips in Observer Declare andDeployment System (ODDS[6]). This will improve the ability of NMFS to determine which vessels are in the EM selection pool, when they are fishing, and provides a necessary compliance monitoring tool. From information inthe 2017 Annual Observer Report (AFSC 2018), EM data was collected on a total of 143 trips from various fisheriesin 2017. Ninety-seven longline and 15 pot vessels participated in the 2018 EM project, completing 250 longline trips and 45 pot trips. EM data was reviewed for 83 longline vessels covering 174 trips. EM data was reviewed for 70 sablefish trips and the data spanned 435 sablefish sea days. There is still no monitoring data from vessels less than 40 ft. NMFS does continue to recommend that vessels lessthan 40 ft LOA could be considered for the EM selection pool in the future. NMFS recognizes that the Council's priority for EM research is on trawl vessels, so it is unknown when the evaluation of data collected on fixed-gear less than 40 ft will start. <u>4.3 Management entities shall make data available in a timely manner and in an agreed format in accordance withagreed procedures.</u> NPFMC has substantial information on management of sablefish in Alaskan waters. These data are made widely available throughout the year to allowfor timely resource management, such as quota setting; through the agency websites, publications and at variouspublic meetings. Data on certain aspects of commercial fishing are confidential, such as individuals or individual vessels in the analysis of fishery CPUE data, depending on the number of individuals or entities involved[7], consistent with the information confidentiality policies of NMFS. The Commercial Fisheries Entry Commission[862] is the designated records manager for ADFG fish ticket records. Fish ticket records are retained by the Commission for 45 years, and are confidential as defined by AS 16.05.815 and 16.40.155. <u>4.4/4.5. States shall stimulate the research required to support national policies related to fish as food and collectsufficient knowledge of social, economic and institutional factors relevant to the fishery in question to support policy formulation.</u> State and national policies regarding seafood are guided by the Alaska Seafood Marketing Institute (ASMI), U.S. Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and the U.S. National Institute of Health (NIH). ASMI is the state agency primarily responsible for increasing the economic value of Alaskan seafoodthrough marketing programs, quality assurance, industry training and sustainability certification. ASMI's role includes conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state[9]. Through the University of Alaska Fairbanks, the state of Alaskaalso operates the Kodiak Seafood and Marine Science Center[10], which directs research efforts in several fields, including seafood processing technology, and seafood quality and safety. Socio-economic data collection and economic analyses are required to varying degrees under the Regulatory Flexibility Act (RFA), the MSA, the NEPA, the Endangered Species Act, and other applicable laws. AFSC's Economicand Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska (Fissel *et al.* 2018)[11]. This comprehensive report provides

[6] https://chum.afsc.noaa.gov:7104/apex/f?p=140
[7] https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/BSAIsablefish.pdf
[8] https://www.cfec.state.ak.us/
[9] http://www.alaskaseafood.org/quality/
[10] https://www.uaf.edu/sfos/about-us/locations/kodiak/about-ksmsc/
[11] https://www.afsc.noaa.gov/refm/stocks/plan_team/2018/economic.pdf

4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
	estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, values of catch and resulting food products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, and employmenton at-sea processors. The report contains a wide range of analyses and comments on the performance of a rangeof indices for different sectors of the North Pacific fisheries, including sablefish, and relates changes in value, price, and quantity, across species, product and gear types, to changes in the market. 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. The sablefish fisheries in Alaska are well established and any original knowledge and technologies have been partof the evolution of the mature fisheries. Virtually all data from the state and federally managed sablefish fisheriesare included in the stock assessments (Hanselman *et al.,* 2018). There is minimal recreational, personal use, or subsistence fishing for sablefish in Alaskan waters, and all estimates are included in the catch data. At the 2012 Alaska BOF meeting, a regulation was passed to require personal use and subsistence use sablefish permits, and at the 2015 BOF meeting, limits were defined for personal use sablefish fisheries for the number of fish, number of permits per vessel, and number of hooks. No changes were made to sablefish subsistence fisheriesin 2015[12]. Southeast sablefish subsistence and personal use fishing permits for 2017 were available from May 2017[13]. 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. Data from the annual setline survey conducted by IPHC, using commercial vessels from USA and Canada, are considered in the annual sablefish assessments. In 2018 the survey encompassed both nearshore and offshore waters of southern Oregon, Washington, British Columbia, southeast Alaska, the central and western Gulf of Alaska, Aleutian Islands, and the Bering Sea continental shelf[14]. Thus, only the waters under jurisdiction of USA and Canada were surveyed. Survey activities were compliant with all laws and regulations of those countries, registered commercial halibut vessels were chartered, and all catches in the survey were recorded and reported. Other scientific surveys used directly, or considered, in the sablefish stock assessments include NMFS annual setline and trawl surveys in GOA and BSAI, surveys by ADF&G in state waters, and a trap survey by DFO (Canada)in British Columbia. None of these surveys cross any international boundaries (Webster , 2018)[15]. 4.8 States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas. As this stock of sablefish is not distributed in high seas areas, there is no research conducted in those waters. Sharing of sablefish information between Canada and USA, for research carried out in their EEZs, is accomplishedthrough the stock assessment process, e.g. results from the stratified random trap surveys conducted in Canadianwaters by DFO are available to NMFS scientists and included in

[12] http://www.psmfc.org/tsc-drafts/2017/ADFG_2017_AK_TSC_Alaska_FINAL.pdf
[13] Southeast Sablefish Subsistence And Personal Use Fishing Permit And Harvest Reporting Available Online
[14] https://iphc.int/uploads/pdf/im/2018im/iphc-2018-im094-07.pdf
[15] Ibid.

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	the annual SAFE stock assessment reports. 4.9/4.10/4.11. States shall promote and enhance the research capacities of developing countries, support (upon request) States engaged in research investigations aimed at evaluating stocks which have been previously un- fished or very lightly fished. Not applicable for this fishery.
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 4 of the RFM Fishery Standard.

7.9.2.2 Fundamental Clause 5

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.
Summary of relevant changes:	5.1 States shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science. The research shall be disseminated accordingly. States shall also ensure the availability of research facilities and provide appropriate training, staffing and institution building to conduct the research, taking into account the special needs of developing countries. The mission of the NMFS/AFSC is to conduct scientific research to generate scientific data and analysis for understanding, managing, and sustaining living marine resources. Appropriate and directed research is conducted for the management of sablefish in Alaska waters. NMFS and ADFG conduct surveys on sablefish in Alaskan waters. The NMFS conducts an annual longline survey and a biennial trawlsurvey in the GOA and the Aleutian Islands (alternating years between the two regions), and an annual trawl survey in the Eastern Bering Sea and ADFG performs annual longline surveys in Chatham and Clarence Strait. Thesesurveys provide estimates of CPUE, relative abundance, and biological data. In addition, tagging studies exist to study sablefish movement for federal, state, and Canadian waters. The ADFG conducts an annual tagging survey in Chatham Strait as part of a mark-recapture study to estimate population abundance. The mark-recapture data is used to determine an annual relative abundance index and to understand movement dynamics. In the 2020 sablefish stock assessment there were no changes in the assessment methodology (Goethel *et al.,*2020). The primary developments are changes in the input data and some changes in the assessment methodology. Changes to the input data include relative abundance and length data from the 2020 longline survey, relative abundance and length data from the fixed gear fishery for 2019, length data from the trawl fisheries for 2019, age data from the longline survey and fixed gear fishery for 2019, updated catch for 2019, and projected 2020 - 2022 catches. Estimates of killer and sperm whale depredation in the fishery were updated and projected for 2020 - 2022. In 2020, there was not a NMFS Gulf of Alaska trawl survey. There were **no changes to the Assessment Methodology in the 2020 assessment.** However, there is an authors' recommended ABC that is lower than maximum permissible based on the risk table approach utilized previously and updated. These recommendations are consistent with the current understanding of the biology, ecology, environmental science, and social science. Full, publicly available descriptions of the data series and stock assessment methodology are provided in the 2020 SAFE document (Goethel *et al.,* 2020). The 2020 SAFE continues to include the standard Ecosystem Considerations section, along with a new Ecosystem and Socioeconomic Profile (ESP) which highlights specific ecosystem indicators that may help explain variability in thestock assessment, particularly recruitment.

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.**	
		In addition to the annual stock assessment and its related/supporting work, extensive research is ongoingin Alaskan waters which have relevance for the sablefish stock and Alaskan ecosystems. This work includes **North Pacific Research Board (NPRB)**[16] The NPFB conducts research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean prioritizing on research efforts designed to address pressing fishery management or marine ecosystem information needs. **Bering Sea Integrated Ecosystem Research Program**[17] is a $52 million partnership between the NPRB and the National Science Foundation (NSF) that seeks to understand the impacts of climate change and dynamic sea ice cover on the eastern Bering Sea ecosystem. More than one hundred scientists are engaged in field research and ecosystem modelling to link climate, physical oceanography, plankton, fishes, seabirds, marine mammals, humans,traditional knowledge and economic outcomes to better understand the mechanisms that sustain this highly productive region. **The Gulf of Alaska Integrated Ecosystem Research Project (IERP)**[18] is a program of the NPRB that seeks to understand how environmental and anthropogenic processes, including climate change, affect trophic levels anddynamic linkages among trophic levels, with emphasis on fish and fisheries, marine mammals, and seabirds withinthe GOA. Implementation of the GOA IERP is structured around four separately completed components which willlink together to form a fully integrated ecosystem study in the Gulf of Alaska. The four components of this programare Upper Trophic Level, Forage Base, Lower Trophic Level and Physical Oceanography, and Ecosystem Modelling. **The Alaska Climate Integrated Modelling (ACLIM) project**[19] is a collaboration of diverse researchers aimed at giving decision makers critical information regarding the far-reaching impacts of environmental changes in the Bering Sea. To better predict and respond to future changes, the ACLIM project will develop cutting-edge and multi-disciplinary models. The models will consist of alternative climate scenarios and the associated estimates ofpotential impacts or benefits to people, industry and the Bering Sea ecosystem. The ACLIM team has 19 members and includes oceanographers, ecosystem modelers, socioeconomic researchers and fishery management experts from NOAA Alaska Fisheries Science Center, NOAA Pacific Marine Environmental Laboratory, the University of Washington Joint Institute for the Study of Atmosphere and Ocean (JISAO) and School of Aquatic and Fishery Sciences (SAFS) and the Norwegian Institute for Water Research (NIVA). **PISCES** The North Pacific Marine Science Organization (PISCES) is an intergovernmental scientific organization, established in 1992 to promote and coordinate marine research in the northern North Pacific and adjacent seas. Its present members are Canada, Japan, People's Republic of China, Republic of Korea, the Russian Federation, and the United States of America. Its scientific program named FUTURE[20] (Forecasting and Understanding Trends,Uncertainty and Responses of North Pacific Marine Ecosystems) is an integrative program undertaken by the member nations and affiliates of PICES to understand how marine ecosystems in the North Pacific respond to climate change and

[16] http://www.nprb.org/
[17] http://www.nprb.org/bering-sea-project
[18] http://gulfofalaska.nprb.org/
[19] https://www.afsc.noaa.gov/REFM/REEM/ACLIM.htm
[20] http://meetings.pices.int/Members/Scientific-Programs/FUTURE

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.
	human activities. As part of IPHC's annual setline survey, which provides data for the sablefish assessment, IPHC conducts an extensive oceanographic monitoring program which includes waters off British Columbia, and into the Gulf of Alaska, Bering Sea, and Aleutian Islands (Sadorus and Walker, 2017). The IPHC is collaborating with the Joint Institute for the Study of the Atmosphere and Ocean (JISAO) at the University of Washington and NOAA's Pacific Marine Environmental Laboratory to process the oceanographic data and make them publicly accessible, and a number of years of data up to 2014 are currently available[21]. Also, the Pacific States Marine Fisheries Commission[22] coordinates research activities, monitors fishing activities, collects and maintains databases on marine fish occurring off the California, Oregon, Washington, and Alaska coasts. Another major ecosystem research report is the AFSC Ecosystem Consideration Report series[23]. The Ecosystem Considerations reports are produced annually to compile and summarize information about the status of the Alaska marine ecosystems for the North Pacific Fishery Management Council, the scientific community, and the public. As of 2018, there are separate reports for the Eastern Bering Sea (EBS), Aleutian Islands (AI), the Gulf of Alaska (GOA), and Arctic (forthcoming) ecosystems. These reports include ecosystem assessments, and ecosystem-based management indicators that together provide context for ecosystem-based fisheries management in Alaska. In 2016, NPFMC appointed 12 people to a Plan Team to begin developing the Council's Bering Sea Fishery Ecosystem Plan (FEP). The Team's primary responsibilities were to develop the core FEP document, to discuss potential and ongoing FEP action modules, make recommendations to the Ecosystem Committee and the Council about future steps, and to help communicate results to the Council. While the team is a scientific and technical team, the focus is also to ensure that FEP action modules interface with the Council's management needs, and can be integrated into the Council's decision making and management process. In December 2018 NPFMC adopted the Bering Sea Fishery Ecosystem Plan (FEP)[24]. The Bering Sea FEP establishes a framework for the Council's continued progress towards ecosystem-based fishery management (EBFM) of the Bering Sea fisheries, and relies and builds on the Council's existing processes, advisory groups, and management practice. The Council noted that adoption of the FEP represents a major milestone in what has been a multi-year process to develop this FEP. The FEP builds from the Council's Ecosystem Vision Statement, adopted in 2014, and is a continued commitment by this Council to use the best science to sustainably manage fisheries using a precautionary, transparent and inclusive process. The BSFEP document identifies management goals and objectives for the FEP and for monitoring of the Bering Sea ecosystem, and describes how the FEP framework will support research projects (Action Modules) to address Council priorities. The Council also adopted the five action modules included in the draft, and initiated action on two of them. For year 2019, NPFMC staff will work with

[21] https://www.ecofoci.noaa.gov/projects/IPHC/efoci_IPHCData.shtml
[22] http://psmfc.org
[23] https://access.afsc.noaa.gov/reem/ecoweb/
[24] https://access.afsc.noaa.gov/reem/ecoweb/

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	the BS FEP Team to bring back workplans for how to manage the workload associated with the initiated modules. The two action modules for the Council to work on are: • Develop protocols for using Local Knowledge and Traditional Knowledge in management and understanding impacts of Council decisions on subsistence use. • Evaluate the short- and long-term effects of climate change on fish and fisheries. Regarding socio-economic data collection, AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish fisheries in Alaska. This comprehensive report (Fissel, et. al., 2018) provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch(PSC) and PSC discards rates, values of catch and resulting food products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, and employment on at-sea processors. The report contains a wide range of analyses and comments on the performance of a range of indices for different sectors of the North Pacific fisheries, and relates changes in value, price, and quantity, across species, product and gear types, to changes in the market. This report includes extensive economic data for the commercial sablefish fishery. Various studies have been conducted on the economic value of sportfishing in Alaska (e.g. Lew et al. 2015), which include sablefish, although sablefish is not a major target species for sport fishing. The Alaska Seafood Marketing Institute has contracted studies to determine the value of Alaska's seafood industry, and the University of Alaska, Institute of Social and Economic Research conducts research on the economics of various Alaskan fisheries. Since 2002 IPHC has been working cooperatively with the Alaska Department of Environmental Conservation (ADEC) in a project monitoring environmental contaminants in Alaskan fish. The fish being studied include sablefish, and these are analyzed for organochlorine pesticides, dioxins, furans, polybrominated diphenyl ethers, PCB congeners, methyl mercury and heavy metals (arsenic, selenium, lead, cadmium, nickel, and chromium). The Oil Spill Recovery Institute (OSRI) was established by US Congress in response to the 1989 Exxon Valdez oil spill. OSRI is administered through and housed at the Prince William Sound Science Center, a non-profit research and education organization located in Cordova, AK. The PWS Science Center facilitates and encourages ecosystem studies in the Greater Prince William Sound region. OSRI produces an annual report[25], among other publications. The 2017 report contains details on their activities, including ongoing research projects, an update of field guide for oil spill response in arctic waters, and shore-zone mapping of the eastern Aleutian Islands. <u>5.2 The state of the stocks under management jurisdiction, including the impacts of ecosystem changes resultingfrom fishing pressure, pollution or habitat alteration shall be monitored.</u> The NMFS, ADFG, and University of Alaska maintain established and funded research programs to monitor the state of the sablefish stocks and effects of fishing, pollution, habitat alteration and climate change. These programs are described in Clause 5.1 above. Alaska's sablefish stock assessment programs (NMFS, ADF&G) are robust, extensive, and comprehensive. The process to determine the stock removals used in the assessment and

[25] http://www.pws-osri.org/wp-content/uploads/2018/03/FY17-Annual-report.pdf

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.**	
		management considerations is explained in Clause 4.1.Research capacity in environmental science is also discussed in Clause 5.1. The program to determine reference points and evaluate the stock against these in a precautionary approach is described in Clauses 6.1, 6.2 and 6.3. Additional information on ecosystem aspects of the stock and fishery is contained in Clause 12. The state of the sablefish stock is monitored mainly through survey and the resulting patterns are evaluated in the context of peer-reviewed stock assessment which is comprised primarily of an age-structured statistical model. The 2020 stock assessment (Goethel et al. 2020) reported that the longline survey abundance index (relative population numbers, RPNs) increased 32% from 2019 to 2020 following a 47% increase in 2019 from 2018. Similarly, the trawl survey biomass was at a time series low in 2013, but has more than tripled since that time. The fishery catch-rate (CPUE) index was at the time series low in 2018, but increased 20% in 2019. The age and length composition data continue to indicate strong year classes in 2014, 2016, and a potentially strong, albeit highly uncertain, 2017 year class. NOAA identifies habitats essential for managed species and conserves habitats from adverse effects on those habitats. These habitats are termed “Essential Fish Habitat” or EFH, and are defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”. NMFS and NPFMC must describe and identify EFH in fishery management plans (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. Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS, and NMFS must provide conservation recommendations to federal and state agencies regarding actions that would adversely affect EFH. More specific information on EFH and recent activities pertaining to this are described in Clause 12 below. Ecosystem considerations for Alaska sablefish are available from the yearly SAFE and addressed in Clause 12.1. The Alaska Department of Fish and Game (ADF&G) evaluates stock status and establishes the SSEI AHO using commercial fishery and survey catch per unit effort (CPUE) data, fishery and survey biological data (age, weight, length, and maturity), and stock status trends of sablefish populations in surrounding geographic areas. For state-managed fisheries, ADF&G has a well-developed research capacity[26] and conducts stock assessments in State waters to determine safe harvest levels. In 1988, the department began annual longline research surveys in both Southeast inside sub-districts where the majority of state fleet fishing effort is focused, in order to assess the relative abundance of sablefish over time and differing environmental conditions. Biological data is also collected during the surveys and ADF&G has standardized its survey methods with the NMFS longline survey. These data are presented and reviewed as part of the overall annual sablefish assessment process, and ADF&G scientists participate in the NPFMC Plan Team. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For the Clarence and Chatham Strait fisheries (Southeast Inside areas) an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which is based, in part, on estimates from mark-recaptured individuals. ADF&G arranges public meetings to present and discuss the scientific findings on these sablefish management areas.

