Responsible Fishery Management (RFM)

US Alaska Salmon Commercial Fisheries

2nd Surveillance Report

Certification Body (CB):	Global Trust Certification
Assessment team:	Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor
Fishery client:	Alaska Fisheries Development Foundation
Assessment Type:	Surveillance 2 of 2nd Re-assessment
Report Code:	AK/SAL/0.003.2/2022
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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 scope of the program was expanded to include other North American fisheries outside 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

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2 Glossary

Acronym	Full name
ABC	Allowable Biological Catch
AC	Advisory Committee
ACC	Alaska Administrative Code
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFDF	Alaska Fisheries Development Foundation
AFSC	Alaska Fisheries Science Center
AS	Alaska Statue
ASMI	Alaska Seafood Marketing Institute
AWT	Alaska Wildlife Troopers
AYK	Artic Yukon Kuskokwim
BC	British Columbia
BEG	Biological Escapement Goal
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CIAA	Cooke Inlet Aquaculture Association
CMA	Chignik Management Area
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
COAR	Commercial Operators Annual Report
CPUE	Catch per Unit Effort
CWCS	Comprehensive Wildlife Conservation Strategy
CWT	Coded Wire Tags
DEC	Department of Environmental Conservation
DIPAC	Douglas Island Pink and Chum Inc.
DNR	Department Natural Resources
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of United Nations
FDA	Food Drugs Administration
FMP	Fishery Management Plan
FSB	Federal Subsistence Board
GOA	Gulf of Alaska
GHL	Guideline Harvest Level
HAPC	Habitat Area of Particular Concern
HCD	Habitat Conservation Division
IFQ	Individual Fishing Quota
IJC	International Joint Commission

Acronym	Full name
IMS	Institute of Marine Sciences
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
IUCN	International Union of Conservation of Nature
IUU	Illegal Unreported and Unregulated
KSMSC	Kodiak Seafood and Marine Science Center
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MSFCMA	Magnuson-Stevens Fisheries Management and Conservation Act
MRA	Maximum retainable allowances
MT	Metric tons
MSY	Maximum Sustainable Yield
Ne	Effective Population
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NIH	US National Institute of Health
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NPRB	North Pacific Research Board
NRSEAA	Northern Southeast Aquaculture Association
OEG	Optimal Escapement Goal
OFL	Overfishing Level
OLE	Office for Law Enforcement
OY	Optimum Yield
PAR	Permit Alteration Request
PNP	Private Non-Profit
PSMFC	Pacific States Marine Fisheries Commission
PSC	Pacific Salmon Commission
PSC	Prohibited Species Catch
PWS	Prince William Sound
PWSAC	Prince William Sound Aquaculture Center
PWSS	Prince William Sound Science Center
RAC	Regional Advisory Council
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SEAK	Southeast Alaska
SEG	Sustainable Escapement Goal
SET	Sustained Escapement Threshold
SOC	Stocks of Concern

Acronym	Full name
SSC	Scientific and Statistical Committee
SSL	Steller Sea Lion
SSSC	Sitka Sound Science Center
TAC	Total Allowable Catch
UCI	Upper Cook Inlet
USCG	U.S. Coast Guard
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife
VFDA	Valdes Fisheries Development Association
YRP	Yukon River Panel

3 Executive Summary

3.1 Brief intro and description of surveillance process

This Surveillance report documents the 2nd Surveillance report from the 2nd reassessment cycle for the US Alaska Salmon commercial fishery originally certified on 11th March 2011, and recertified in 9th March 2017 and March 8, 2020 and presents the recommendation of the Assessment Team for continued AK RFM Certification.

Unit of Certification

The certification covers the United States Alaska commercial salmon fisheries [all Pacific salmon species: Chinook *Oncorhynchus tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta*]. Fisheries employ troll, purse seine, drift gillnet, beach seine, set gillnet, dip net, and fish wheel (Upper Yukon River only) gear in the four administrative regions of Alaska that are principally managed by the Alaska Department of Fish and Game (ADFG). While certification covers the entire Alaska Exclusive Economic Zone (EEZ), most of the harvest is taken in the internal waters (0-3 nautical miles, and other enclosed waters) of the state of Alaska.