[26] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/12612813340.pdf

5.	**There shall be regular stock assessment activities appropriate for the fishery, its range, the species biology and the ecosystem, undertaken in accordance with acknowledged scientific standards to support its optimum utilization.**
	The following summarizes stock indices in SSEI and adjacent waters for recent years[27]: • The 2021 Southern Southeast Inside (SSEI) Subdistrict sablefish commercial annual harvest objective (AHO) is 601,271 round pounds, a 5% increase from the 2020 AHO. Positive indicators for sablefish in SSEI include increases in both the longline survey and fishery CPUE indices from 2019 to 2020 and continued recruitment from the 2014, 2016, and potentially 2017 age classes 5.3 Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources. The only two nations involved in the sablefish fishery in the eastern North Pacific are Canada and the United Statesof America. The resources in each nation's waters are managed separately, and each nation conducts surveys thatoccur in adjacent geographical areas, as well as a survey conducted by IPHC that covers areas in the EEZs of bothcountries. Japan and USA conducted cooperative longline surveys from 1978 to 1994, these data are used in the current stock assessment as an index of abundance. There is cooperation on various aspects of research, stock assessment, and management between the fisheries agencies (e.g. DFO and NMFS) of USA and Canada[28]. 5.4The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programmes to improve understanding of the biology, environment and status of trans-boundary aquatic stocks. The main transboundary issues for the Alaskan sablefish stock are between Canada and USA. Both countries have extensive scientific programs for research and assessment, and collaborate on numerous topics related to sablefish science and management. Data from the DFO sablefish surveys in B.C. waters are considered in the NMFS/NPFMC assessment process and SAFE document. The similarly low abundance (through 2014) south of Alaska is of concern, and points to the need to better understand the contribution to Alaska sablefish productivityfrom B.C. sablefish. Some potential ideas which have been discussed are to conduct an area-wide study of sablefish tag recoveries, and to attempt to model the population to include B.C. sablefish and U.S. West Coast sablefish[29]. Recent data from Canadian surveys in BC waters have shown an increase in sablefish abundance and biomass. 5.6 Data generated by research shall be analysed and the results of such analyses published in a way that ensuresconfidentiality is respected, where appropriate. Data collected by scientific surveys and sablefish fisheries are analysed and presented in peer-reviewed meetings and in primary literature, following rigorous scientific protocols. These have been described extensively in previous Clauses. Results of these analyses are disseminated in a timely fashion through numerous methods, including scientific publications, and as information on NMFS, ADFG, and NPFMC websites, in order to contributehigher transparency to fisheries conservation and management. Confidentiality of individuals or individual vessels(e.g. in the analysis of fishery CPUE data) is fully respected where necessary. By Alaska Statute (16.05.815 Confidential Nature of Certain Reports and Records)[30], except for certain circumstances, all records obtained by the state concerning the landing of fish, shellfish, or fishery products and annual statistical reports of

[27] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1261281340.pdf
[28] https://www.afsc.noaa.gov/REFM/Docs/2017/GOAsablefish.pdf
[29] https://www.afsc.noaa.gov/REFM/Docs/2017/GOAsablefish.pdf
[30] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section815.htm

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.
	fishermen, buyers, and processors may not be released. To ensure confidentiality, fishery data are routinely redacted from ADFG reports if the data for a time/area stratum were obtained from a small number of participants.
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 5 of the RFM Fishery Standard.

7.9.3 Section C. The Precautionary Approach

7.9.3.1 Fundamental Clause 6

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.
Summary of relevant changes:	6.1/6.2/6.3/6.4 States shall determine for the stock both safe targets for management (Target Reference Points) and limits for exploitation (Limit Reference Points), shall measure the status of the stock against these reference points and agree to actions to be undertaken if reference points are exceeded. No significant change in the assessment methodology occurred in 2020, or in the reference point definitions used to manage the fishery. The NPFMC harvest control system is complex and multi-faceted in order to address issues related to sustainability, legislative mandates, and quality of information. The NPFMC tier system[31] specifies the maximum permissible Allowable Biological Catch (ABC) and the Overfishing Limit (OFL). The BSAI and GOA groundfish fishery management plans have pre-defined harvest control rules that define a series of target and limit reference points for sablefish and other groundfish covered by these plans. Each SAFE report describes the current fishing mortality rate, and stock biomass relative to the target and limit reference points. In the NPFMC tier system, the sablefish stock in Alaska is currently managed under Tier 3. Stocks in tier 3 are further categorized as (a), (b), or (c) based on the relationship between biomass, B40%, and a lower value B/B40% <= .05, with (3a) indicating a stock where biomass is above B40%, (3b) indicating a stock where biomass is below B40% but above the lower value, and (3c) indicating a stock where biomass is at or below the lower value. The category assigned to a stock determines the method used to calculate ABC and OFL. The harvest control rule is biomass-based, for which fishing mortality is constant when biomass is above the B40% target and declines linearly down to a threshold value when biomass drops below the target, consistent with the precautionary approach. The rule used to determine the ABC is applied in exactly the same manner, i.e.based on a harvest control rule triggered by targets and limits. If the stock is in Tier 3c, FOFL and maxFABC are set to zero. Note that the MSST threshold used to determine if a stock is overfished is a different reference point than those used in the NPFMC tier system. The following section on stock rebuilding is from the NPFMC FMP for GOA Groundfish*: Within two years of such time as a stock or stock complex is determined to be overfished, an FMP amendment or regulations will be designedand implemented to rebuild the stock or stock complex to the MSY level within a time period specified at Section 304(e)(4) of the Magnuson-Stevens Act. If a stock is determined to be in an overfished condition, a rebuilding planwould be developed and implemented*

[31] http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf

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.**	
		for the stock, including the determination of an FOFL and FMSY that will rebuild the stock within an appropriate time frame. Sablefish are managed under Tier 3 of the NPFMC harvest control rules. Reference points are calculated using the mean size of the 1977 – 2016 year classes. The updated point estimate of *B40%,* is 126,389 t. Since projected female spawning biomass (combined areas) for 2021 is 134,401 t (6% higher than *B40%*, or equivalent to *B42%*), sablefish is in sub-tier "a" of Tier 3. The updated point estimates of *F40%* and *F35%* from this assessment are 0.100 and 0.117, respectively. Thus, the maximum permissible value of *FABC* under Tier 3a is 0.100, which translates into a 2021 maximum permissible ABC (combined areas) of 52,427 t. The OFL fishing mortality rate is 0.117, which translates into a 2021 OFL (combined areas) of 61,319 t. Biomass-based reference points have increased by 20% from 2019. The main factor driving these changes is the incorporation of the strong 2016 year class in the calculation of reference points for 2020, which was not incorporated in the 2019 estimate of average recruitment. It is likely that a similar pattern will occur in the next assessment, because the 2017 year class is estimated to be large, which will further increase the average recruitment used to determine reference points. Thus, relative stock status estimated in the model year 2021 stock assessment will likely decline due to further increases in the *B40%* reference point. Model projections indicated that this stock ***is not subject to overfishing, overfished, nor approaching an overfished condition***. **Instead of maximum permissible ABC, the NMFS stock assessment team recommended that the 2021 ABC be held at the 2020 specified ABC of 22,551 t, which is a 57% reduction from maximum ABC. The final whale-adjusted 2021 ABC of 22,237 t is 1% higher than the 2020 whale-adjusted ABC of 22,009 t. The recommended ABC represents a 3,250 t (17%) increase from the author recommended 2020 ABC in 2019, and an 88% increase in the ABC since 2016 when the lowest ABC on record (11,795 t) was enacted.** The maximum permissible ABC for 2021 is 52,427 t, which represents a 19% increase from the 2020 maximum permissible ABC of 44,065 t projected by the 2019 assessment. However, this represents a smaller increase in the maximum permissible 2021 ABC compared to the 28% increase projected by the 2019 assessment from 2020 to 2021 (i.e., the 2019 assessment projected a 2021 ABC of 56,589 t). Goethel et al. (2020) recommended ABCs for 2021 and 2022 are lower than maximum permissible ABC. For state-managed sablefish fisheries, the Cook Inlet, Prince William Sound, and the Aleutian Islands state fisheries have guideline harvest limits (GHL) and are managed using NMFS assessment data (and therefore federal reference points), historical catches and effort, projected catch and effort, and a yield-per- unit-area model, among other parameters. The 2021 Southern Southeast Inside (SSEI) Subdistrict sablefish commercial annual harvest objective (AHO) is 601,271 round pounds, a 5% increase from the 2020 AHO. Equal quota share (EQS) for each of the 22 permit holders will be 27,330 round pounds[32]. The 2021 Northern Southeast Inside (NSEI) Subdistrict commercial sablefish fishery annual harvest objective (AHO) is 1,136,685 round pounds. There are 75 valid Commercial Fisheries Entry Commission (CFEC) permits for 2021, which is the same number of permits as in 2020. The individual

[32] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1261281340.pdf

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.**
	equal quota share (EQS) is 15,156 round pounds, a 2.6% increase from the 2020 EQS of 14,773 round pounds[33]. Although there is not a full suite of reference points for these state-managed sablefish resources, the fisheries continue to be well managed, with recent catches often being less than the specified GHLs.
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 6 of the RFM Fishery Standard.

7.9.3.2 Fundamental Clause 7

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.**
Summary of relevant changes:	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. No significant change has occurred since the 3rd surveillance assessment in 2019. The first element of the precautionary approach applied in Alaska is the Optimum Yield (OY) for the groundfish complexes in the BSAI[34] and the GOA[35], as a range of values. The sum of the TACs of all groundfish species (except Pacific halibut, and including sablefish) is required to fall within the range. The second element of precautionary approach is the Tiersystem, based on knowledge and uncertainties of the stock in question. Sablefish harvest specifications are made annually by NPFMC, and include the Overfishing Level (OFL), acceptable biological catch (ABC), and total allowable catch (TAC). TACs are generally set more conservatively than ABCs, which in turn are generally set more conservatively than OFLs. Since OFLs are consistent with MSY and catches are generally within TAC levels, harvests tend to always be at the conservative side of MSY. As can be seen below,recent catches of Alaska sablefish have been well within recommendations, indicating that the harvest control rules continues to work well and within precautionary set limits. In addition to this, the NPFMC FMPs, last updated in October 2018, 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 MSYconsiderations. The Tier system specifies the maximum permissible ABC and the OFL for each stock in the complex(usually individual species but sometimes species groups). The overall objectives of the GOA and BSAI FMPs is consistent with preventing overfishing and optimizing the yield from the fishery through the promotion of conservative harvest levels while considering as well as addressing the differing levels of uncertainty[36]. Both FMPscontain the Council's Groundfish Management Policy "to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than re-actively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations."

[33] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1269953262.pdf
[34] https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
[35] https://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
[36] https://www.npfmc.org/bering-seaaleutian-islands-groundfish/

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.**
	According to the Tier system, Sablefish in Alaska is managed under Tier 3, sub Tier "b" of NPFMC harvest rules[37].Reference points are calculated using recruitments from 1977-2014. The updated point estimates of F40%, and F35% from the 2018 assessment are 0.099, and 0.117, respectively, but Tier 3b uses the control rule to adjust these values downward. Model projections indicate that this stock is not subject to overfishing, overfished, nor approaching an overfished condition. The 2017 assessment projected a 41% increase in ABC for 2019 from 2018. Instead of the maximum permissible ABC, stock assessment scientists applied the precautionary approach and recommended the 2019 ABC to be equalto the 2018 ABC[38], which translates to a 45% downward adjustment from max ABC. They also recommended ABCsfor 2019 and 2020 to be set lower than maximum permissible ABC for several important reasons that are examined in the new SSC-endorsed risk-matrix approach for ABC reductions. First, the 2014 year class is estimatedto be 2 times higher than any other year class observed in the current recruitment regime (1977 – 2014). Tier 3 stocks have no explicit method to incorporate the uncertainty of this extremely large year class into harvest recommendations. While there are clearly positive signs of strong incoming recruitment, there are concerns regarding the lack of older fish and spawning biomass, the uncertainty surrounding the estimate of the strength of the 2014 year class (i.e., 7.5x average), and the uncertainty about the environmental conditions that may affectthe success of the 2014 year class in the future. These concerns warrant additional caution when recommendingthe 2019 and 2020 ABCs. At the time the Federal Government began the IFQ program, the State established two minor fisheries in Cook Inlet and the Aleutian Islands, so that open-access fisheries were available to fishermen that were not allowed toparticipate in the IFQ program. Three major state fisheries exist which are limited entry and are located in PrinceWilliam Sound, Chatham, and Clarence Strait[39]. The Prince William Sound sablefish fishery is managed using a GHLand derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance. A mark–recapture project was conducted in 2018 in the Northern Southeast Inside (NSEI) Subdistrict (Chatham Strait) and provided a point estimate of abundance. This estimate was used to forecast abundance and biomass for the 2019 fishery using updated biological data from the fishery and longline survey[40]. The harvest rate was alsorecalculated using updated biological information. As in previous years, an F50% biological reference point was used for calculating the 2019 ABC, resulting in a harvest rate of 6.32% (the harvest rate in 2018 was 6.35%). The 2019 ABC (1,058,037 round pounds) increased 9.6% relative to the 2018 ABC (965,354 round pounds). Large year classes of sablefish from 2013 and 2014 have been recruiting to the fishery and surrounding geographic areas with signs of improvement observed since 2016. The 2019 Southern Southeast Inside (SSEI) Subdistrict (Clarence Strait) sablefish commercial annual

[37] https://www.fisheries.noaa.gov/resource/data/2018-assessment-sablefish-stock-alaska
[38] https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/BSAIsablefish.pdf
[39] https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
[40] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1037467075.pdf

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.**
	harvest objective (AHO) is 590,349 round lb, a 2% increase from the 2018 AHO[41]. For 2019, the SSEI AHO was raised 2% due to continued increases in the longline survey CPUE index, signs of continued recruitment in length and age class distributions in the survey and fishery, introduction of escape rings for pot gear to reduce harvest of immature individuals and increasing trends in sablefish biomass from adjacent areas including the GOA, BC, and the NSEI Subdistrict. The PWS harvest has been well within GHL in all recent years, as per data from ADFG[42]. In 2018 the GHL was 133,000 lbs with harvest of 88,117 lbs, in 2017 the GHL was 117,000 lbs with harvest of 73,113 lbs, in 2016 the GHL was 105,000 lbs with harvest of 40,457 lbs, and in 2015 the GHL was 122,000 lbs with harvest of 16,910 lbs. Minor fisheries for sablefish include the Aleutian Islands state fishery, which allows longline, pot, jig, and hand troll gear, and one trawl vessel qualifies for the limited entry program in Prince William Sound, and the Cook inlet fishery. The catches used in federal 2018 sablefish SAFE report include catches from minor State-managed fisheries in the northern GOA (Cook Inlet) and in the AI region because fish caught in these State waters are reported using the area code of the adjacent Federal waters in the Alaska Regional Office catch reporting system. Catches from state areas that conduct their own assessments and set Guideline Harvest levels (e.g., Prince William Sound, Chatham Strait, and Clarence Strait), are not included in the 2018 federal assessment[43]. State fisheries for sablefish, like the federal counterpart, also appear to be managed conservatively using precautionary measures.
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 7 of the RFM Fishery Standard.

7.9.4 Section D. Management Measures

7.9.4.1 Fundamental Clause 8

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.**
Summary of relevant changes:	8.1. Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization and be based on verifiable and objective scientific and/or traditional sources. In the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact shall be considered. The Magnuson-Stevens Fishery Conservation and Management Act (MSA)[44] is the primary domestic legislation governing management of US marine fisheries. The act establishes MSY as the basis for fishery management and requires that: the fishing mortality rate does not jeopardize the capacity of

[41] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1029668426.pdf
[42] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.pws_groundfish_sablefish_harvest
[43] https://www.afsc.noaa.gov/REFM/Docs/2018/GOA/GOAsablefish.pdf
[44] http://www.nmfs.noaa.gov/sfa/magact/

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.**
	a stock or stock complex to produce MSY; the abundance of an overfished stock or stock complex is rebuilt to a level that is capable of producing MSY; and OY not exceed MSY. FMPs for GOA[45] and BSAI[46] Regions present long-term management objectives for the Alaska sablefish fishery. Updated last in November 2020 these include: Optimum Yield (keeping all groundfish TACs within the BSAI and GOA ecosystem caps) six management areas through which ABCs and TACs are apportioned (i.e. BS, AI, Western GOA, Central GOA, W Yakutat, E Yakutat), quota allocation (by fixed and trawl gears) through IFQ quota share since 1995, CDQ allocations, in-season adjustments and management, time and area restrictions, recordkeeping, and observer requirements, PSC limits (for species like crab and halibut), maximum retainable allowances for sablefish catches in other fisheries, licenses, permits and legal gear (IFQ for longline and pot, demersal trawl is non-IFQ). Pot fishing in the BSAI IFQ fishery is legal and landings have increased dramatically since 2000. Pots in the BSAI are longlined with approximately 40-135 pots per set[47]. One of the newest development in management measures is the allowance of pot gear for catching sablefish in the GOA, partly due to sperm whale predation. Since January 2017, Amendment 101[48] to the Fishery Management Plan for Groundfish of the Gulf of Alaska authorizes the use of longline pot gear in the GOA sablefish IFQ fishery. Partly related to this fishery, the Council is currently reviewing/considering allowing sablefish pots in the BSAI[49]. In the October 2018 meeting the NPFMC took final action[50] to allow for: (1) more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and (2) reduced whale depredation of halibut caught on hook-and-line gear by allowing operators that hold both halibut IFQ or CDQ the opportunity to retain halibut in pot gear. This action includes the following elements[51]: 1) an exemption to the 9-inch maximum width of the tunnel opening on pots, 2) VMS and logbook requirements for all vessels using pot gear to fish IFQ/CDQ, and 3) in the event that the overfishing limit for a shellfish or groundfish species is approached, regulations would allow NMFS to close IFQ fishing for halibut as necessary. Additionally, the Pribilof Islands Habitat Conservation Zone would be closed to all fishing with pot gear. Sablefish also are caught incidentally during directed trawl fisheries for other species groups such as rockfish and deepwater flatfish. Allocation of the TAC by gear group varies by management region and influences the amount of catch in each region. Trawl catches in 2020 were about 43% of the total catches, while in 2019 they were about 31%[52]. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment

[45] http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
[46] https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
[47] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[48] https://www.fisheries.noaa.gov/action/amendment-101-fmp-groundfish-gulf-alaska-management-area
[49] https://www.npfmc.org/halibut-retention-in-pots/
[50] http://meetings.npfmc.org/CommentReview/DownloadFile?p=94b0f940-78a1-45d9-bc75-3686b6ccb3a9.pdf&fileName=C4%20Action%20Memo.pdf
[51] https://www.npfmc.org/halibut-in-pots/
[52] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf

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.**
	on those evaluations[53]. The most recent NEPA compliant Regulatory Impact Review/ Environmental Assessment was performed in regards to the proposed NPFMC action to allow halibut retention in BSAI sablefish pots, issued for public review in October 2018[54]. In terms of the state fisheries, three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham, and Clarence Strait[55]. The Prince William Sound sablefish fishery is managed using a GHL and derived from the estimated area of sablefish habitat and a yield-per-unit-area model. For Clarence and Chatham Strait fisheries an annual harvest objective is set with regard to survey and fishery catch per unit effort and biological characteristics of the population. In addition, in Chatham Strait an annual stock assessment is performed which includes a mark-recapture estimate of the population abundance. Minor fisheries for sablefish include the Aleutian Islands state fishery, which allows longline, pot, jig, and hand troll gear, and the Cook Inlet fishery. These catches are reported and included in the federal SAFE assessment for sablefish. Further details about these fisheries have been provided under Fundamental Clause 7. Detailed management measures for the sablefish state fisheries have been published for 2020 and 2021 Commercial regulations for groundfish fisheries[56]. The management measures summarized above, as well as those highlighted under Clause 7 directly leading to sustainable harvesting of sablefish resources, are designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization, and are based on verifiable and objective scientific and/or traditional sources. Harvest levels for each sablefish as set by NPFMC are based on the best retention of halibut in biological[57], ecological[58], and socioeconomic information[59] available, published yearly. Accordingly, the 2020 SAFE report indicates that model projections indicate that the sablefish stock is not subject to overfishing, overfished, nor approaching an overfished condition[60]. 8.2 States shall prohibit dynamiting, poisoning and other comparable destructive fishing practices. The GOA and BSAI FMPs[61] and NMFS regulations[62] make clear that the only legal gears for taking sablefish in Alaska are hook and line, pot, trawl (and jig and hand troll in the AI state fishery[63]). No destructive practices such as dynamite or poison are permitted, nor is there any evidence that such gears are being used illegally. 8.3 States shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. The NPFMC is responsible for allocation of the sablefish resource among user groups in Alaska waters.

[53] https://www.epa.gov/nepa/what-national-environmental-policy-act
[54] https://meetings.npfmc.org/CommentReview/DownloadFile?p=2dcf0126-26d7-478a-a2c6-c8f1dc234d58.pdf&fileName=C4%20Halibut%20Retention%20in%20BSAI%20Pots%20Public%20Review%20-%20pdf%20version.pdf
[55] https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
[56] https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_groundfish_regs.pdf
[57] https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
[58] https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands
[59] https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands
[60] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[61] https://www.npfmc.org/bering-seaaleutian-islands-groundfish/
[62] https://www.ecfr.gov/cgi-bin/text-idx?SID=0cc954068b4cef56066a93c0ecbd605f&mc=true&node=pt50.13.679&rgn=div5
[63] https://www.adfg.alaska.gov/index.cfm?adfg=fishresearch.sablefish

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.**
	In addition, the Alaskan Board of Fisheries (BOF)[64] public meetings 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 sablefish off Alaska to participate in the development of legal regulations for fisheries. The Pacific Halibut and Sablefish IFQ Program was adopted by the NPFMC under Amendment 15 to the BSAI FMP and Amendment 20 to the GOA FMP in October 1992[65]. Participation in the IFQ Program is limited to persons that hold Quota Share (QS), although there are several very limited provisions for "leasing" of annual IFQ. QS is a transferable permit that was initially issued to persons who owned or leased vessels that made legal commercial fixed-gear landings of Pacific halibut or sablefish in the waters off Alaska during1988-1990. An IFQ Committee provides recommendations to the Council regarding potential future revisions to the IFQ program. Membership is intended to represent a broad range of stakeholders in the IFQ fisheries, including representatives from both directed halibut and sablefish fisheries, representation covering multiple areas, and IFQ processors[66]. The Western Alaska Community Development Quota (CDQ) Program created by the NFMC in 1992 provides western Alaska communities opportunities to participate in the BSAI fisheries. There are 65 communities participating in the program[67]. The Gulf of Alaska parallel of the CDQ program is the Community Quota Entity Program, which authorizes 45 eligible communities in areas 2C, 3A and 3B and one community in the Aleutian Islands to form Community Quota Entities (CQEs)[68] that may purchase commercial halibut and sablefish quota share (QS) for lease to community residents. The overarching purpose of this program is to remedy barriers to participation in remote coastal communities and to provide these communities with long-term opportunities to access the halibut and sablefish resources[69]. The Council formed the Community Engagement Committee in June 2018 to identify and recommend strategies for the Council to provide effective community engagement with rural and Alaska Native communities. The Community Engagement Committee will develop tools and processes to facilitate improved communication and understanding between rural communities and tribes and the Council. In June 2019 the Council reviewed a discussion paper outlining domestic and international examples of programs that facilitate access opportunities for rural communities and new entrants within

[64] https://www.fisheries.noaa.gov/alaska/commercial-fishing/pacific-halibut-and-sablefish-individual-fishing-quota-ifq-program
[65] https://www.npfmc.org/halibutsablefish-ifq-program/
[66] https://www.npfmc.org/halibutsablefish-ifq-program/
[67] https://www.federalregister.gov/documents/2016/07/12/2016-16418/proposed-information-collection-comment-request-western-alaska-community-development-quota-cdq
[68] https://www.npfmc.org/community-quota-entity-program/
[69] https://meetings.npfmc.org/CommentReview/DownloadFile?p=60c6260c-faa3-4eed-87e9-2a324869f26b.pdf&fileName=C6%20MOTION.pdf

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.**
	limited access fisheries and tasked staff to come back with an expanded paper[70]. The Council requested this discussion paper at the June 2018 meeting in response to information from the IFQ 20-year program review, academic research, and public testimony regarding access challenges in the IFQ Program. The discussion paper provided a more detailed review of Norway's Recruitment Quota, and highlighted access program design specifications, distributional impacts, and legal considerations that may be relevant to an application in the North Pacific for the Halibut and Sablefish IFQ Program. As a result of that, the Council directed staff to develop an expanded discussion paper identifying considerations related to the creation of a quota Access Pool for halibut and sablefish QS that facilitates entry-level opportunities. The Access Pool would be targeted at crewmembers and vessel owner-operators whose QS holdings equate to less than 5,000 lbs. of IFQ in 2019. Participation in the Access Pool would be temporary, meaning that a qualifying individual could only fish this quota for a set number of years. Access Pool QS could not be sold. The Access Pool would be structured such that a Regional Fishery Association (RFA) or another entity receives the allocation and determines the criteria for distribution to applicants; criteria would be reviewed by the Council and approved by NMFS. The discussion paper will highlight explicit Council decision points necessary for this approach, the amount of detail needed to develop criteria for allocation, effects on the QS market and existing QS holders, and MSA considerations regarding the ability to allocate QS to RFAs. At the state level, Advisory committees (AC) are local groups that meet to discuss fish and wildlife issues, provide a local forum for those issues, and make recommendations to the Alaska boards of fisheries and game. Their purpose as established by the Joint Board of Fisheries and Game includes developing regulatory proposals, evaluating regulatory proposals and making recommendations to the appropriate board, providing a local forum for fish and wildlife conservation and use, including matters relating to habitat, consulting with individuals, organizations, and agencies[71]. The regulations governing the advisory committee are 5 AAC Chapters 96 and 97. More than 700 Alaskans belong to 84 advisory committees up and down the coast and throughout the interior, arctic and southcentral. It is through these individuals that the Alaska Board of Fisheries develop regulations that are responsive to local needs. In 2019, five individuals were awarded the Excellence in Service Award recognizing outstanding contributions in service to Alaska's communities, fish and wildlife, and regulatory process by Fish and Game Advisory Committee members across the state. 8.4 Mechanisms shall be established where excess capacity exists, to reduce capacity. Fleet capacity operating in the fishery shall be measured. 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. Amendment 20 to the GOA Fishery Management Plan and 15 to the BS/AI Fishery Management Plan established IFQ management for sablefish beginning in 1995. These amendments also allocated 20% of the fixed gear allocation of sablefish to a CDQ reserve for the BS and AI. Since the implementation of IFQs, the number of longline vessels with sablefish IFQ harvests experienced a substantial anticipated decline from 616 in 1995 to 362 in 2011 (NOAA 2016). This decrease was expected as shareholders have consolidated their holdings and fish them off fewer vessels to reduce costs (Fina

[70] https://www.npfmc.org/ifq-access-opportunities-global-examples/
[71] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

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.**
	2011). IFQ management has increased fishery catch rates and decreased the harvest of immature fish (Sigler and Lunsford 2001). Catching efficiency (the average catch rate per hook for sablefish) increased 1.8 times with the change from an open-access to an IFQ fishery. The change to IFQ also decreased harvest and discard of immature fish which improved the chance that these fish will reproduce at least once. Thus, the stock can provide a greater yield under IFQ at the same target fishing rate because of the selection of older fish (Sigler and Lunsford 2001)[72]. There are detailed records of all fishing operations and permits allowed in Alaska. There were 1,054 entities holding Sablefish QS in 1995. The number of entities has declined over time to 809, or 23% fewer entities holding QS by 2017, and the number of active CV and CP sablefish vessels decreased to 285, by 11 catcher vessels in 2017[73], from 2016. Current (as of 2019) Quota Share with Holders and QS Units - by species, area, vessel category, blocks, and CDQ compensation flag are listed on the NOAA website[74]. All the federal IFQ fisheries and the three major state fisheries are limited access fisheries. Exploitation is regulated and controlled through TACs in federal fisheries and GHL/TACs in state fisheries. None of these fisheries is considered depleted or overexploited. 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. A summary of the NPFMC management measures that govern the GOA and BSAI groundfish fisheries are contained in the FMPs and are summarized below. **Fish size.** The fishery is primarily managed through IFQ and through Maximum Retainable Allowances[75] for other fisheries to account for incidental catches of sablefish in those fisheries. Minimum size requirements are not currently in use. However, a recent discussion paper on sablefish discard allowance (Armstrong et al., 2018) provides information on biological and economic impacts for introducing minimum size regulations for sablefish. In 2018, there was a marked increase in sablefish landings for small (1-3 pound) sablefish in the BSAI fisheries, most notably the midwater pollock fishery, and an associated large decrease in value for these same sized fish(Armstrong et al., 2018). **Gear.** Sablefish in Alaska is caught with longline, pot and bottom trawl gear. In short, longliners use streamer lines to avoid seabird bycatch, demersal trawl are required to carry raised bobbins when targeting flatfish and cod in the BSAI and the Central GOA. Research has demonstrated that this gear modification reduces unobserved mortality of red king crab, Tanner crab, and snow crab, reducing contact with the ocean floor by as much as 90%[76]. In addition to this there are extensive habitat

[72] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[73] https://www.fisheries.noaa.gov/resource/data/2017-economic-status-groundfish-fisheries-alaska
[74] https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska%23individual-fishing-quota-(ifq)-halibut/sablefish-and-cdq-halibut-ifq
[75] https://meetings.npfmc.org/CommentReview/DownloadFile?p=b6b509dd-a14c-442b-867b-3f88fa9f8d98.pdf&fileName=D2%20Sablefish%20Discard%20Allowance.pdf
[76] https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs

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.**
	closures in Alaska[77]. Pot gear carry biodegradable panels to avoid ghost fishing in case of gear loss, as well as escape rings in State fisheries[78]. Mesh size for the relevant gear is specified in Federal regulation 679 (on the management of fisheries within Alaska's EEZ[79]). **Closed seasons/areas.** In 1995, Individual Fishery Quotas (IFQ) were implemented for hook-and-line vessels along with an 8- month season. The season dates have varied by several weeks since 1995, but the monthly pattern has been from March to November with the majority of landings occurring in May - June. Extensive trawl closures have been implemented to protect benthic habitat or reduce bycatch of prohibited species (i.e., salmon, crab, herring, and halibut) in the BSAI and GOA. Seasonal closures are used to reduce bycatch by closing areas where and when bycatch rates had historically been high[80]. Over 95% of the AI management area is closed to bottom trawling (277,100 nm^2). With the Arctic FMP closure included (an area roughly 150,000 sq nm^2), almost 65% of the U.S. EEZ of Alaska is closed to bottom trawling. **Artisanal fisheries.** At the time the Federal Government began the IFQ program, the State established two minor fisheries in Cook Inlet and the Aleutian Islands, so that open-access fisheries were available to fishermen that were not allowed to participate in the IFQ program[81]. Three major state fisheries exist which are limited entry and are located in Prince William Sound, Chatham, and Clarence Strait. 8.6. Fishing gear shall be marked. Regulations pertaining to vessel and gear markings in the sablefish fishery are established in NMFS regulations, as prescribed in the annual management measures published in the Federal Register (part 679.24) [82]. They state: 1. Marking of hook-and-line, longline pot, and pot-and-line gear. a) All hook-and-line, longline pot, and pot-and line marker buoys carried on board or used by any vessel regulated under this part shall be marked with the vessel's Federal fisheries permit number or ADF&G vessel registration number. b) Markings shall be in characters at least 4 inches (10.16 cm) in height and 0.5 inch (1.27 cm) in width in a contrasting color visible above the water line and shall be maintained so the markings are clearly visible. c) Each end of a set of longline pot gear deployed to fish IFQ sablefish in the GOA must have attached a cluster of four or more marker buoys including one hard buoy ball marked with the capital letters "LP" in accordance with paragraph (a)(2) of this section, a flag mounted on a pole, and radar reflector floating on the sea surface. 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.

[77] https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_groundfish_regs.pdf
[78] https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_groundfish_regs.pdf
[79] https://www.ecfr.gov/cgi-bin/text-idx?SID=0cc954068b4cef56066a93c0ecbd605f&mc=true&node=pt50.13.679&rgn=div5#se50.13.679_124
[80] https://apps-afsc.fisheries.noaa.gov/REFM/docs/2020/EBSecosys.pdf
[81] https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
[82] https://www.ecfr.gov/cgi-bin/text-idx?SID=0cc954068b4cef56066a93c0ecbd605f&mc=true&node=pt50.13.679&rgn=div5

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.**
	The sablefish resource is not depleted. According to the 2020 SAFE report for Sablefish, model projections indicate that this stock is not subject to overfishing, overfished, nor approaching an overfished condition. The overall objectives of the GOA and BSAI FMPs is consistent with preventing overfishing and optimizing the yield from the fishery through the promotion of conservative harvest levels while considering as well as addressing the differing levels of uncertainty[83]. Management measures are summarized under clause 8.1. 8.8/8.9/8.10/8.11/8.12/8.13. States shall encourage the development and implementation of technologies and operational methods that reduce waste and discards and reduce the loss of fishing gear. The implications of the introduction of new fishing gears, methods and operations shall be assessed and the effects of such introductions monitored. New developments shall be made available to all fishers and shall be disseminated and applied appropriately. The federal sablefish fishery is managed under an IFQ system. The fishery is for the most part a demersal longline fishery. Longline is typically not associated with as much ghost fishing as some other fishing gears, such as gillnets and some types of traps (NOAA 2015[84]). Longline gear is also required to carry streamer lines to avoid seabird interactions and fishermen deploy weighted lines that sink faster and further decrease possible interactions with these animals. In recent years, an increasing percentage of sablefish is also caught and retained with pot gear, due to depredation by whales in longline gear. Groundfish pots are required to comply with a number of specifications, including use of a biodegradable panel[85], and tunnel openings (rigid or soft) which must not exceed maximum dimensions. These gear constructions minimize impacts of ghost fishing and of catch of certain non-target species and sizes, hence reducing waste, discards and mortality in case of gear loss. Escape rings in pots are required in some sablefish state fisheries as per 2020-2021 state regulations[86]. In one the newest developments to reduce wastage and discards in the IFQ fishery, the NPFMC, in October 2018 took final action[87] to allow for: 1) more efficient harvest of the halibut resource by decreasing the wastage of legal-size halibut discarded in the BSAI sablefish pot fishery, and 2) reduced whale depredation of halibut caught on hook-and-line gear by allowing operators that hold both halibut IFQ or CDQ the opportunity to retain halibut in pot gear. This action includes the following elements[88]: 1) an exemption to the 9-inch maximum width of the tunnel opening on pots, 2) VMS and logbook requirements for all vessels using pot gear to fish IFQ/CDQ, and 3) in the event that the overfishing limit for a shellfish or groundfish species is approached, regulations would allow NMFS to close IFQ fishing for halibut as necessary. Additionally, the Pribilof Islands Habitat Conservation Zone would be closed to all fishing with pot gear.