This Surveillance Report documents the assessment results for the continued certification of commercially exploited US Alaska Salmon commercial 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 (v 2.1, September 2020) 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 6 major components are supported by 12 fundamental clauses (+ 1 in case of enhanced fisheries) that guide the AK RFM Certification Program surveillance assessment.

The surveillance process also included substantive meetings with representatives from some of the key fishery management agencies charged with management of the US Alaska Salmon commercial fisheries. Assessment team meetings included: different divisions of Alaska Department of Fish & Game (ADFG), and Kodiak Regional Aquaculture Association. The assessment team also met with the Alaska Fisheries Development Foundation (AFDF) – fishery client and certificate holder. Owing to constraints imposed by COVID-19, all meetings were held remotely via videoconferencing.

As described more fully in the following report sections, the assessment team did note some minor changes to the fishery management system. However, none of these changes were seen to undermine continued compliance of the fishery management system for US Alaska Salmon commercial fisheries with requirements of the Alaska

RFM Standard. Progress in addressing non-conformities, as judged against defined milestones in client action plans, was judged to be adequate and on target.

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

3.2 Summary of main findings

The Audit team has determined that the US Alaska Salmon commercial 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) Precautionary approach (Clauses 4, 5, 6) Management Measures (Clauses 7, 8, 9), Monitoring and Control component (Clauses 10 and 11) and Ecosystem Impact (Clauses 12 and 13). No evidence exists to indicate that nonconformance situations arose during the 1st Surveillance audit

3.3 Recommendation with respect to continuing Certification

The assessment team recommends the continued certification of the applicant fisheries, the United States Alaska commercial salmon [Chinook *Oncorhynchus tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta*] fisheries employing troll, purse seine, drift gillnet, set gillnet, fish wheel, dip net and beach seine gears in the four administrative Regions of Alaska that are principally managed by the Alaska Department of Fish and Game (ADFG).

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
- Dr. Brian Allee – Assessor 1, Responsible for Fundamental Clauses 1, 2, 3, 7, 8, 9
- Mr. Scott Marshall – Assessor 2, Responsible for Fundamental Clauses 4, 5, 6,
- Dr. Marc Johnson – Assessor 3, Responsible for Fundamental Clauses 10, 11, 12, 13

3.5 Details of Applicable RFM Documents

This assessment was conducted according to the relevant program documents outlined in **Error! Reference source not found.** 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 2.1, September 2020	Standard
Responsible Fisheries Management Certification Program Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in North America	Version 2.1, January 2021	Guidance to Standard

4 Client contact details

Table 2. Client details and key contact information.

Applicant Information		
Organization/Company Name:		Alaska Fisheries Development Foundation
Address:	Street:	P.O. Box 2223
	City:	Wrangell
	State:	Alaska
	Country:	USA
	Zip code	99929-2223
Applicant Key Contact Information		
Name:		Julie Decker
Position:		Director
E-mail:		jdecker@afdf.org

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 **Error! Reference source not found.** below.

Table 3. Units of Certification.

		UoC	
Species:	Common name(s):	1	King/Chinook
	Latin name:		*Oncorhynchus tschawytscha*
	Common name(s):	2	Sockeye/Red
	Latin name:		*Oncorhynchus nerka*
	Common name(s):	3	Coho/Silver
	Latin name:		*Oncorhynchus kisutch*
	Common name(s):	4	Pink/Humpback
	Latin name:		*Oncorhynchus gorbuscha*
	Common name(s):	5	Keta/Chum
	Latin name:		*Oncorhynchus keta*
Geographical area(s):		All	State and Federal waters of the U.S. state of Alaska in FAO major fishing area 67
Stock(s):		1	ADFG Admin Region 1: Southeast & Yakutat
		2	ADFG Admin Region 2: Central
		3	ADFG Admin Region 3: Arctic-Yukon-Kuskokwim
		4	ADFG Admin Region 4: Kodiak, Chignik, Alaska Peninsula, Aleutian Islands
Management system:		All	Alaska Department of Fish and Game (ADFG)
Fishing gear(s)/methods:		1	Troll
		2	Purse Seine
		3	Beach Seine
		4	Drift Gillnet
		5	Set Gillnet
		6	Dipnet
		7	Fish Wheel
Client Group			Alaska Fisheries Foundation