[83] https://www.npfmc.org/bering-seaaleutian-islands-groundfish/
[84] https://marinedebris.noaa.gov/sites/default/files/publications-files/Ghostfishing_DFG.pdf
[85] https://www.ecfr.gov/cgi-bin/text-idx?SID=0cc954068b4cef56066a93c0ecbd605f&mc=true&node=pt50.13.679&rgn=div5
[86] https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_groundfish_regs.pdf
[87] http://meetings.npfmc.org/CommentReview/DownloadFile?p=94b0f940-78a1-45d9-bc75-3686b6ccb3a9.pdf&fileName=C4%20Action%20Memo.pdf
[88] http://meetings.npfmc.org/CommentReview/DownloadFile?p=94b0f940-78a1-45d9-bc75-3686b6ccb3a9.pdf&fileName=C4%20Action%20Memo.pdf

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.**
	Sablefish also are caught incidentally during directed trawl fisheries for other species groups such as rockfish and deepwater flatfish. Trawl catches in 2020 were about 43% of the total catches, while in 2019 catches were about 31%[89]. Research has demonstrated that trawl sweep gear modification required in the trawl flatfish fisheries in the EBS (since 2010) and the central GOA (since 2013) reduces unobserved mortality[90] of red king crab, Tanner crab, and snow crab. A recent discussion paper on sablefish discard allowance (Armstrong et al., 2018) provides information on biological and economic impacts for introducing minimum size regulations for sablefish[91]. In 2018, there was a marked increase in sablefish landings for small (1-3 pound) sablefish in the BSAI fisheries, most notably the midwater pollock fishery, and an associated large decrease in value for these same sized fish (Armstrong et al., 2018). This size range is the likely age for the 2014-to-2016-year classes (age 2-4). In terms of sablefish discards in 2018, 42.29% of the combined catch by trawl, pot and jig gear was discarded. Since April 2018, a regulatory change that would allow discarding of small sablefish in the Individual Fishing Quota (IFQ) sablefish fishery has been discussed as a potential tool to mitigate fishery and population impacts of very large sablefish year classes[92]. This change was first suggested by IFQ stakeholders following enormous increases in survey catches of small sablefish from the 2014-year class, the largest on record. In October 2018, the Council has reviewed an initial discussion paper that evaluated a range of biological, economic, and management considerations related to a discarding allowance, and which pointed out that growth of fish from the 2014 year class into typical market categories would outpace the timing of the proposed management change. After review of the October 2018 discussion paper, the Council passed a motion instructing staff to gather more information on the possible implications of permitting sablefish discarding, identifying in the motion nine areas of concern for staff to focus on. In April 2019, the NPFMC motioned to initiate an expanded discussion paper to gather more information on the possible implications of modifying the requirement (e.g. to proxy DMR, gear specific DRMs, etc..) to retain small sized sablefish and to explore the implications of these changes on overall stock abundance and allocations to trawl and IFQ fisheries. All new proposals, for and resulting developments to reduce waste and discards in the sablefish and other groundfish fisheries, are made available to all fishers through the NPFMC/NMFS and Board of Fishery processes and published online for all relevant stakeholders. <u>8.14. Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures.</u> Not applicable. Sablefish is not an enhanced species.

[89] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[90] https://www.npfmc.org/habitat-protections/gear-modifications/
[91] https://meetings.npfmc.org/CommentReview/DownloadFile?p=b6b509dd-a14c-442b-867b-3f88fa9f8d98.pdf&fileName=D2%20Sablefish%20Discard%20Allowance.pdf
[92] https://meetings.npfmc.org/CommentReview/DownloadFile?p=b40b8eb3-a783-421c-9c3a-4497b1432159.pdf&fileName=D8%20Action%20Memo.pdf

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.**
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 8 of the RFM Fishery Standard.

7.9.4.2 Fundamental Clause 9

9.	**Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.**
Summary of relevant changes:	9.1./9.2./9.3. Education and training programs. No significant changes have occurred since the 3rd Surveillance audit. To be eligible to purchase sablefish (and halibut) IFQ shares, new participants must apply for and obtain a Transferable Eligibility Certificate issued by the North Pacific Region of NMFS. An applicant must be a U.S. citizen and show documentation of 150 days of commercial fishing experience[93] in the U.S. Obtaining IFQ share most often will require the purchaser (aspirant sablefish fisherman) to enter into loan capital arrangements with banks that will require comprehensive fishing business plans supported by competent, professional fishermen with demonstrable fishing experience. This competence and professionalism are a learned experience with the culmination of entrants into the fishery starting at deck hand level working their way up through proof of competence. There are several avenues for fishermen to receive training to ensure they have appropriate standards of competence. AMSEA provides marine safety training for commercial fishermen[94], subsistence & recreational boaters, and youth & women boaters throughout Alaska and across the United States. AMSEA's Fishing Vessel Drill Conductor Trainings are accepted by the U.S. Coast Guard and meet the training requirements for fishermen onboard commercial fishing vessels. The State of Alaska, Department of Labor and Workforce Development (ADLWD) includes the Alaska's Institute of Technology, also called Alaska Vocational Training & Education Center (AVTEC). One of AVTEC's main divisions is the Alaska Maritime Training Center. The Alaska Maritime Training Center is a United States Coast Guard approved training facility located in Seward, Alaska, and offers USCG/STCW (STCW is the international Standards of Training, Certification, and Watchkeeping) compliant maritime training[95]. In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of world class ship simulator, state of the art computer based navigational laboratory and modern classrooms equipped with the latest instructional delivery technologies. AVTEC offers courses such as Able Seaman, Fire Fighting, Meteorology, Electronic Chart display and Information Systems, Seafood Processor Orientation and Safety Course, among many others. The Marine Advisory Program (MAP) is a university-based statewide program designed to help Alaskans with the practical use and conservation of the state's marine and freshwater resources.

[93] https://www.edf.org/sites/default/files/11391_alaska-ifq.pdf
[94] https://www.amsea.org/commercial-fishermen
[95] https://avtec.edu/department/alaska-maritime-training-center

9.	Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.
	MAP is based at the University of Alaska Fairbanks (UAF) College of Fisheries and Ocean Sciences[96]. Through classes, workshops, trainings and other resources, MAP offers Alaskans technical assistance, marine education, applied research and other expert advice on how residents can sustain healthy coastal economies, communities and ecosystems. Established in 2007 by the Alaska Sea Grant Marine Advisory Program, the Alaska Young Fishermen's Summit (AYFS) is a three-day networking and skill-building conference for new entrants in managing modern commercial fishing businesses designed to provide training, information and networking opportunities for commercial fishermen early in their careers. The event features prominent industry leaders as speakers and mentors. All regulations governing the sablefish fisheries are available on the NPFMC, NMFS[97] and ADFG[98] websites, as previously documented under fundamental clause 8. Changes to regulations are considered only after detailed processes which include open and public discussions, and the results of any changes are widely communicated. Fishermen do attend these meetings and participate in these processes where they input in and become better acquainted with fishery regulations. Data on the number and location of Alaskan of fishers, permits issued, Current Quota Share with Holders and QS Units - by species, area, vessel category, blocks, and CDQ compensation flag etc. can be can be found online at the NMFS website[99]. In 2020 there were 2569 IFQ quota share holdings registered in the NMFS database. Data on fishing in Alaskan state-managed fisheries can be found in the State of Alaska's CFEC website[100].
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 9 of the RFM Fishery Standard.

[96] https://alaskaseagrant.org/marine-advisory/
[97] https://www.fisheries.noaa.gov/alaska/commercial-fishing/pacific-halibut-and-sablefish-individual-fishing-quota-ifq-program
[98] https://meetings.npfmc.org/CommentReview/DownloadFile?p=b6b509dd-a14c-442b-867b-3f88fa9f8d98.pdf&fileName=D2%20Sablefish%20Discard%20Allowance.pdf
[99] https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska%23individual-fishing-quota-(ifq)-halibut/sablefish-and-cdq-halibut-ifq
[100] https://www.cfec.state.ak.us/fishery_statistics/earnings.htm

7.9.5 Section E. Implementation, Monitoring and Control

7.9.5.1 Fundamental Clause 10

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.**
Summary of relevant changes:	The legal and administrative frameworks that define how the principle management agencies are to operate and the environment in which they are to do so at the state, national and binational levels have been in place for many decades. There is clear evidence of an ongoing and effective level of cooperation between all of the agencies that collectively continue to deliver positive conservation and sustainability outcomes for the Pacific halibut resource and the marine environment on which the species depends. The Monitoring, Control and Surveillance programs operated by the federal and state enforcement agencies (NMFS, USCG, ADPS's AWT) continued to perform at a high rate of effectiveness in monitoring the small but diverse sablefish fishing fleet that operates within Alaska's EEZ and in applying the significant number of federal and state regulations they are mandated to enforce. The reported annual rate of compliance by fishers has consistently averaged 97-98%, a very high rate that speaks to the effectiveness of the MCS program carried out by law enforcement personnel. Officials with whom the Audit team spoke characterized the few sablefish violations encountered as being minor in nature and scope.
References:	1. Annual enforcement reports provided to the NPFMC for 2019 and 2020 by USCG and NOAA-OLE. 2. Email from Deputy Commander, Southern District of Alaska's AWT dated May 19, 2021. 3. Emails from USCG official dated April 14 and May 24, 2021. 4. Site visit (virtual): May 19, 2021, with AWT official - Lt. Jonathan Streifel. 5. Site visit (virtual): May 27, 2021, with FVOA representative - Bob Alverson.
Statement of consistency to the RFM Fishery Standard	The legal and administrative frameworks that inform the federal and state MCS programs within Alaska's 200 nm EEZ including program assets continued to provide the necessary tools that enforcement officers required to effectively discharge their duties. The compliance level in 2020 by commercially-permitted vessels with respect to the fishery's regulations remained very high, proof of the overall effectiveness of the program. The fishery continues to conform to the requirements of Fundamental Cause 10 of the RFM Fishery Standard.

7.9.5.2. Fundamental Clause 11

11.	**There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.**
Summary of relevant changes:	For federally-managed fisheries, law enforcement agents and prosecutors rely upon NOAA's Office of General Counsel, Enforcement Section's Penalty Policy (2019) for guidance in assessing civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. The purpose of this Policy is to continue to ensure that: (i) civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; (ii) penalties and permit sanctions are appropriate for the gravity of the violation; (iii) penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations; (iv) economic incentives for noncompliance are eliminated; and (v) compliance is expeditiously achieved and maintained to protect natural resources. For state-managed fisheries in Alaska, misdemeanor commercial fishing penalties are described in the Alaska Statutes, Title 16 (Fish and Game), Chapter 5 (Fish and Game Code), Section 723. Strict liability commercial fishing penalties are covered in Section 722.
References:	1. Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions NOAA Office of General Counsel - Enforcement Section: https://www.gc.noaa.gov/documents/Penalty-Policy-CLEAN-June242019.pdf 2. Alaska misdemeanor commercial fisheries penalties: http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05.htm 3. Alaska strict liability commercial fishing penalties: http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section722.htm 4. Email dated May 19, 2021, from Deputy Commander, Southern District, AK AWT. 5. Emails dated April 14 and May 24, 2021, from USCG official.
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 10 of the RFM Fishery Standard.

7.9.6 Section F. Serious Impacts of the Fishery on the Ecosystem

7.9.6.1 Fundamental Clause 12

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.**
Summary of relevant changes:	12.1. Assessment of environmental effects on target stocks and ecosystem The impacts of environmental factors on sablefish and other fish or non-fish species associated or dependent upon them continue to be assessed appropriately by the NMFS/NPFMC and ADFG. The 2020 sablefish SAFE report highlights some key information relating to environmental effects on target stocks and ecosystem. In it, the authors highlight that[101] there are concerns about increased variability and decreased predictability of the ecosystem in Alaska. For example, recent stock assessment estimates of GOA Pacific cod showed an enormous 2012-year class. This estimate declined severely when the 2015 - 2017 GOA bottom trawl survey biomass estimates and the 2016 – 2018 longline survey abundance estimates were included in the assessment. This severe decline could have been related to unforeseen environmental factors. A similar phenomenon could happen

[101] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf

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	for sablefish because both larval, juvenile, and adult sablefish are well known to be sensitive to ocean temperature for both optimal growth and reproduction (e.g., Sogard and Olla 1998). It is possible that the increased recruitment in 2014-2016 is due to the marine heat wave, perhaps due to higher productivity and increased food supply for larval sablefish (or competitive release because of mortality or movement of other predators from the marine heat waves). If marine heat waves become a regular occurrence perhaps this bodes well for future sablefish recruitment, but if this is a one-time unrelated recruitment success, then it is critical that these fish survive to contribute to the depleted spawning biomass. However, the effects of the marine heat wave and changing ecosystem have not yet been evaluated carefully for sablefish. Fish condition has declined since the appearance of these large year classes and is much worse than during the last period of larger recruitments (1997 – 2000) which may affect the ability of these fish to survive or mature. Given the current uncertainty in the ecosystem, the stock assessment authors rated the environmental/ecosystem concern for sablefish as level 2, indicating a substantially increased concern. The NMFS' Alaska Fisheries Science Center also publishes yearly Ecosystem Status Reports that provide links between ecosystem research and fishery management. Key findings from the 2020 status reports are briefly summarized below[102]. **<u>Bering Sea</u>** Following two years of physical oceanographic perturbations, the eastern Bering Sea experienced a return to near-normal climatic conditions in 2020. The winters of 2017/2018 and 2018/2019 had unprecedentedly low sea ice and reduced spatial extent of the cold pool, removing the thermal barrier between the southern and northern Bering Sea shelves. Distributional shifts in groundfish stocks were observed (e.g., more than 50% of the overall biomass of Pacific cod biomass occurred in the northern Bering Sea in 2018). Ecosystem impacts in response to these conditions include changes in overall productivity and the potential for new trophic pathways. Considerable cooling during winter2019/2020 allowed for rapid build-up of sea ice, exceeding median ice extent in parts of February and March 2020. However, ice thickness was low, and retreated quickly in spring. This ephemeral ice was sufficient to form a cold pool of average spatial extent, but above-average sea surface temperatures returned in spring and remained above average through summer 2020. The southeastern and northern Bering Sea are experiencing a persistent warm stanza, greater in both magnitude and duration than that of the early 2000s. <u>Data and Information Mitigation Strategies</u>. During 2020, the vast majority of NOAA Fisheries surveys were canceled in the eastern and northern Bering Sea due to COVID-19 travel restrictions. This was an on-year for the biennial NOAA ecosystem and acoustics surveys, in addition to annual trawl surveys, therefore numerous contributions of ecosystem information for this Report were unable to be updated this year. While gaps exist throughout the Report (e.g., forage fish), NOAA scientists,

[102] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf

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	state/university partners, tribal governments, and coastal community members provided new and innovative contributions to inform our understanding of the current ecosystem state. The Bering 10K Regional Ocean Modeling System (ROMS**)** hindcast simulation provided critical information of bottom water conditions over the Bering Sea shelf in 2020. First, the evolution of modeled bottom temperatures between November of the previous year through the beginning of August placed 2020 in historical context as an 'average' year in terms of <2°C and <0°C waters in the standard bottom trawl survey area and spatial extent of the cold pool. Second, a new indicator of ocean acidification, based on Ωarag undersaturation, estimates the percent of the Bering Sea shelf where bottom waters are corrosive. This operationalizing of the ROMS model has great potential for the Ecosystem Status Report (ESR) as well as groundfish and crab Ecosystem and Socio-economic Profiles (ESPs). Satellite-derived indicators were developed this year to better describe and understand oceano-graphic conditions. Sea surface temperature is a foundational metric; new analyses presented in 2020 may help to identify mechanisms or critical periods through which SST has the greatest impacts on Bering Sea ecosystem and fisheries. As an example, the accumulation of SST throughout the year provides a better understanding of the annual thermal exposure experienced by the system. Marine heatwave thresholds were defined and demonstrate that recent heatwaves have been persistent and intense. Heatwaves occurred during early years of the time series, but the frequency and durations have increased dramatically, especially in the northern Bering Sea, where residual heat and low sea ice extent resulted in dramatically increased cumulative annual thermal exposure. The 2020 Eastern Bering Sea ESR includes the Integrated Seabird Information section and the Physical Environment Synthesis, both intended to incorporate information from a variety of knowledge sources and provide comprehensive overviews and implications for fisheries management. In fact, the U.S. Fish and Wildlife Service was unable to conduct seabird research in the eastern and northern Bering Sea in 2020 due to COVID-19 travel restrictions. Coastal community members, tribal governments, and state/university partners provided all information on seabird dynamics for this Report and the U.S. Fish and Wildlife biologists helped to synthesize this information and provide implications. Bridging Across Gaps Due to survey limitations in 2020, the contributions received ranged from basin-scale, satellite derived indicators to local-scale community observations. The mesoscale patterns gleaned from comprehensive shelf-wide surveys were absent. Trophic gaps in information occurred, as well. For example, for 2020, no indicators from zooplankton to adult fish were available. The interpretation of the current ecosystem state bridges across these gaps and hinges on existing understanding of mechanistic relationships and dynamics in the eastern Bering Sea. Tracking the seasonal progression and retreat of sea ice over the shelf highlights the interactive roles of water temperature (i.e., residual warmth in the system) and winds. Late arrival of sea ice is more and more common with a strong negative linear trend of early ice (Oct–Dec) over the past 40 years. Delayed freeze-up leads to shortened ice seasons that has impacts on ice thickness, ice algae, and thermal modulation as well as impacts to transportation and subsistence activities. After two years of little to no sea ice over the Bering Sea shelf, the near-normal ice extent observed in 2020 appeared to have only minimal mitigating effects on the warmth in the upper water column (i.e., sea surface

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temperatures), but did result in an 'average' cold pool extent. This vertical stratification of the water column is more typical of shelf conditions and affects predator/prey dynamics.

Chlorophyll-a concentrations were lower in 2020 than 2019 in all regions except the southern outer domain. Chl-a concentrations over the southern inner and middle shelves have been below average since 2016. In the northern Bering Sea, the concentrations over the inner and middle shelves were below average and the outer shelf was low and continued a decreasing trend since 2014. Primary producers provide fundamental energy and nutrients for zooplankton grazers and higher trophic level species; these trends indicate lower energy transfer to support the food web over the southern and northern Bering Sea shelves in 2020. The timing of the peak spring bloom in 2020 was earlier than the long-term average; for the southern inner and middle shelves it occurred about a week earlier. This contrasts with 2018 which was among the latest while 2017 was among the earliest spring blooms. The coccolithophore bloom index was below average in 2018 and 2019 but increased, particularly on the middle shelf, in 2020. Coccolithophores may be a less desirable food source for microzooplankton in this region and smaller coccolithophores result in longer trophic chains. The striking milky aquamarine color of the water during a coccolithophore bloom can also reduce foraging success for visual predators. Combined, these indicators of primary production suggest limited and/or poor quality of the prey base to support trophic energy transfer (e.g., juvenile fish, seabirds) in 2020.

The 2020 Togiak herring population is predominantly comprised of age-6 and age-7 fish (the 2013- and 2014-year classes). The 2014-year class remains the largest estimated recruitment since 1982. Oceanographic conditions over the southeastern Bering Sea shelf transitioned from below-average (i.e., cold) in 2013 to above-average (i.e., warm) in 2014 and neither year experienced temperatures that exceeded the marine heatwave threshold. While the recruitment of age-4 fish to the spawning population in 2018 was still the largest estimated recruitment since 1982, the magnitude of that recruit class was estimated in the 2020-forecast model to be lower than was previously estimated. 2018 was above-average (i.e., warm) with little cooling effect from sea ice and just over 200 days that exceeded the marine heatwave threshold.

Preliminary data from ADF&G for 2020 commercial salmon harvests indicate that statewide total harvests are below the preseason forecast but nearing the 2018 total harvest (as of 22 Sept 2020). The 2020 Bristol Bay salmon inshore run was the 5th largest on record and 74.5% higher than the 1963–2019 average. The current period of high Bristol Bay sockeye salmon production now exceeds the previous high production stanza that occurred 1989–1995. A projected decrease in the number of pink salmon in 2020 could have a positive impact on fish-eating seabirds (i.e., less prey competition).

In 2020, at the Pribilof Islands, seabird attendance appeared similar to recent years while breeding observations suggest that it was an average, to slightly below average, year for most fish-eating species (e.g., kittiwakes, murres). Planktivorous species (i.e., auklets) have been declining in recent years and continued to be low in 2020, at least for St. Paul Island. Warmer water temperatures from 2014–2019 seem to have negatively affected least auklets, and likely parakeet auklets, as evidenced by declines in reproductive success and colony attendance. In the northern Bering Sea, on St. Lawrence Island, reproductive success and colony attendance differed among fish-eating and

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planktivorous seabirds suggesting foraging impacts across trophic levels. In the Bering Strait region, emaciation and starvation were observed in some individuals throughout the summer and beach-cast carcasses of several species of seabirds were observed on the eastern and western sides of the Bering Strait.

Direct and indirect indicators of groundfish recruitment success provide information on the status of recent year classes. The 2020 springtime drift pattern was mixed, indicating larvae (e.g., pollock) may have be retained over the southern middle shelf. Lower primary production in this region may limit the prey base to support trophic energy transfer to large, lipid-rich copepod taxa (i.e., Calanus spp.). The 2019 pollock year class experienced unfavorable temperature conditions from age-0 to age-1 and is predicted to have below-average recruitment to age-4 in 2023. Concurrently, low abundance of large copepods during late-summer in 2017–2019 indicate poor overwinter survival and recruitment to age-3 in 2020–2022. Recent years of low recruitment for pollock have resulted in lower rates of cannibalism. The climate-enhanced multispecies model (CEATTLE) estimates of age-1 predation mortality for pollock is at the long-term mean as declines in total predator biomass are contributing to reduced predation rates and mortality.

Aleutian Islands

This year, due to the COVID-19 pandemic, most surveys and fieldwork were cancelled, so there are no biological indicators updated for 2020. The new information in this assessment is largely from remote-sensing, updated analysis of 2019 data, and local observations. Whenever possible we included data for 2019 as an update from the previous 2018 Aleutian Islands Ecosystem Status Report. Cancelled surveys and data streams include:

1. AFSC AI 2020 biennial bottom trawl survey, which provides data for:

   (a) Aleutian Islands Trawl Survey Water Temperature Analysis

   (b) Jellyfish in the Bottom Trawl Survey

   (c) Aleutian Islands Groundfish Condition

   (d) Distribution of Rockfish Species in the Aleutian Islands

   (e) Miscellaneous Species in the Aleutian Islands

   (f) Stability of Groundfish Biomass in the Aleutian Islands

   (g) Mean Length of the Fish Community in the Aleutian Islands

   (h) Mean Lifespan of the Fish Community in the Aleutian Islands

2. AMNWR seabird monitoring, which provides data for:

   (a) Hatching dates at Buldir and Aiktak

   (b) Reproductive success at Buldir and Aiktak

   (c) Seabird diets—tufted puffin chicks diets

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(d) Seabirds die-offs (contribute data to overall dataset)

3. AFSC Steller sea lion surveys, which provides data for:

(a) Counts of non-pups at rookeries and haul-outs

(b) Counts of pups at rookeries and haul-outs

4. COASST year-round citizen scientists surveys, which provide data for:

(a) Seabird die-offs

(b) Beached bird relative abundance

5. Fish and Wildlife Survey periodic sea otter survey that was planned this year.

During 2019–2020, the state of the North Pacific atmosphere-ocean system featured the continuance of warm sea surface temperature anomalies in the Gulf of Alaska with an almost year-long marine heat wave in 2019 that decreased significantly towards the west, with subsurface warmer temperatures throughout the chain that reached the western Aleutians. Bottom trawl survey temperatures from 2019 support model results from the Global Ocean Data Assimilation System that show the persistence of subsurface warmer temperatures in the 100–250 m deep layer that have stayed statistically above the long-term mean. The warm temperatures can be attributed in part to slower at-depth processes. In 2020, the surface temperatures cooled, and climate indices were near average, potentially offering more favorable environmental conditions for biota relative to recent years.

Newly estimated indices show eddies have a distinctly different signature across the island chain, with discrete, strong events characterizing the east and multiple or multi-year but less intense events towards the west. The role of these eddies and how they are processed within the system are yet to be understood, as stocks and overall populations are subject to the dynamics in the east and the west throughout their life cycle. Eddy kinetic energy has remained low since 2013 in the east, and this coincides with the North Pacific Gyre Oscillation more than with the North Pacific Index, which is typically the more characteristic index of the region. Model results suggest moderate increases in the strength of the Alaskan Stream Current increases flow through the eastern passes such as Amukta, while stronger flows carry the current westward, decreasing flows through the eastern passes and increasing them through the wider and deeper passes prevalent in the central and western Aleutians.

With average or close to average climate conditions throughout, 2020 is expected to be a return to more favorable conditions for the biological components of the Aleutian Islands ecosystem.

<u>Biological summary through 2019</u>
In general, warmer temperatures increase bioenergetic costs for ectothermic fish, and all else being equal, prey consumption must increase to maintain fish condition. These increased bioenergetic costs and consumption demands may partly explain why the observed body condition of several commercial groundfish (adult pollock, Pacific cod, northern rockfish and Pacific ocean perch) has been lower than the survey mean since 2012, as last measured by length-weight residuals during the

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	biennial summer bottom trawl survey during 2018. We note however, that for Pacific Ocean perch and northern rockfish, intraspecific competition might be a contributing factor, as their abundance increased and appears to have now stabilized at high biomasses (e.g. Pacific Ocean perch) that now surpass that of Atka mackerel and pollock combined. While Pacific Ocean perch condition has also been lower than the long term mean, it has decreased less than that of the rockfish. The poorer condition of fish, particularly of species such as Atka mackerel and pollock that when small serve as prey for piscivorous seabirds and apex fish predators like Pacific cod and arrowtooth flounder, also means that that their quality as prey has decreased, with potential cascading effects on their predators. Warmer temperatures may also impact ontogenesis of Atka mackerel eggs (Lauth et al., 2007). Surface temperature was found to be the most important determinant of egg and larval stage distribution of commercial fish in Alaska based on the distribution models used to define EFH. For many of the commercial groundfish for which the youngest age in the stock assessment is 4 years old or older, effects of this sustained warmer temperature on recruitment will not be immediately apparent. These generally unfavorable conditions seem to be improving, as seabirds—both plankton and fish-eating species—had earlier to average hatch dates and average to above-average reproductive success in 2019. This seems particularly true for surface-feeding seabirds which have been shown to respond more consistently with changes in their phenology as warmer temperatures bring earlier spring blooms. This flexibility and higher response to fluctuations in the environment is also coherent with the lower response to variable environmental conditions that is observed in fish and seabirds used to generally more stable processes at depth throughout their lifespan. In addition to physical drivers, Kamchatka pink salmon (a new indicator this year), with a marked biennial signal in their abundance that peaks in odd years, has been shown to be correlated with copepod abundance, otolith growth in Atka mackerel, planktivorous seabird reproductive success (Batten et al., 2018; Matta et al., 2020; Springer and van Vliet, 2014), and potentially, Pacific ocean perch young of the year. With record abundance in 2019 and an increasing trend over the past decade, their potential for competitive impacts on prey availability for other groundfish and cascading ecosystem effects warrants consideration. These competitive impacts may differ for fish feeding in shallow versus deeper waters as other biological processes may confound physical forcing driven by surface temperatures or may have a lagged effect in deeper waters. While, in general, Kamchatka pink salmon abundance correlates with a lower copepod abundance in off years, 2019 was an exception, as shown by the CPR timeseries which shows an increase in the mean size of the copepod community and its abundance -as supported by the decreased biomass of large diatoms which signals a potential increased predation pressure from copepods. With a potential cascading effect on plankton feeding species and young-of-year fish, this may partly explain the success of fish feeding seabirds in 2019. Understanding the interplay of vertical and horizontal spatial variability in food-web and oceanographic dynamics is particularly relevant given the higher reliance on plankton in the western Aleutians versus more piscivorous and invertivore feeding habits of fish and seabirds towards the eastern Aleutians.

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	The largest total biomass of both fish apex predators and pelagic foragers is located in the central Aleutians, the ecoregion with the largest shelf area under 500m. The lowest apex predator biomass is located in the western Aleutians whereas that of pelagic foragers is found in the eastern Aleutians. This pattern has been consistent since 1991, though individual species group fluctuations do not necessarily follow the same behavior. Finally, the increase of Pacific Ocean perch biomass and its stable high population, might be driving some spatial dynamics, where it may be encroaching onto other species' habitats, as seen by the estimated increase in the area occupied shown in the Pacific Ocean perch stock assessment. This increase in abundance and area occupied may be the cause of the increased bycatch of Pacific Ocean perch. Western Ecoregion In the western ecoregion, the reproductive success of planktivorous auklets, serving as indicators of zooplankton production, was above average during 2019. Both least and crested auklets hatched chicks earlier than the long term average. These species feed their chicks mainly euphausiids and copepods, respectively. Parakeet, whiskered, and crested auklets all had high reproductive success in 2019, while that of least auklets was average. While the overall timing of breeding for fish-eating seabirds was average in 2019, their reproductive success varied. Glaucous-winged gulls and horned puffins had high reproductive success, tufted puffins and thick billed murres had average reproductive success, and common murres failed. There was an increase in the variety of fish brought back to feed tufted puffin chicks. Increased diversity in chick diets may indicate that more favored prey were less available. There was a slight increase in the proportion of gadids fed but lower proportions of hexagrammids (likely age-0) and Ammodytes. It is still unknown whether the high number of hexagrammids seen in 2013 and 2014 possibly indicated high recruitment in Atka mackerel, as their overall abundance has been in decline since 2006. Steller sea lion non-pup counts continue to decline with the lowest estimated numbers yet in 2019. The diet of Steller sea lions consists primarily of commercially fished species, many of which seem to have had poorer body condition in recent years. The declining Steller sea lion trends in both numbers and birth rates are topics of active research, and prey quality may play a role in their lack of recovery. Central Ecoregion There was a slight increase in Steller sea lions non-pup estimates in 2019, which although small, have been consistent since 2015. School enrolment was slightly higher, pointing perhaps to more stable conditions for families in the area. The increase was driven by both students in Adak and Atka. Eastern Ecoregion Pollock and Pacific Ocean perch commonly comprise more than half the pelagic foraging fish biomass observed in the bottom trawl survey, and 2019 was no exception. There are almost no northern rockfish in this area, but Pacific Ocean perch has been increasing their spatial extent, as seen by the estimated area occupied in the Pacific Ocean perch stock assessment. All the piscivorous seabirds species monitored for reproductive timing at Aiktak Island in Unimak Pass, hatched chicks early or on average in 2019, signalling favorable foraging conditions in the region. Reproductive success was high for red-faced cormorants, thick-billed murres, and puffins. This is despite the low forage fish availability of sandlance Ammodytes, gadiids and hexagrammids as suggested by the 2019 diets of tufted puffin chicks. Chick-provisioning patterns suggest puffins are responding to changes in forage fish availability. As in the west, the diversity of fish prey in puffin diets increased in 2019, possibly indicating that more favored prey were less available. Planktivorous

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auklets are not as numerous in the eastern ecoregion as in the central and western ecoregion and are not monitored in the Eastern ecoregion.

Gulf of Alaska

Current Environmental State—Gulf of Alaska 2020

Western Gulf of Alaska

The WGOA returned to near-average sea surface temperatures in the winter of 2020, after the previous marine heatwave ended in December 2019. Temperatures were close to long-term mean levels for winter and spring followed by elevated temperatures in the summer and fall. Temperatures oscillated around the heatwave threshold throughout the summer and have remained in heatwave conditions since September (as of Oct. 30th). Residual heat from previous warm years remains at depth, as seen along the Seward Line, which remains a concern for lagged ecological recovery from previous heatwaves. Indicators of surface transport described upwelling-favorable westerly winds causing eastward and southward sea surface transport (described by satellite data and supported by the Papa Trajectory Index) due to anomalously high sea level pressure during winter 2019/2020 (satellite data and a strongly positive state of the Arctic Oscillation). Spring winds in Shelikof Strait were downwelling-favorable northeasterly winds, conducive to enhanced retention of larval and juvenile pollock. High eddy kinetic energy was present off the shelf west of Kodiak, potentially enhancing higher phytoplankton biomass in that region. La Niña conditions are predicted for winter 2020–2021, along with moderate to cooler sea surface temperatures across the GOA.

Chlorophyll-a data indicate early peak phytoplankton bloom timing, similar to that in 2017 and 2018, and approximately average phytoplankton biomass in WGOA. Spring biomass estimates of large copepods and euphausiids were near the long-term average along the Seward Line (May 2020), suggesting prey were not limiting. A lack of additional zooplankton data makes this trend difficult to extrapolate across the WGOA, due to an “off-year” of GOA surveys and COVID-related cancellations of planktivorous seabird surveys.

The limited forage fish data show mixed trends in WGOA. Forage fish-eating seabirds (surface feeding and diving) at Middleton Island found sufficient prey to successfully rear chicks, although chick diets were diverse and included a notable increased proportion of greenlings. These diets suggested that the more typical forage fish, such as capelin, were not abundant. Preliminary analysis of ichthyoplankton surveys from 2019 reported relatively high abundance of larval sand lance (highest since 2007) indicating potential for elevated age-1 sand lance populations in 2020, although no surveys were conducted this year to verify. Prince William Sound herring spawning stocks increased slightly from 2019 due to a strong age 3+ recruitment, but they remain very low. Several indicators of good age-1 walleye pollock recruitment in 2020 include southwest wind trajectories in Shelikof Strait and an early spring phytoplankton bloom (similar to 2017 and 2018).
Indications of groundfish biomass trends in 2020, an “off-year” for the GOA-wide bottom trawl surveys, are based on ADF&G surveys off Kodiak Island over Barnabus Gully and in two inshore bays. Catch rates were below the long-term mean for arrowtooth flounder, flathead sole, Pacific cod, Pacific halibut, skates, and walleye pollock, and above the long-term mean for Tanner crab.

Paralytic shellfish toxin (saxitoxin) monitoring in phytoplankton and shellfish in SEAK, Kachemak Bay, and Kodiak Island reported a consistent presence of harmful algal blooms (HABs). Bivalve shellfish from areas that are well known for having PSP levels above the regulatory limit, including Southeast Alaska and Kodiak, continued to test above the regulatory limit in 2020, while Kachemak Bay shellfish

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	did not exceed the limit this year. Whales and seabirds continue to show mixed trends in the WGOA in 2020. Humpback whale counts in Prince William Sound remained lower in 2020 than pre-2014 heatwave levels. 2020 is the second year of an unusual mortality event that included 44 dead grey whales found within Alaskan waters, 24 of which were in the GOA (primarily western). Given that benthic prey (primarily ampelecid amphipods) in the Bering, Chukchi, and Beaufort Seas are considered the mainstay of gray whale foraging, it is reasonable to assume that the mortalities located in the GOA are linked to the extreme changes in their foraging grounds to the north. Overall, the status of seabirds was fair to good in the WGOA in 2020, based on an integration of qualitative and quantitative, limited data from Middleton Island, Cook Inlet, and the Kodiak Archipelago. Colony attendance remains low in some populations compared to historic levels, and some colonies were newly abandoned. However, when birds did arrive to breed, reproductive success was fair to good for both fish-eating, surface-feeding birds and fish-eating, diving birds. There was spatial variability in colony attendance and reproductive success, with Middleton Island birds performing more strongly than Kodiak Island or Cook Inlet. Middleton Island populations from both these groups experienced their strongest breeding seasons since the marine heatwave began in 2014, suggesting an increase in the availability of small schooling fish in that region of WGOA. The Alaska Maritime National Wildlife Refuge's seabird reproductive success time series were not updated in 2020, due to COVID-19 related survey cancellations, making these reported data trends difficult to compare to previous years' ESRs. **Eastern Gulf of Alaska** The EGOA returned to near-average sea surface temperatures in the winter of 2020, after the previous GOA marine heatwave ended in December 2019. Sea surface temperatures were close to long-term mean levels for winter, spring, and summer (cooler than WGOA), followed by elevated temperatures in the fall in EGOA. The EGOA is experiencing warmer sea surface temperatures than fall 2019 but has not exceeded the marine heatwave threshold (as of Oct 30th). Indicators of surface transport described upwelling-favorable westerly winds causing eastward and southward sea surface transport (shown with satellite data and supported by the Papa Trajectory Index), due to anomalously high sea level pressure during winter 2019/2020 (satellite data and a strongly positive state of the Arctic Oscillation). La Niña conditions are predicted for winter 2020-2021, along with moderate sea surface temperatures in the EGOA. Chlorophyll-a data indicate early peak phytoplankton bloom timing and approximately average phytoplankton biomass in EGOA. Total zooplankton density in SEAK inside waters (Icy Strait, summer) was near the long-term average, but included increases in large copepods, decreases in small copepods, and decreases in euphausiids. A lack of additional zooplankton data makes these trends difficult to extrapolate across the EGOA, including offshore waters, due to an off-year of GOA surveys and COVID-19 related cancellations of planktivorous seabird surveys. Limited forage fish data show mixed trends in EGOA. Preliminary results of mature spawning herring (age 3+) show strong recruitment in 2020, continuing the 2019 high levels in Sitka Sound and Craig (ocean influenced populations). Juvenile pink and chum salmon CPUE in inside waters (Icy Strait) increased to average levels for the first time since 2016 while sockeye and coho remain lower. Humpback whale productivity and juvenile survival in Glacier Bay and Icy Strait returned to more typical, pre-2014 heatwave levels, reflecting good feeding conditions (for females) from 2018–2020.