5.2 Changes to the Unit(s) of Certification

There have been not 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: 12-12-22 Location: ADF&G Aerie Conference Room 333 Raspberry Rd. Anchorage, AK	**Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Purpose of surveillance audit. Updates on performance of the fishery.
Date: 12-12-22 Location: ADF&G Aerie Conference Room 333 Raspberry Rd. Anchorage, AK	**ADFG Anchorage** Bill Templin Chris Habich Kyle Shedd Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Progress on Southeast Alaska (SEAK) and Prince William Sound (PWS) Pedigree Fitness Studies and Final Pink and Chum Salmon Assessment Papers.
Date: 12-12-22 Location: ADF&G Aerie Conference Room	**KRAA** Tina Fairbanks Mike Wachter Nate Weber **Client AFDF**	Update on KRAA Progress on Marking and Sampling.

Meeting Date and Location	Personnel	Areas of discussion
333 Raspberry Rd. Anchorage, AK	Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	
Date: 12-12-22 Location: ADF&G Aerie Conference Room 333 Raspberry Rd. Anchorage, AK	**ADFG Anchorage** Bill Templin Chris Habicht Scott Wagner Dean Day **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Precautionary Approach to Implementation of Hatchery Programs. Cook Inlet and Crawfish
Date: 12-12-22 Location: ADF&G Aerie Conference Room 333 Raspberry Rd. Anchorage, AK	**ADFG Anchorage** Kathy Howard Bill Templin Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer	Hatchery Effects & Information: Marine Ecosystem

Meeting Date and Location	Personnel	Areas of discussion
	Assessment Team Members Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK	**ADFG Anchorage** Britteny Cioni-Haywood Bill Templin Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Budget, Research, Staffing at ADF&G
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK	**ADFG Anchorage** Dani Evenson Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Orca ESA Issue Update
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd	**ADFG Anchorage** Dani Evenson Sam Rabung Grant Hagerman **Client AFDF**	Topics Discussed: SE AK Troll Fishery Description

Meeting Date and Location	Personnel	Areas of discussion
Anchorage, AK	Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK K	**ADFG Anchorage** Ed Jones Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Stock Status Chinook Salmon: research and Downturn
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK	**ADFG Anchorage** Andrew Munro Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor	Stock Status - Management Issue Updates by Region

Meeting Date and Location	Personnel	Areas of discussion
	Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK	**ADFG Anchorage** Andrew Munro Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Stock Status -Management Issue Updates by Region
Date: 12-13-22 Location: William Jack Hernandez Hatchery 941 N Reeve Blvd Anchorage, AK	**AK Wildlife Troopers** Captain Aaron Frenzel **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Enforcement issues
Date: 12-14-22 Location: Harrigan Centennial Hall Room 3 Sitka, AK	**NOAA** Jennifer Ferdinand **USFWS** Liz Lubunski **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus	Fishery-Seabird Interactions

Meeting Date and Location	Personnel	Areas of discussion
	MRAG Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	
Date: 12-14-22 Location: Harrigan Centennial Hall Room 3 Sitka, AK	**ADFG** Karla Bush Sam Rabung **Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members** Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Implications of 2020 & 2021 Salmon Fisheries Disaster Determination
Date: 12-15-22 Location: Harrigan Centennial Hall Room 3 Sitka, AK	**Client AFDF** Julie Decker Tommy Sheridan Hannah Wilson Benjamin Americus **MRAG** Amanda Stern Ray Beamesderfer **Assessment Team Members**: Dr. Ivan Mateo, Lead Assessor Dr. Brian Allee, Assessor Mr. Scott Marshall, Assessor Dr. Marc Johnson, Assessor	Progress on the NCs. Discussion Surveillance findings

7 Summary findings

Surveillance audits are summary audits intended to evaluate continued compliance with the RFM Fishery Standard. Each aspect of the fishery they are intended to focus on is addressed below.

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 Assessment 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

There have been no changes in the management regime and processes that affect the outcome of certification or that have potential to change the effect of the fishery on resources.

7.3 Changes to the organizational responsibility of the main management agencies

There have been no significant changes to the organizational responsibility in the Alaska Department of Fish and Game.

7.4 New information on the status of stocks

Pink salmon runs in 2021 throughout the state were above average and escapement goals were met or exceeded in most area.

Sockeye salmon runs have been exceptionally strong in Bristol Bay and fairly stable in most other areas except for the Chignik and the Copper River systems. In the Chignik area, returns were very low from 2018 to 2020 and no commercial fishing was allowed. In 2021 the return to Chignik improved and limited fishing was allowed. Copper River Sockeye Salmon returns were also depressed in 2018 and 2020 and improved in 2021.

Chinook salmon runs have continued to exhibit low productivity. There have been extensive season-long commercial fishery closures throughout western Alaska. In Bristol Bay, the 2020 and 2021 runs were below average. Copper River runs of Chinook salmon have been low periodically in recent years but near average in 2021. In the Southeast area, extensive closures of both the commercial and sport fisheries around mouths of the local stocks have dramatically reduced harvest rates and many stocks have not met escapement goals in recent years.

Chum salmon returns in Western Alaska remain very low and have resulted in complete closures of commercial fishing. Coho Salmon stocks have been relatively stable state-wide.

7.5 Update on fishery catches

State-wide the runs in 2016, 2018, 2020 were much less than in the odd-numbered years of 2013, 2015, 2017 and 2021. The differences between run sizes of the even and odd year runs are attributable to variation in returns of Pink salmon along the Gulf of Alaska coast Figure 1.

The 2021 state-wide harvest in 2021 of 234 million fish (Table 5) weighed 861.1 million pounds (Table 6) was composed primarily of Pink (161.3 million pounds) and Sockeye salmon (57 million pounds). Most the Sockeye salmon was landed in the Bristol Bay UoC, while most of the Pink salmon was landed in the Prince William Sound, Southeast, Kodiak and Alaska Peninsula UoC's. Low runs of Chinook salmon precluded fishing in the Kuskokwim and Yukon. The Kuskokwim had a Chum salmon fishery in 2021 but the Yukon did not.