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This could include the increased herring abundance described above.

Phytoplankton and shellfish monitoring for paralytic shellfish toxins (saxitoxins) in Southeast Alaska included samples exceeding the regulatory limit in 26 out of 40 sites, slightly lower than the 30 sites observed in 2019. The lower toxicity levels may be attributed to the rainy summer and cooler temperatures in 2020.

Salmon commercial harvest was low across most of GOA, and lowest in SEAK since 1976, resulting in numerous requests for the State to declare salmon fishery disasters. The low returns in SEAK were primarily driven by low chum and sockeye. Low adult returns are tied to juvenile mortality in 2017 (and years since then for certain species) but the mechanism driving that trend (e.g., environment, predation) is still uncertain.

ACLIM

The Alaska Climate Integrated Modeling project (ACLIM) is a NOAA sponsored interdisciplinary collaboration to project and evaluate climate impacts on marine fisheries in the Bering Sea, Alaska[103]. It connects research on global climate and socioeconomic projections to regional circulation, climate enhanced biological models, and socio-economic and harvest scenarios. To evaluate a range of possible future conditions, scientists are evaluating the effectiveness of existing fishery management actions under 11 different climate scenarios (spanning high and low CO2 futures expected to lead to different degrees of warming). They will also look at how human fishing fleets and communities can adapt to climate change through climate-informed management.

Results of the ACLIM have been presented to the Council. In December 2018 the North Pacific Council adopted a Bering Sea Fishery Ecosystem Plan (BS FEP). Under the overarching guidance of the Council's Ecosystem Approach Statement, the BS FEP sets goals and objectives for the Bering Sea ecosystem which direct the process by which the Council should manage fisheries, monitor the ecosystem, and prioritize new research through identification of projects, called "Action Modules" [104].

Accordingly, in June 2019, the Council sought nominations for membership for two taskforces to work on two Action Modules, or projects that implement the Council's Bering Sea FEP. One of the two is the Climate Change Action Module: tasked with evaluating short- and long-term effects of climate change on fish, fisheries, and the Bering Sea ecosystem, and develop management considerations. The Bering Sea FEP establishes a framework for the Council's continued progress towards ecosystem-based fishery management (EBFM) of the Bering Sea fisheries, and relies and builds on the Council's existing processes, advisory groups, and management practice. The FEP was prepared by the Bering Sea Fishery Ecosystem Plan Team, which is an interagency group of Council, NMFS, and other Federal, State and IPHC staff, with contributions from other Council and NMFS staff, and with extensive input from the Council's Ecosystem Committee. The module will leverage ongoing studies, such as ACLIM and an Alaska species vulnerability assessment, and consider how information from those existing studies can better filter into the Council process.

[103] https://www.fisheries.noaa.gov/alaska/ecosystems/alaska-climate-integrated-modeling-project

[104] https://meetings.npfmc.org/CommentReview/DownloadFile?p=c334ad33-4139-4b5a-b205-a8b7c5028562.pdf&fileName=D6%20Final%20BS%20FEP%20Jan%202019.pdf

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	Aside from the NMFS ecosystem-based research, there are a number of other programs, initiatives and plans initiatives devoted to understanding the ecosystem dynamics as they relate to fisheries. The North Pacific Research Board (NPRB) has funded long-term monitoring (LTM) projects since 2002 through its annual Request for Proposals (RFPs) and as part of its Integrated Ecosystem Research Program with projects in the Bering Sea and Gulf of Alaska[105]. The NPRB Long-term Monitoring Program was launched in 2013. The board committed an initial $400,000 per year for five years to this effort (a total of $2 million). The first long-term monitoring projects were funded in 2014 and will continue for a minimum of five years. The NPRB's Bering Sea Project[106]was founded upon the implementation and science plans for the Bering Ecosystem Study (''BEST'') supported by the National Science Foundation (NSF), and the Bering Sea Integrated Ecosystem Research Program (''BSIERP'') supported by the NPRB. The overarching goal of the two programs was to increase our understanding of the processes that maintain the structure and function of the Bering Sea marine ecosystem, and to learn how natural and anthropogenic variation in sea ice and other physical forcing mechanisms may produce natural, economic, sociological and cultural impacts to the ecosystem. Major direct funding was provided by the National Science Foundation ("Bering Ecosystem Study"; ~$26M) and the North Pacific Research Board ("Bering Sea Integrated Ecosystem Research Program", BSIERP; ~$16M). Substantial in-kind support (~$15M) was provided by other agencies. The $17.6 million Gulf of Alaska ecosystem study examines the physical and biological mechanisms that determine the survival of juvenile groundfishes in the Gulf of Alaska[107]. From 2010 to 2014, oceanographers, fisheries biologists and modelers studied commercially and ecologically important groundfishes, specifically walleye pollock, Pacific cod, Pacific ocean perch, sablefish and arrowtooth flounder, during their first year of life as these fish are transported from offshore areas where they are spawned to nearshore nursery areas. A synthesis was planned from September 2015 through February 2018. The synthesis is building upon the results of the field program and producing products that apply the results to fisheries management. <u>12.2 Research and Institutional capacity for environmental impact assessment</u> The NPFMC and NOAA/NMFS routinely carry out assessments and research related to fishery impacts on ecosystems and habitats and how environmental factors affect the fishery. Findings and conclusions are published in the Ecosystem section of the SAFE documents, annual Ecosystem Considerations documents (summarized under clause 12.1), and various other research reports. In terms of impact assessment, it is a requirement that every time a major change is proposed to regulations affecting fisheries management such as the revision of a fishery management plan, a federal National Environmental Policy Act (NEPA) analysis is initiated. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed

[105] https://www.nprb.org/long-term-monitoring-program/about-the-program/
[106] https://www.nprb.org/bering-sea-project/about-the-project/
[107] https://www.nprb.org/gulf-of-alaska-project/about-the-project/

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	actions. Agencies also provide opportunities for public review and comment on those evaluations[108]. The most recent NEPA compliant Regulatory Impact Review/ Environmental Assessment was performed in regard to the proposed NPFMC action to allow halibut retention in BSAI sablefish pots, issued for public review in October 2018[109]. Impact assessments are available for all major elements affected by the sablefish fishery. Those include bycatch, ETP species, and habitat effects. The bycatch from the sablefish fishery was also assessed in 2020, full details of which were reported in the 2020 sablefish SAFE report[110] (Goethel et. al. 2020). Giant grenadiers, a non-target species (Ecosystem Component in both the GOA and BSAI FMPs), continue to make up the bulk of the nontarget species bycatch. The species is not considered at risk of depletion or depleted. In terms of seabirds affected, a 2018 report from NOAA Fisheries monitored bycatch seabirds and of ESA short- tailed albatross, where no catches were reported for the year. The report estimated seabird bycatch for the combined groundfish and halibut fisheries (6,075 birds) and conclude that it was below the 2010 through 2018 annual average of 6,492 birds. The report further explained that consistent with results for all gear types combined, most 2018 estimated seabird bycatch by demersal longline gear was Northern fulmar (55 percent; 2,794 birds); gulls (15 percent; 781 birds); and shearwaters (13 percent; 641 birds). Marine mammal interactions are summarized by NOAA Fisheries annually, in their marine mammal stock assessment reports in U.S. waters[111]. The sablefish fisheries are known to interact with Steller sea lions and sperm whales, and further information has been summarized in the clauses below. The EFH Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST)[112]. The stock continues to be above its MSST level in 2018. The 2015 Essential Fish Habitats (EFH) 5-year review that concluded in June 2017 evaluated new information on EFH, concluded that no change to the conclusions of the evaluation of fishing effects on EFH was warranted based on new information. In June 2018 a final environmental assessment was released relating to EFH as Omnibus amendments applying to: Amendment 115 to the FMP for the Groundfish Fishery of the BSAI Area, Amendment 105 to the FMP for Groundfish of the GOA, among other FMPs[113]. In terms of habitat impacts, bottom trawl impacts, which are the most significant have been addressed in Alaska by requires raised bobbins in demersal trawl targeting flatfish and cod in the BSAI

[108] https://www.epa.gov/nepa/what-national-environmental-policy-act
[109] https://meetings.npfmc.org/CommentReview/DownloadFile?p=2dcf0126-26d7-478a-a2c6-c8f1dc234d58.pdf&fileName=C4%20Halibut%20Retention%20in%20BSAI%20Pots%20Public%20Review%20-%20pdf%20version.pdf
[110] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[111] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---otariids-(eared-seals-or-fur-seals-and-sea-lions)
[112] https://repository.library.noaa.gov/view/noaa/17392
[113] https://repository.library.noaa.gov/view/noaa/18204

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	and the Central GOA. Research has demonstrated that this gear modification reduces unobserved mortality of red king crab, Tanner crab, and snow crab, reducing contact with the ocean floor by as much as 90%[114]. In addition to this there are extensive habitat closures in Alaska[115]. 12.3./12.4/12.5/12.6. Fishery Interaction with the ecosystem, non-target catches, discards, associated, dependent or endangered species The 2020 SAFE[116] reported extensively on the sablefish fishery effects on the ecosystem, including non-target catches, discards, and associated, dependent or endangered species. We provide a direct summary of this information here below. **Sablefish Discards** Sablefish discards by target fisheries are available for hook-and-line gear and other gear combined. From 1994 to 2004 discards averaged 1,357 t for the GOA and BSAI combined (Hanselman et al. 2008). Since then, discards have been lower, averaging 847 t during 2010 - 2018. Discard rates are generally higher in the GOA than in the BSAI. In 2017 and 2018 there was a large increase in discards in the non-halibut gears, mostly because of the high encounter rates with young fish. A recent discussion paper on sablefish discard allowance (Armstrong et al., 2018) provides information on biological and economic impacts for introducing minimum size regulations for sablefish. In 2018, there was a marked increase in sablefish landings for small (1-3 pound) sablefish in the BSAI fisheries, most notably the midwater pollock fishery, and an associated large decrease in value for these same sized fish (Armstrong et al., 2018). This size range is the likely age for the 2014-to-2016-year classes (age 2-4). Since April 2018, a regulatory change that would allow discarding of small sablefish in the Individual Fishing Quota (IFQ) sablefish fishery has been discussed as a potential tool to mitigate fishery and population impacts of very large sablefish year classes[117]. This change was first suggested by IFQ stakeholders following enormous increases in survey catches of small sablefish from the 2014-year class, the largest on record. In October 2018, the Council has reviewed an Initial discussion paper that evaluated a range of biological, economic, and management considerations related to a discarding allowance, and which pointed out that growth of fish from the 2014 year class into typical market categories would outpace the timing of the proposed management change. After review of the October 2018 discussion paper, the Council passed a motion instructing staff to gather more information on the possible implications of permitting sablefish discarding, identifying in the motion nine areas of concern for staff to focus on. In April 2019, the NPFMC motioned to initiate an expanded discussion paper to gather more information on the possible implications of modifying the requirement (e.g. to proxy DMR, gear specific DRMs) to retain small sized sablefish and to explore the implications of these changes on overall stock abundance and allocations to trawl and IFQ fisheries

[114] https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs
[115] https://www.npfmc.org/habitat-protections/gear-modifications/
[116] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[117] https://meetings.npfmc.org/CommentReview/DownloadFile?p=b40b8eb3-a783-421c-9c3a-4497b1432159.pdf&fileName=D8%20Action%20Memo.pdf

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	Bycatch in the sablefish fishery (observer data) The largest bycatch group in the sablefish fishery[118] is GOA thornyhead rockfish with an bycatch average of 610 t/year and , 187 t discarded for years 2013-2020 . Sharks and skates are also taken in substantial numbers and are mostly discarded. Giant grenadiers, a non-target species that is an Ecosystem Component in both the GOA and BSAI FMPs, make up the bulk of the nontarget species bycatch, with 2013 the highest in recent years at 15,035 t but has decreased by more than half in in the last few years. Other non-target taxa that have catches over one ton per year are corals, snails, sponges, sea stars, and miscellaneous fishes and crabs. PSCs in the targeted sablefish fisheries are dominated by halibut (7 t/year on average, mostly BSAI) and golden king crab (13,805 individuals/year on average, mostly BSAI). Crab catches are highly variable, probably as a result of relatively low observer sampling effort in sablefish fisheries. **Bycatch of other species in the target sablefish fleet from EM data** One of the key updates of the 2018 North Pacific Observer Program Report was that[119] 2018 was the first year that EM was integrated into the Observer Program under regulations. In 2020[120], EM data were collected from 106 vessels from 258 trips (195 longline trips and 63 pot trips). By target species, there were 122 halibut trips, 23 Pacific cod trips, and 113 sablefish trips. The data spanned 682 halibut sea days, 86 Pacific cod sea days, and 674 sablefish sea days for a total of 1,442 sea days with trips averaging 5.6 days across all fisheries. Of the 11,491 hauls on reviewed trips, the catch level data was recorded for 3,814 hauls. All catch data presented is from this subset of hauls. Since total catch accounting is the goal for EM in the Southeast Alaska fixed gear sectors, all species of retained or discarded marine organisms were reported and summarized to the target fishery level. Video reviewers identified a high proportion of retained and discarded catch to species. Exceptions were primarily those species that reviewers have been instructed to identify to a group level because they are too similar to reliably differentiate (e.g., shortraker rockfishes, and arrowtooth/Kamchatka flounders). There were also a small proportion of rockfish that were recorded as “Rockfish – unidentified” or “Rockfish – Small Red unidentified Some of the most common bycatch (retained and/or discarded) in the sablefish fleet component using EM included Thornyhead, Shortspine Thornyhead, Shortraker/Rougheye rockfish, grenadier, spiny dogfish and soft snout skate. **Seabird bycatch** <u>Demersal Longline Gear</u> Based on standard observer sampling protocols, demersal longline gear in Alaska groundfish fisheries accounted for 78 percent of the estimated seabird mortality in 2019 (6,873 birds), which is comparatively lower than the average estimated seabird mortality from 2010 through 2018 (88 percent; range 76 to 96 percent).

[118] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[119] https://www.fisheries.noaa.gov/resource/document/north-pacific-observer-program-2018-annual-report
[120] https://meetings.npfmc.org/CommentReview/DownloadFile?p=9e77fc11-b9c8-44b5-a153-69bdbf5d75b8.pdf&fileName=C1%20Observer%20Program%202020%20Annual%20Report.pdf

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	From 2010 through 2019, most of the demersal longline gear estimated seabird bycatch occurred in the Bering Sea (81 percent) when compared to the Aleutian Islands (5 percent) and GOA (14 percent). In fact, most (70 percent) of the total (all gear types) seabird bycatch off Alaska occurred in the Bering Sea fisheries using demersal longline gear (range 55 percent to 86 percent from 2010 through 2019). Consistent with results for all gear types combined, most 2019 estimated seabird bycatch by demersal longline gear was shearwaters (51 percent; 3,497 birds); Northern fulmar (38 percent; 2,588 birds); and gulls (4 percent; 244 birds;). While estimated bycatch of shearwaters in 2019 was the highest reported in the time series, total bycatch of Northern fulmar and gulls was comparatively lower when compared to the 2010 through 2018 times series average. Estimates of seabird bycatch were also analyzed to compare C/Ps and CVs. In the BSAI, 99 percent of the total estimated seabird bycatch for vessels using demersal longline gear occurred on C/Ps in 2019 (6,327 birds). This is slightly higher than 2010 through 2018 time series average (96 percent; 4,654 birds; range of 1,427 to 8,831 birds). Northern fulmar, shearwaters, and gulls accounted for 96 percent of total estimated bycatch for C/Ps in 2019 (2,454; 3,437; 186 birds, respectively). On CVs, Northern fulmar accounted for 35 of the 37 total estimated seabirds caught as bycatch in the BSAI in 2019 (Table 7). In the GOA, 86 percent of total estimated seabird bycatch for vessels using longline gear occurred on CVs in 2019 (423 birds). This proportion is similar to the 2010 though 2018 average (746 birds; 87 percent). Black-footed albatross, gulls, and Northern fulmar were the three most prevalent seabird bycatch species for CVs in 2019 (221; 32; 82 birds, respectively; Table 7). The difference in proportion of seabird bycatch attributed to CVs and C/Ps in the BSAI and GOA is most likely a reflection of the differences in fleet characteristics between the two regions. In the BSAI, most of the longline effort is by C/Ps targeting Pacific cod, while in the GOA, most of the longline effort is by CVs targeting halibut, sablefish, and Pacific cod. Of the demersal longline fisheries that have seabird bycatch, the bulk of recent fishery effort in the Bering Sea occurs in the Pacific cod demersal longline fleet (Eich et al. 2016). While this fishery accounts for the greatest amount of seabird bycatch (2010 through 2019 average of 68 percent), it captures an average of 8 percent of the total albatross bycatch. However, nearly all of the estimated short-tailed albatross takes that have occurred since 2003 have been in the Pacific cod demersal longline fleet (24 of the total 31 birds), while the remainder were taken in the Greenland turbot demersal longline fishery. As noted earlier, no endangered short-tailed albatross takes by demersal longline gear were observed in 2019 in the Federal fisheries off Alaska Examining the three fisheries responsible for the majority of seabird bycatch—Pacific cod, sablefish, and 14 halibut demersal longline—the average annual seabird bycatch for 2010 through 2018 was 4,521, 719, and 316 birds per year, respectively. In 2019, the Pacific cod, sablefish, and halibut demersal lon halibut demersal longline—the average annual seabird bycatch for 2010 through 2018 was 4,521, 719, and 316 birds per year, respectively. In 2019, the Pacific cod, sablefish, and halibut demersal longline estimated seabird bycatch was similar with 6,385, 441, and 34 birds, respectively

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	Focusing solely on the bycatch of albatross (unidentified, short-tailed, Laysan, and black-footed), the Pacific cod, sablefish, and halibut fisheries using demersal longline gear average 37, 359, and 76 albatross per year, respectively, for 2010 through 2019 (average for halibut fisheries calculated for 2013 through 2019). Seabird bycatch levels and rates are highly variable among years; however, sablefish has higher estimated albatross bycatch relative to other fisheries. Therefore, future conservation efforts for mitigating albatross bycatch should focus on the sablefish fleet for maximum benefit. For endangered species bycatch, the focus should remain on the Pacific cod fleet; however, the average estimated mortality (2010 through 2019) is about 2 short-tailed albatross per year. Takes of short-tailed albatross have not been observed in the sablefish fishery since the mid-1990s. The only other fishery with a short-tailed albatross take is the BSAI Greenland turbot fishery in which 2 short-tailed albatross were recorded taken in 2014 (only 1 bird was in the observer sample). When expanded by the CAS, the average estimated mortality (2010 through 2019) across the Greenland turbot fishery is less than 1 short-tailed albatross per year. **Marine Mammals** The 2021 List of Fisheries Summary Tables list U.S. commercial fisheries by categories according to the level of interactions that result in incidental mortality or serious injury of marine mammals. The sablefish fisheries in the GOA are listed as Category II (occasional interactions with North Pacific sperm whale and Steller sea lion, Western US) while the BSAI and state fisheries are classified as Category III[121] (remote likelihood of/no known interactions with no marine mammal species mentioned). **Sperm Whales** Sperm whales have been observed depredating both halibut and sablefish longline fisheries in the Gulf of Alaska and this is also widespread in sablefish longline fisheries in the central and eastern Gulf of Alaska; this depredation can lead to mortality or serious injury if hooking or entanglement occurs. Potential threats most likely to result in direct human-caused mortality or serious injury of this stock include entanglement in fishing gear and ship strikes due to increased vessel traffic (from increased shipping in higher latitudes). Between 2013 and 2017, three serious injuries of sperm whales were observed in the Gulf of Alaska sablefish longline fishery (two in 2013 and one in 2016) and one in the Bering Sea/Aleutian Islands halibut longline fishery (in 2015). Each of these injuries was prorated at a value of 0.75 and extrapolated to fishery-wide estimates when possible, resulting in a minimum estimated mean annual mortality and serious injury rate of 4.7 sperm whales in U.S. commercial fisheries between 2013 and 2017[122]). The Potential Biological Removal (PBR) for sperm whales is 0.5, however, this is likely an underestimate given that is was calculated based on a limited geographical subset of the whole population. On the basis of total abundance, current distribution, and regulatory measures that are in place, it is unlikely that this stock is in danger of extinction (Braham 1992).

[121] https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables#table-1-category-iii

[122] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---otariids-(eared-seals-or-fur-seals-and-sea-lions)

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	Steller Sea Lions Mean estimated annual mortality of Western DPS Steller sea lion was 1.1 in the GOA sablefish fishery. The minimum estimated mean annual U.S. commercial fishery-related mortality and serious injury rate (36 sea lions) is more than 10% of the PBR (10% of PBR = 32) and, therefore, cannot be considered insignificant and approaching a zero mortality and serious injury rate. Based on available data, the minimum estimated mean annual level of human-caused mortality and serious injury (247 sea lions) is below the PBR level (322) for this stock[123]. The Western U.S. stock of Steller sea lions is currently listed as endangered under the ESA and, therefore, designated as depleted under the MMPA. As a result, the stock is classified as a strategic stock. The population previously declined for unknown reasons that are not explained by the documented level of direct human-caused mortality and serious injury. **Bait fisheries** Most longline bait is purchased frozen and thawed before using. Salmon, herring, cod, and octopus or squid are typically purchased for bait. These bait species are well managed by either the State of Alaska or the NMFS, and none are classified as depleted, endangered or threatened. 12.7 Role of the "stock under consideration" in the ecosystem Sablefish are not typically categorized as a key prey species for any single marine predator. Predation on sablefish, especially by marine mammals, is apparently low, except in cases where the fish were attached to fishing gear. Larval sablefish sampled by neuston net in the eastern Bering Sea fed primarily on copepod nauplii and adult copepods (Grover and Olla 1990). Gao et al. (2004) studied stable isotopes in otoliths of juvenile sablefish from Oregon and Washington and found that as the fish increased in size, they shifted from midwater prey to more benthic prey. In nearshore southeast Alaska, juvenile sablefish (20-45 cm) diets included fish such as Pacific herring and smelts and invertebrates such as krill, amphipods and polychaete worms (Coutré et al. 2015). In late summer, juvenile sablefish also consumed post-spawning pacific salmon carcass remnants in high volume, revealing opportunistic scavenging (Coutré et al. 2015)[124]. The main juvenile sablefish predators are adult coho and chinook salmon, which prey on young-of-the-year sablefish during their pelagic stage. Although juvenile sablefish may not be a prominent prey item because of their relatively low and sporadic abundance compared to other prey items, they share residence on the continental shelf with potential predators such as arrowtooth flounder, halibut, Pacific cod, bigmouth sculpin, big skate, and Bering skate, which are the main piscivorous groundfishes in the GOA. Sperm whales are likely a major predator of adult sablefish. Juvenile sablefish (< 60cm FL) prey items overlap with the diet of small arrowtooth flounder, and possibly also sleeper sharks[125]. Alaska sablefish trophic level is considered to be between 3.84 and 4.12[126], and they are not

[123] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---otariids-(eared-seals-or-fur-seals-and-sea-lions)
[124] https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
[125] https://www.afsc.noaa.gov/REFM/Stocks/plan_team/2016sablefishCIE/Papers_for_website/SB_CIE_HISTORY_16.pdf
[126] https://www.fishbase.in/Ecology/FishEcologySummary.php?StockCode=528&GenusName=Anoplopoma&SpeciesName=fimbria

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	considered a key prey species; as such there does not appear to be a need for management objectives and measures in place to avoid severe adverse impacts on dependent predators. 12.8 Pollution – MARPOL. MARPOL 73/78 (the "International Convention for the Prevention of Pollution From Ships") is one of the most important treaties regulating pollution from ships. Six Annexes of the Convention cover the various sources of pollution from ships and provide an overarching framework for international objectives. In the U.S., the Convention is implemented through the Act to Prevent Pollution from Ships (APPS). The requirements apply to vessels operating in U.S. waters as well as ships operating within 200 nautical miles of the coast of North America, also known as the North American Emission Control Area (ECA). On June 27, 2011, the EPA and USCG entered into a Memorandum of Understanding (MOU) to enforce Annex VI MARPOL. The Annex VI MOU[127] provides that EPA and USCG will jointly and cooperatively enforce the provisions of Annex VI and APPS. Efforts to be conducted by USCG and EPA include inspections, investigations and enforcement actions if a violation is detected. The efforts to ensure compliance with Annex VI and APPS include oversight of marine fueling facilities, on board compliance inspections, and record reviews. On January 16, 2015, EPA released a penalty policy for violations of the sulfur in fuel standard and related provisions for ships. 12.9 Knowledge of the essential habitats for the “stock under consideration” and potential fishery impacts on them. The 2015 Essential Fish Habitats (EFH) 5-year review that concluded in June 2017 evaluated new information on EFH, assessed information gaps and research needs, and identified whether any revisions to EFH are needed. Based on the 5-year review, the Council determined that new habitat and life history information is available to revise many of the EFH descriptions and maps in the FMPs. These amendments to the EFH provisions in the Council’s FMPs would not substantively change the impacts of EFH as analyzed in the 2005 EFH environmental impact statement. The 2015 EFH 5-year review concluded that no change to the conclusions of the evaluation of fishing effects on EFH was warranted based on newinformation. In June 2018, a final environmental assessment was released relating to EFH as Omnibus amendments applying to: Amendment 115 to the FMP for the Groundfish Fishery of the BSAI Area, Amendment 105 to the FMP for Groundfish of the GOA, among other FMPs[128]. The following changes were proposed for the BSAI and GOA FMPs (as well as the crab FMP): 1. Update EFH descriptions and replace existing maps in the FMPs with maps that represent the 95th percentile by season for each species and life stage, as available.

[127] https://www.epa.gov/enforcement/act-prevent-pollution-ships-apps-enforcement-case-resolutions
[128] https://repository.library.noaa.gov/view/noaa/18204

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Sablefish EFH description in the BSAI (update in October 2018)

- Eggs and larvae: No EFH description determined. Insufficient information is available.
- Early Juveniles: No EFH description determined. Information is insufficient. Early juveniles have generally been observed in inshore water, bays, and passes, and on shallow shelf pelagic and demersal habitat.
- Late Juveniles: EFH for late juvenile sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope (200 to 1,000 m) throughout the BSAI.
- Adults: EFH for adult sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope (200 to 1,000 m) throughout the BSAI.

Sablefish EFH description in the GOA (update in October 2018)

- Eggs: No EFH description determined. Information is insufficient.
- Larvae: EFH for larval sablefish is the general distribution area for this life stage. Larvae are located in epipelagic waters along the middle shelf (50 to 100 m), outer shelf (100 to 200 m), and slope (200 to 3,000
- m) throughout the GOA.
- Early Juveniles: EFH for early juvenile sablefish is the general distribution area for this life stage. Early juveniles have been observed in inshore water, bays, and passes, and on shallow shelf pelagic and demersal habitat.
- Late Juveniles: EFH for late juvenile sablefish is the habitat-related density area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope (200 to 1,000 m) throughout the GOA.
- Adults: EFH for adult sablefish is the habitat-related density area for this life stage, located in deep shelf gulleys along the slope (400 to 800 m) throughout the GOA.

Habitat impact

The Essential Fish Habitat Environmental Impact Statement (EFH EIS) (NMFS, 2005) concluded that benthic longline and fish pot fisheries have minimal or temporary impacts on sablefish habitat while trawl fisheries have substantial long term effects. However, in recent years, even the impacts from trawl fisheries in the BSAI and the Central GOA resulting from gear modifications (raising the bobbins from the seafloor) have decreased[129]. Raised bobbins have been shown to decrease habitat contact by 90%.

Extensive trawl closures have been implemented to protect benthic habitat or reduce bycatch of prohibited species (i.e., salmon, crab, herring, and halibut) in the BSAI and GOA. Some of the trawl closures are in effect year- round while others are seasonal. In general, year-round trawl closures have been implemented to protect vulnerable benthic habitat. Seasonal closures are used to reduce bycatch by closing areas where and when bycatch rates had historically been high[130]. Over 95% of the AI management area is closed to bottom trawling (277,100 nm^2). With the Arctic FMP closure included (an area roughly 150,000 sq nm^2), almost 65% of the U.S. EEZ of Alaska is closed to bottom trawling. Further information on these is available at https://www.npfmc.org/habitat- protections/.

[129] https://www.afsc.noaa.gov/REFM/Docs/2018/GOA/ecosysGOA.pdf
[130] https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/ecosysEBS.pdf

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.**
	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. In regard to the IFQ halibut and sablefish fisheries, one of the most important pieces of recent research was the December 2016 Twenty-Year Review of the Pacific Halibut and Sablefish IFQ Management Program. Primarily, the IFQ Program was examined with respect to how well it met its 10 original policy objectives and how it was providing entry opportunities for new participants, an objective that the Council has sought to provide through numerous revisions since the IFQ Program was implemented. The 10 objectives of this review spanned from access to the fishery to quota shares, community reliance to IFQ and benefits from the program, among others[131]. Socio-economic data collection and economic analyses are often included under the Regulatory Flexibility Act (RFA), the MSA, the NEPA, the Endangered Species Act, and other applicable laws. One of the newest developments in management measures is the allowance of pot gear for catching sablefish in the GOA, partly due to sperm whale predation. Since January 2017, Amendment 101[132] to the Fishery Management Plan for Groundfish of the Gulf of Alaska authorizes the use of longline pot gear in the GOA sablefish IFQ fishery. This FMP Amendment was preceded by a Regulatory Impact Review/ Environmental Assessment[133]. The most recent NEPA compliant Regulatory Impact Review/ Environmental Assessment of some relevance to the sablefish fishery was performed in regard to the proposed NPFMC action to allow halibut retention in BSAI sablefish pots, issued for public review in October 2018[134]. The measure under consideration would allow (and require) retention of legal-size halibut in pot gear in the BSAI, provided the operator holds sufficient halibut IFQ or CDQ for the corresponding International Pacific Halibut Commission (IPHC) regulatory area. In 2018 the total number of vessel offloads containing only halibut IFQ was 3,285, the total number of vessel offloads containing only sablefish IFQ was 1,943, and total number of vessel offloads containing both IFQ species was 1,047[135]. Hence, improving the issue of halibut retention will decrease discards and benefit fishermen with dual sablefish/halibut IFQ shares. AFSC's Economic and Social Sciences Research Program produces an annual Economic Status Report of the Groundfish Fisheries off Alaska is published yearly. This report contains extensive socio-economic fisheries for all fisheries in Alaska, pursued with all allowed gear types. 12.11 Outcome indicator(s) and management objectives for non-target stocks. The main outcome indicators influencing sustainable management of bycatch are those elements expected to keep bycatch species at levels that are highly likely to be within biological limits and

[131] https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf
[132] https://www.fisheries.noaa.gov/action/amendment-101-fmp-groundfish-gulf-alaska-management-area
[133] https://repository.library.noaa.gov/view/noaa/19199
[134] https://meetings.npfmc.org/CommentReview/DownloadFile?p=2dcf0126-26d7-478a-a2c6-c8f1dc234d58.pdf&fileName=C4%20Halibut%20Retention%20in%20BSAI%20Pots%20Public%20Review%20-%20pdf%20version.pdf
[135] https://www.fisheries.noaa.gov/sites/default/files/akro/18ifqland.htm

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.**
	minimize impacts to habitat. Management of non-target species (largely FMP groundfish species) of relevance to the sablefish/halibut IFQ program consists of: 1. A catch accounting system for all species caught (FMP, non-target, PSC, seabirds, marine mammals), 2. Observer program to estimate catches of non-target species (observers + EM data), 3. Fishery independent surveys, 4. Statistical stock assessments for most target and non-target species, 5. A tiered system of assessments that provides for more precautionary annual catch limits when assessments use less precise methods and clear procedures for restricting catch limits if stock rebuilding is necessary, and 6. Mandatory use of seabird avoidance devices on all vessels larger than 55', and 7. A spatial management strategy that prohibits or restricts vessels from fishing in sensitive habits. As summarized in earlier clauses, none of the species considered common bycatch in the sablefish fishery (retained and/or discarded) from 2020 Observer and EM data and that include GOA thornyhead rockfish, sharks and skates, giant grenadiers, Shortspine thornyhead, shortraker/rougheye rockfish can be considered depleted, as most of them are exploited using conservative fishing measures (please refer to the clause 12.3-12.6 for status). The key outcome indicators for groundfish species is the ABCs and OFLs set for these which dictate the management and conduct of fisheries in terms of total possible harvest. These are informed by regular (annual or bi-annual) stock assessments in the GOA and BSAI, and in-season catch accounting. 12.12 Outcome indicator(s) and management objectives for endangered species. The outcome indicators and main management objectives for the sablefish fleet in regard to endangered species refer to regulations aimed at protecting the endangered short-tailed albatrosses (as well as other albatross species and seabirds) from longline fishery interactions, as well as MMPA protected marine mammals. In Alaska, seabird avoidance measures are required[136] (i.e. streamer lines) to be used by operators of all vessels greater than 26 ft LOA using hook-and-line gear while fishing for 1) IFQ halibut, Community Development Quota halibut, or IFQ sablefish in the EEZ off Alaska or State of Alaska (State) waters (0 to 200 nm combined); or 2) groundfish in the EEZ off Alaska (3 to 200 nm). No changes occurred in 2018 to these regulations, which are still seen to be effective at reducing bycatch. No endangered short-tailed albatrosses where caught as bycatch in 2018 in either the halibut or sablefish IFQ fishery. Endangered marine mammal species are managed under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in close coordination with the State of Alaska and other partners. Conservation programs are developed by the NOAA Alaska Regional Office Protected Resources Division for marine mammals including whales, ice seals, harbor seals, northern fur seals, and Steller sea lions; who also develops and implements recovery programs for threatened and endangered species including Cook Inlet beluga whales, bowhead whales, North Pacific right whales,

[136] https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods

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.**
	Steller sea lions, and Arctic ringed seals; coordinates the Alaska Marine Mammal Stranding Network to respond to stranded or entangled marine mammals; and consults with federal agencies to minimize the effects of proposed actions on threatened and endangered marine mammals and their critical habitat, among other tasks. All marine mammal encounters in these fishery are required to be released without harm. The 2021 List of Fisheries Summary Tables list U.S. commercial fisheries by categories according to the level of interactions that result in incidental mortality or serious injury of marine mammals. The sablefish fisheries in the GOA are listed as Category II (occasional interactions with North Pacific sperm whale and Steller sea lion, Western US) while the BSAI and state fisheries are classified as Category III[137] (remote likelihood of/ no known interactions with no marine mammal species mentioned). On the basis of total abundance, current distribution, and regulatory measures that are in place, it is unlikely that North Pacific Sperm whales are in danger of extinction[138]. In 2018 a new aerial survey of Steller sea lions was carried out in Alaska. The results showed that the overall Steller sea lions non-pups count trend has been steadily increasing from 2002 to 2018 and is currently (in 2018) at its highest (see figure 2 of that survey report)[139]. <u>12.13 Outcome indicator(s) and 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.</u> The EFH Environmental Impact Statement (EFH EIS) (NMFS 2005) concluded that the effects of commercial fishing on the habitat of sablefish is minimal or temporary in the current fishery management regime primarily based on the criterion that sablefish are currently above Minimum Stock Size Threshold (MSST)[140]. The stock continues to be above its MSST level in 2020. The sablefish fishery is primarily prosecuted using demersal longline gear which has minimal and temporary effect[141] on sensitive and essential fish habitats. The fishery is also prosecuted using pot gear and demersal trawl gear. Although standard demersal trawling can be considered the highest risk gear when it comes to habitat impacts, the trawl flatfish fisheries in the Bering Sea (since 2010) and the central Gulf of Alaska (since 2013) carry trawl sweep gear modifications. Elevating devices (e.g., discs or bobbins) are required to be used on the trawl sweeps, to raise the sweeps off the seabed and limit adverse impacts of trawling on the seafloor. Research has demonstrated that this gear modification reduces unobserved mortality of red king crab, Tanner crab, and snow crab, reducing contact with the ocean floor by as much as 90%[142].