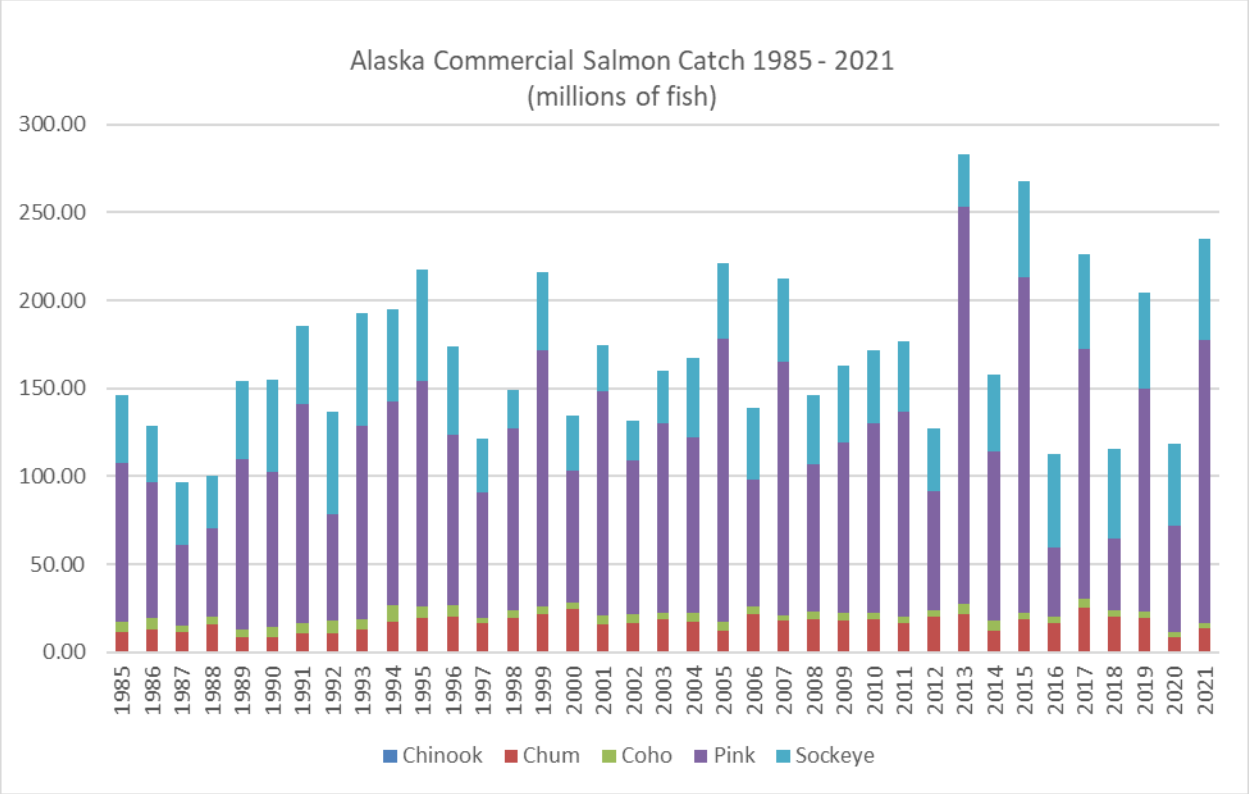

Figure 1. Alaska Commercial Salmon Catch 1985 - 2021.
https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmon_landings

Table 5. Number of salmon landed in Alaska's 2021 commercial fishery by UoC and species.

Unit of Certification	Species					
	Chinook	Chum	Coho	Pink	Scokeye	Total
Alaska Peninsula/Aleutian Islands	15,595	2,267,997	357,187	16,564,333	7,476,517	26,681,629
Bristol Bay	6,944	212,239	48,206	3,596	41,962,155	42,233,140
Chignik	1,420	43,187	84,452	1,312,546	118,785	1,560,390
Copper/Bering	7,028	8,961	187,683	33,744	404,881	642,297
Kodiak	8,710	409,339	305,768	26,566,669	3,290,941	30,581,427
Kotzebue	0	96,492	0	0	0	96,492
Kuskokwim	0	0	0	0	0	0
Lower Cook Inlet	286	27,404	4,938	1,971,155	266,464	2,270,247
Norton Sound	0	6,394	7,189	0	473	14,056
Prince William Sound	1,333	2,680,838	75,570	66,370,402	936,694	70,064,837
Southeast	209,996	7,399,801	1,440,857	48,407,149	1,027,619	58,485,422
Upper Cook Inlet	3,678	69,838	145,007	80,677	1,403,645	1,702,845
Yakutat	6,823	254	118,044	28,888	87,558	241,567
Grand Total	261,813	13,222,744	2,774,901	161,339,159	56,975,732	234,574,349

Table 6. Landed weight of the 2021 Alaska commercial salmon harvest by UoC and species (pounds).
https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmon_landings

Unit of Assessment	**Species**					
	Chinook	Chum	Coho	Pink	Sockeye	Total
Alaska Peninsula/Aleutian Islands	127,291	10,691,745	2,093,529	50,018,302	33,959,949	96,890,816
Bristol Bay	65,170	1,115,658	297,317	11,784	198,591,365	200,081,295
Chignik	10,007	279,236	531,432	4,149,381	616,053	5,586,109
Copper/Bering	96,292	56,032	1,415,897	114,191	2,138,315	3,820,727
Kodiak	59,433	2,752,142	2,086,696	82,793,178	14,788,225	102,479,674
Kotzebue		714,067	0		0	714,067
Kuskokwim	0	0	0	0	0	0
Lower Cook Inlet	3,749	189,500	28,820	6,413,691	1,102,343	7,738,103
Norton Sound	0	34,877	41,198	0	2,465	78,540
Prince William Sound	14,586	17,903,384	519,370	210,103,104	4,953,919	233,494,363
Southeast	2,429,498	49,122,976	8,483,375	134,040,047	5,902,225	199,978,121
Upper Cook Inlet	43,901	501,526	812,895	276,542	7,240,604	8,875,467
Yakutat	71,832	1,483	756,321	116,562	447,369	1,393,567
Grand Total	2,921,760	83,362,626	17,066,850	488,036,783	269,742,831	861,130,850

7.5.1 Spawning Escapements

In 2021, 70% of the stocks assessed had escapements that met or exceeded their escapement goals and 30% of stocks with goals did not meet their minimum goal. Since 2007 the percent of Alaska's salmon escapement goals that were met or exceeded shows some relatively consistent patterns by species (Table 7). As we have previously reported, Chinook salmon goals have not been consistently met in recent years despite extensive fishery closures throughout the state. For example, there has been no commercial fishery for Chinook salmon in the Yukon for 14 years, there has been only one year of fishing in Norton Sound for the last 21 years, and only three years of fishing in the Kuskokwim since 2006. In Kodiak, when ADFG estimates that Chinook salmon run sizes to the Karluk and/or Ayakulik River are below escapement goals there are extensive closures and non-retention regulation placed on the purse seine fishery near these rivers. In Southeast Alaska, coded code wire tag and return per spawner data shows that reduced ocean survival is the primary factor causing low numbers of adults to return. Escapements of Chum and Pink salmon in many areas have also been below goals in some years.

Table 7. Percentage of stocks (by UoC and species) that met or exceeded their escapement goals since 2007.

Unit of Assessment	Chinook	Chum	Coho	Pink	Sockeye	*All*
Southeast	59%	70%	89%	84%	69%	***73%***
Yakutat	56%		89%	64%	74%	***72%***
Copper/Bering	67%		97%		89%	***88%***
Prince William Sound		68%		92%	76%	***80%***
Lower Cook Inlet	64%	73%		80%	85%	***78%***
Upper Cook Inlet	55%	87%	79%		88%	***68%***
Kodiak	27%	61%	84%	83%	89%	***79%***
Chignik	67%	87%		67%	83%	***77%***
AK Peninsula	67%	77%	93%	67%	85%	***82%***
Bristol Bay	67%	78%	75%	100%	99%	***95%***
Kuskokwim	73%	85%	96%		98%	***81%***
Yukon	67%	77%	67%			***72%***
Norton Sound	40%	73%	100%	100%	70%	***75%***
Kotzebue Sound		100%				***100%***
All	60%	74%	88%	83%	85%	***77%***

Stocks of Concern

Alaska's sustainable salmon fishery policy (5 AAC 39.222) requires ADFG to report to the BOF any salmon stock that has chronically failed to meet its escapement goal. The policy defines three levels of concern (yield, management, and conservation) with yield being the lowest level of concern and conservation the highest level of concern. Chronic inability is defined as "the continuing or anticipated inability to meet expected yields over a 4 to 5-year period." This designation allows the BOF and ADF&G to develop specific management measures to prevent fishing activity from allowing rebuilding to sustainable levels. The action plans contain goals, measurable and implementable objectives, and provisions for fishery management actions needed to achieve rebuilding. Also included are performance measures appropriate for monitoring and gauging the effectiveness of the action plan, and as deemed appropriate a research plan. There are 13 stocks of concern (Table 8). Eleven stocks have been identified as a management concern and 2 have been identified as a yield concern.