[137] https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables#table-1-category-iii
[138] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---otariids-(eared-seals-or-fur-seals-and-sea-lions)
[139] SSL_Aerial_Survey_2018_final.pdf
[140] https://repository.library.noaa.gov/view/noaa/17392
[141] http://www.fao.org/3/y3427e/y3427e04.htm#bm04.3.2
[142] https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs

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.**
	In addition to this there are extensive habitat closures in Alaska. A figure depicting the current closures and marine protection areas can be found under clause 12.9. No new closures have been implemented in 2018. Further information on these is provided at https://www.npfmc.org/habitat-protections/. 12.14 Outcome indicator(s) and management objectives for dependent predators. Alaska sablefish trophic level is considered to be between 3.84 and 4.12[143], and they are not considered a key prey species for any single marine predator (for additional information see clause 12.7, and the information on prey and predators from Hanselman et al., 2017). As such, this clause is not applicable. 12.15 Outcome indicator(s) and 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. The GOA and BSAI groundfish fishery management plans[144] have specific objectives and indicators used to implement the NPFMC approach to groundfish fisheries and include ecosystem-based management principles that protect managed species from overfishing, and where appropriate and practicable, increase habitat protection and bycatch constraints. This includes the setting of outcome indicators related to preserving the food web, managing incidental catch, avoiding impacts on seabirds and marine mammals, and reduce and avoid habitat effects though gear modifications, area closures, etc. The eastern Bering Sea indicators were selected in 2010 and will be updated as part of the Fishery Ecosystem Plan currently being developed. The Aleutian Islands indicators were selected in 2011. The Gulf of Alaska indicators were selected in 2015. In December 2018, the North Pacific Council adopted a Bering Sea Fishery Ecosystem Plan (BS FEP). Under the overarching guidance of the Council's Ecosystem Approach Statement, the BS FEP sets goals and objectives for the Bering Sea ecosystem which direct the process by which the Council should manage fisheries, monitor the ecosystem, and prioritize new research through identification of projects, called "Action Modules" [145].
References:	
Statement of consistency to the RFM Fishery Standard	The fishery continues to conform to the requirements of Fundamental Cause 12 of the RFM Fishery Standard.

[143] https://www.fishbase.in/Ecology/FishEcologySummary.php?StockCode=528&GenusName=Anoplopoma&SpeciesName=fimbria
[144] https://www.npfmc.org/bering-seaaleutian-islands-groundfish/
[145] https://meetings.npfmc.org/CommentReview/DownloadFile?p=c334ad33-4139-4b5a-b205-a8b7c5028562.pdf&fileName=D6%20Final%20BS%20FEP%20Jan%202019.pdf

7.9.6.2 Fundamental Clause 13

13.	**Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.**
Summary of relevant changes:	There are no enhancement activities for the Alaska Sablefish stock; as such that portion of the Clause is not applicable.
References:	
Statement of consistency to the RFM Fishery Standard	

8 Recommendations for continued certification

8.1 Certification Recommendation

Following this surveillance audit, the Assessment Team recommends that the fishery Alaska Sablefish Commercial fishery be awarded continuing certification against RFM Certification Program Fisheries Standard Version 1.3.

9 References

Reference	Hyperlink
NOAA Office of General Counsel - Enforcement Section: Policy for the Assessment of Civil Administrative	https://www.gc.noaa.gov/documents/Penalty-Policy-CLEAN-June242019.pdf
Alaska Statutes - Title 16 Fish and Game; Chapter 5 Fish and Game Code: Misdemeanor commercial fisheries penalties:	http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section722.htm
Alaska Legislative Affairs Agency:	http://akleg.gov/publications.php
Alaska State Constitution	https://ltgov.alaska.gov/information/alaskas-constitution/
Alaska Administrative Code	http://www.akleg.gov/basis/aac.asp
NSEI sablefish FMP for 2020:	https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1162363215.pdf
SSEI sablefish FMP for 2020	http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1150381833.pdf https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2020.10.pdf
ADFG Statewide Commercial Groundfish Fishing Regulations, 2019-2020	https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2020_cf_groundfish_regs.pdf
2020 Northern Southeast Inside (NSEI) Subdistrict Sablefish Fishery: Annual Harvest Objective Announcement:	https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2020.05.pdf
BSAI Groundfish Specifications for 2020 and 2021:	https://www.npfmc.org/bsai-specs-2/
GOA Groundfish Final Harvest Specifications for 2020 and 2021	https://www.npfmc.org/goa-specs-2/
BSAI Halibut Abundance-based Management	https://www.npfmc.org/halibutabmworkplan/
Small Sablefish Discarding/Release	https://www.npfmc.org/small-sablefish/
Prince William Sound Sablefish Guideline Harvest Level (GHL) and Harvest	https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.pws_groundfish_sablefish_harvest
Commercial Groundfish Fisheries Southeast Alaska & Yakuta	https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.groundfish

Electronic Monitoring	https://www.npfmc.org/electronic-monitoring-3/
Observer Program	https://www.npfmc.org/observer-program/
2018 Assessment of the Sablefish Stock in Alaska	https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/BSAIsablefish.pdf
Commercial Fishery Entry Commission	https://www.cfec.state.ak.us/
Alaska Seafood Marketing Institute	http://www.alaskaseafood.org/quality/
North Pacific Research Board Bering Sea Project	http://www.nprb.org/bering-sea-project
North Pacific Research Board Gulf of Alaska	http://gulfofalaska.nprb.org/
FUTURE Scientific Program	http://meetings.pices.int/Members/Scientific-Programs/FUTURE
Pacific States Marine Fisheries Commission	http://psmfc.org
Oil Spill Recovery Institute	http://www.pws-osri.org/wp-content/uploads/2018/03/FY17-Annual-report.pdf
2021 SOUTHERN SOUTHEAST INSIDE SUBDISTRICT SABLEFISH FISHERY	http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1261281340.pdf
2017 Alaska Fisheries Science Center Gulf of Alaska Sablefish Stock Assessment	https://www.afsc.noaa.gov/REFM/Docs/2017/GOAsablefish.pdf
AS 16.05.815. Confidential Nature of Certain Reports and Records	http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section815.htm
NPFMC FISHERY MANAGEMENT PLAN for Groundfish of the Gulf of Alaska	http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf
2021 NORTHERN SOUTHEAST INSIDE (NSEI) SUBDISTRICT SABLEFISH FISHERY ANNUAL HARVEST OBJECTIV	https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1269953262.pdf

FISHERY MANAGEMENT PLAN for Groundfish of the Bering Sea and Aleutian Islands Management Area	_https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
NPFMC Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish	https://www.npfmc.org/bering-seaaleutian-islands-groundfish/
ADFG Sablefish (Anoplopoma fimbria) Managemen	https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
2019 NORTHERN SOUTHEAST INSIDE (NSEI) SUBDISTRICT SABLEFISH FISHERY ANNUAL HARVEST OBJECTIVE ANNOUNCEMENT	https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1037467075.pdf
2019 SOUTHERN SOUTHEAST INSIDE SUBDISTRICT SABLEFISH FISHERY ANNOUNCEMENT	https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1029668426.pdf
2020 Assessment of the Sablefish Stock in Alaska	https://apps-afsc.fisheries.noaa.gov/refm/docs/2020/sablefish.pdf
Alaska Climate Integrated Modeling project (ACLIM)	https://www.fisheries.noaa.gov/alaska/ecosystems/alaska-climate-integrated-modeling-project
NPRB Long-term Monitoring Program	https://www.nprb.org/long-term-monitoring-program/about-the-program/
Bering Sea Project	https://www.nprb.org/bering-sea-project/about-the-project/
Gulf of Alaska Project	https://www.nprb.org/gulf-of-alaska-project/about-the-project/
National Environmental Policy Act (NEPA)	https://www.epa.gov/nepa/what-national-environmental-policy-act
marine mammal stock assessments for sea lions	https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock#pinnipeds---otariids-(eared-seals-or-fur-seals-and-sea-lions)
Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska: Volume II Appendices A-L	https://repository.library.noaa.gov/view/noaa/17392

Final Environmental Assessment for: Amendment 115 to the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area Amendment 105 to the Fishery Management Plan for Groundfish of the Gulf of Alaska Amendment 49 to the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs Amendment 13 to the Fishery Management Plan for the Salmon Fisheries in the Exclusive Economic Zone off Alaska Amendment 2 to the Fishery Management Plan for Fish Resources of the Arctic Management Area Essential Fish Habitat (EFH) Omnibus Amendments	https://repository.library.noaa.gov/view/noaa/18204
Environmental Assessment/ Regulatory Impact Review/ Final Regulatory Flexibility Analysis of Amendment 94 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and gear modification for nonpelagic trawl vessels targeting flatfish in the Bering Sea subarea.	https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs
Gear Modifications	https://www.npfmc.org/habitat-protections/gear-modifications/
The 2021 List of Fisheries Summary of U.S. commercial fisheries by categories according to the level of interactions that result in incidental mortality or serious injury of marine mammals:	https://www.fisheries.noaa.gov/national/marine-mammal-protection/list-fisheries-summary-tables#table-1-category-iii
FishBase Fish Ecology for Sablefish	https://www.fishbase.in/Ecology/FishEcologySummary.php?StockCode=528&GenusName=Anoplopoma&SpeciesName=fimbria
Annex VI of MARPOL	[1] https://www.epa.gov/enforcement/act-prevent-pollution-ships-apps-enforcement-case-resolutions
Alaska Marine Ecosystem Status Reports.Gulf of Alaska	https://www.afsc.noaa.gov/REFM/Docs/2018/GOA/ecosysGOA.pdf
Alaska Marine Ecosystem Status Reports.Bering Sea Aleutian Islands	https://www.afsc.noaa.gov/REFM/Docs/2018/BSAI/ecosysEBS.pdf
IFQ Program Review	https://www.npfmc.org/wp-content/PDFdocuments/halibut/IFQProgramReview_417.pdf
Amendment 101 to the FMP for the Groundfish of the Gulf of Alaska Management Area	[1] https://www.fisheries.noaa.gov/action/amendment-101-fmp-groundfish-gulf-alaska-management-area

Environmental Assessment / Final Regulatory Impact Review For Amendment 101 to the Fishery Management Plan For Groundfish of the Gulf of Alaska Allow the Use of Pot Longline Gear in the Gulf of Alaska Sablefish Individual Fishing Quota Fishery October 2016	https://repository.library.noaa.gov/view/noaa/19199
Individual Fishing Quota (IFQ) Allocations and Landings	https://www.fisheries.noaa.gov/sites/default/files/akro/18ifqland.htm
Seabird Avoidance Gear and Methods	https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods
USE OF TECHNICAL MEASURES IN RESPONSIBLE FISHERIES: REGULATION OF FISHING GEAR	http://www.fao.org/3/y3427e/y3427e04.htm#bm04.3.2
Environmental Assessment/ Regulatory Impact Review/ Final Regulatory Flexibility Analysis of Amendment 94 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and gear modification for nonpelagic trawl vessels targeting flatfish in the Bering Sea subarea.	https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs
NPFMC Bering Sea/Aleutian Islands and Gulf of Alaska Groundfish	https://www.npfmc.org/bering-seaaleutian-islands-groundfish/
Amendment 101 to the Fishery Management Plan for Groundfish of the Gulf of Alaska for the sablefish individual fishing quota fisheries in the Gulf of Alaska.	https://www.fisheries.noaa.gov/action/amendment-101-fmp-groundfish-gulf-alaska-management-area
Halibut Retention in Pots	https://www.npfmc.org/halibut-retention-in-pots/
ADFG Sablefish Management	https://www.adfg.alaska.gov/index.cfm?adfg=sablefish.management
2020–2021 Statewide Commercial Groundfish Fishing Regulations	https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_groundfish_regs.pdf
FISHERY MANAGEMENT PLAN For Groundfish of the Bering Sea and Aleutian Islands Management Area	https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
Ecosystem Status Reports for the Gulf of Alaska, Bering Sea and Aleutian Islands	https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

Federal fisheries regulations Title 50: Wildlife and Fisheries	https://www.ecfr.gov/cgi-bin/text-idx?SID=0cc954068b4cef56066a93c0ecbd605f&mc=true&node=pt50.13.679&rgn=div5
ADFG Sablefish Management and Research	https://www.adfg.alaska.gov/index.cfm?adfg=fishresearch.sablefish
Pacific Halibut and Sablefish Individual Fishing Quota (IFQ) Program	https://www.fisheries.noaa.gov/alaska/commercial-fishing/pacific-halibut-and-sablefish-individual-fishing-quota-ifq-program
NPFMC Halibut/Sablefish IFQ Program	https://www.npfmc.org/halibutsablefish-ifq-program/
Western Alaska Community Development Quota (CDQ) Program	https://www.federalregister.gov/documents/2016/07/12/2016-16418/proposed-information-collection-comment-request-western-alaska-community-development-quota-cdq
Community Quota Entity Program	https://www.npfmc.org/community-quota-entity-program/
IFQ Access Opportunities	https://www.npfmc.org/ifq-access-opportunities-global-examples/
Alaska Board of Fisheries	http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main
2017 Economic Status of the Groundfish Fisheries Off Alaska	https://www.fisheries.noaa.gov/resource/data/2017-economic-status-groundfish-fisheries-alaska
Discussion Paper: Sablefish Discard Allowance	https://meetings.npfmc.org/CommentReview/DownloadFile?p=b6b509dd-a14c-442b-867b-3f88fa9f8d98.pdf&fileName=D2%20Sablefish%20Discard
Environmental Assessment/ Regulatory Impact Review/ Final Regulatory Flexibility Analysis of Amendment 94 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area and gear modification for nonpelagic trawl vessels targeting flatfish in the Bering Sea subarea.	https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs
Ecosystem Status Report 2020 Eastern Bering Sea	https://apps-afsc.fisheries.noaa.gov/REFM/docs/2020/EBSecosys.pdf
Discussion Paper: Sablefish Discard Allowance	https://meetings.npfmc.org/CommentReview/DownloadFile?p=b6b509dd-a14c-442b-867b-3f88fa9f8d98.pdf&fileName=D2%20Sablefish%20Discard

Environmental Assessment/ Regulatory Impact Review/ Final Regulatory Flexibility Analysis of Amendment 94 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands	https://www.fisheries.noaa.gov/resource/document/ea-rir-frfa-amendment-94-bsai-groundfish-fmp-require-trawl-sweep-modification-bs
2015 NOAA Marine Debris Program Report. Ghost fishing	https://marinedebris.noaa.gov/sites/default/files/publications-files/Ghostfishing_DFG.pdf
Gear Modifications	https://www.npfmc.org/habitat-protections/gear-modifications/
Alaska Marine Safety Education Association	[1] https://www.amsea.org/commercial-fishermen
Alaska Vocational Technical Center	https://avtec.edu/department/alaska-maritime-training-center

10 Appendices

10.1 Appendix 1 – Assessment Team Bios

Based on the technical expertise required to carry out this assessment, an Assessment Team was selected as follows.

Dr.Ivan Mateo, Lead Assessor

Dr. Ivan Mateo has over 25 years' experience working with natural resources population dynamic modeling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bio-energetic modeling for Atlantic cod He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defence Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Dr. Mateo worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modeling of Alaska sablefish.

Dr. Robert Leaf, Assessor 1

Dr. Robert Leaf has 20 years of experience working in the field of natural resource management of fin and shellfish. He specializes in the evaluation of management strategies of harvested species and the identification of environmental drivers that impact their population dynamics. Dr. Leaf received his Master's Degree in Marine Science at Moss Landing Marine Laboratories and his PhD in Fisheries and Wildlife Sciences from Virginia Polytechnic and State Institute. His last professional post was as a post-doc under Dr. Kevin Friedland at the Northeast Fishery Science Center's Narragansett Laboratory. There, he worked on understanding the impact of environmental conditions on fish stock productivity and recruitment. He has worked in the Gulf of Mexico for the last three years working on fish stock assessment of commercially and recreationally important species in that area. Dr. Leaf is a member of the Gulf of Mexico Fishery Management Council's Red Drum working group and NOAA's Marine Fisheries and Climate Taskforce. He currently supervises four masters level students working on various state and federally managed fish stocks.

Robert Allain, Assessor 2

Mr. Allain is a graduate of Saint Mary's University in Halifax, Nova Scotia with undergraduate degrees in Commerce (Business Administration) and Science (Chemistry). In 1977, he joined the then Federal Department of Fisheries and Environment as a Fishery Officer (International Surveillance) and carried out inspections of foreign and domestic fishing vessels within and beyond Canada's EEZ. During his 32-year career with the now Department of Fisheries and Oceans (DFO), Mr. Allain served in a variety of fisheries management, strategic planning and policy positions in Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland and Labrador, and at Departmental Headquarters in Ottawa. He served as a senior executive from 1991 to 2008.

Currently, he is the president of the consulting firm OceanIQ Management Services in Dieppe, New Brunswick. He is a Marine Stewardship Council-certified P3 assessor who has participated in approximately 25 assessments and surveillance audits in Canada and the U.S. in respect of demersal, pelagic, invertebrate and crustacean fisheries. He is also fully conversant with the Alaska Responsible Fisheries Management (AK RFM) model through his participation as a technical expert to the Fisheries Standard Committee that developed the certification scheme.