Implementing a management framework designed to increase escapements, to the extent possible, is a key element of the stocks of concern process. The following are examples of BOF plans to guide ADF&G in-season management under observed levels of abundance:

- Lynn Canal and Chilkat River King Salmon Fishery Management Plan 5 AAC 33.384 (ADFG 2019a);
- McDonald Lake Sockeye Salmon (Gray *et al*., 2019);
- Yukon River Chinook Management Plan 5 AAC 05.360 (ADFG 2019 b);
- Chinook and Sockeye Salmon Stocks in Upper Cook Inlet (ABF 2011)

Table 8. Alaska's current stocks of concern.
http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks

Region	Stock	Species	Listing Date	Level of Concern
Southeast	Chilkat River	Chinook	Jan - 2018	Management
	King Salmon River	Chinook	Jan - 2018	Management
	Unuk River	Chinook	Jan - 2018	Management
	Stikine River	Chinook	Mar - 2022	Management
	Andrew Creek	Chinook	Mar - 2022	Management
	Chickamin River	Chinook	Mar - 2022	Management
	Taku River	Chinook	Mar - 2022	Management
	McDonald Lake	Sockeye	Jan - 2018	Management
	Klukshu River	Sockeye	Mar - 2022	Management
Central	McNeil River	Chum	Dec - 2016	Management
	Chuitna River	Chinook	Feb - 2011	Management
	Theodore River	Chinook	Feb - 2011	Management
	Alexander River	Chinook	Feb - 2011	Management
	East Susitna River	Chinook	Feb - 2020	Management
AYK	Yukon	Chinook	Sept - 2020	Yield
	Norton Sound Sub Dist. 5 & 6	Chinook	Jan - 2004	Yield
Westward	Karluk	Chinook	Jan - 2011	Management
	Ayakulik	Chinook	Jan - 2020	Management
	Chignik River - early run	Sockeye	Mar - 2022	Management

7.6 Significant changes in the ecosystem effects of the fishery

We found no evidence to suggest that significant changes have occurred with respect to the fishery's effects on the ecosystem, associated species or the environment. Fishery managers in Alaska work closely with researchers and managers from within and outside Alaska to closely monitor how the environment, harvest, and enhancement affect the diversity, abundance, and distribution of salmon in Alaska. Regulations on harvest timing, location, and methods are established, enforced, and modified when needed to protect sensitive stocks and ensure sustained yield of salmon, as mandated by Alaska's constitution and state laws. International treaties and associated federal regulations further limit fishery impact on threatened salmon populations and protect dependent predators from severe impacts to their prey base. Where adverse impacts have been identified, research is conducted to resolve uncertainty and management actions are taken to alleviate severity. In cases where significant information gaps have been identified, such as exists for fishery interactions with seabirds, new and expanded research efforts are developed. Salmon fishery enhancement activities, achieved primarily through hatchery propagation, are strictly regulated by state managers to minimize impacts to the environment and naturally spawning salmon populations. Ongoing and improved marking of hatchery-produced salmon in Alaska facilitates accounting of hatchery and wild components in harvest and on spawning grounds. Ongoing genetic monitoring and research contributes to stock identification in harvest and improves understanding of enhancement activities on wild population productivity.

7.7 Violations and enforcement information

No significant changes have been made with respect to Alaska's approach to establishing and enforcing regulations for its commercial salmon fishery. State managers (ADFG) set and publish regulations each year, and these regulations are enforced by ADFG and Alaska Wildlife Troopers (AWT). During a December 2022 meeting with AWT officer, Capt. Aaron Frenzel, our Team was apprised of enforcement activities performed during the months of June, July, and August, 2022, when officers issued 70 warnings and 155 citations, primarily associated with enforcement of commercial salmon fishery regulations. Capt. Frenzel informed that law enforcement staffing

is expected to increase during the coming year, to achieve full staff of 91 troopers. Capt. Frenzel also reported a trend of declining offenses, greater compliance with regulations, and a culture of "self-policing" that appears to be growing within the commercial salmon fishing community.

7.8 Other information that may affect the outcome of certification

There was no other information that may affect the outcome of certification.

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

There were no changes in the fishery relevant to the fundamental clauses of the RFM Fishery Standard. The fishery continues to conform to the requirements of all Fundamental Clauses of the RFM Fishery Standard.

7.9.1 Section A: The Fisheries Management System

7.9.1.1 Fundamental Clause 1. Structured and legally mandated management system.

1.	**There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
Summary of relevant changes:	1.1. There shall be an effective legal and administrative framework established at local and national level appropriate for the fishery resource and conservation and management. As described in detail by the 2017 US Alaska Commercial Salmon Reassessment Report[1], Alaska's commercial salmon fisheries are managed in accordance with a transparent structure of laws, regulations, treaties, and other legal mandates at the international, national, and local (state) levels. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) is the principal domestic legislation governing the management of American fisheries. For the State of Alaska, Section 4 (Sustained Yield) of Article VIII of Alaska's Constitution states that, "fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the state shall be utilized, developed and maintained on the sustained yield principle, subject to preferences among beneficial uses". ADFG's Commercial Fisheries Division is responsible for conservation of Alaska's salmon stocks and for management of commercial fisheries. ADFG's area fishery managers produce annual management reports and related documents, taking into account all previously-agreed management measures. Representatives from ADFG and NMFS routinely participate in several international fora and organizations [i.e., North Pacific Anadromous Fish Commission (NPAFC), Pacific Salmon Commission (PSC)]. These organizations strive for compatibility in their management and promote cooperation among states in the areas of salmon fisheries research, development and management. ADFG performs routine review and revision of conservation and management measures within the Commercial Fisheries Division, and between the latter and the BoF. ADFG'S management approach and decision-making processes for Alaska commercial salmon fisheries are made available to the public through the agency's website. 1.2. Management measures shall take into account the whole stock unit over its entire area of stock distribution. ADFG's priority for salmon management is to maintain adult escapement levels that ensure adequate natural spawning, long-term viability of stocks and, consequently, sustainability of associated fisheries. Measures taken to meet escapement goals consider each stock over its entire distribution, taking into account the cumulative effect of those factors that can influence survivorship at all life stages in diverse habitats, including freshwater spawning and rearing habitats, and expansive marine environments. In each management area, ADFG's fishery managers produce annual reports that describe how commercial salmon fisheries were conducted and managed for

[1] http://www.alaskaseafood.org/wp-content/uploads/2017/03/ALASKA-RFM-SALMON-REASSESSMENT-Final-ReportMarch-2017.pdf

1.	**There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
	that year[2]. Fishing regulations, including allocation criteria and subsistence determinations, also consider past use and management. Accordingly, Alaska's commercial salmon fishery management system is informed and abides by all previously- agreed management measures. 1.3./1.4/1.5/1.6. Transboundary stocks Because numerous salmon-bearing rivers in Southeast Alaska are transboundary with Canada, Alaska State, U.S. federal and Canadian agencies, as well as tribal (i.e., First Nations) governments maintain interest in planning and decision-making that may affect salmon and their habitats. Representatives from Alaska's departments of Fish and Game, Natural Resources, Environmental Conservation, the USCG, as well as other public officials and non-public agency experts occasionally participate in Canadian permitting processes. In the past, most review processes have focused on individual BC development projects. In 2015, USA and Canada governments signed a Memorandum of Understanding regarding transboundary waters. While the MOU is not a legally binding document, it is a firm commitment by both governments to continue working together where possible. The MOU identifies the broad areas of continued or new activity by Alaska and British Columbia, including: • Establishing a bilateral working group on the protection of transboundary waters; • Sharing best practices on workforce development and training; • Advancing marine transportation reliability and safety; • Reinforcing emergency management mutual aid response through the existing Pacific Northwest Emergency Management Arrangement; • Fostering continued growth of existing and increased transportation links; • Continuing joint visitor industry promotion; • And exploring other areas for cooperative action, including natural resource development, fisheries, ocean acidification, border management, trade and investment, and climate change adaptation. ADFG and NMFS representatives routinely participate in several relevant Pacific salmon management organizations designed to resolve transboundary fishery management issues[3][4][5]. Management agreements and arrangements for promoting research have been developed for Pacific salmon throughout the range of all five North American species. Conservation and management measures include a prohibition of high seas fishing for salmon by all nations involved (Japan, Canada and the United States); the Bilateral Pacific Salmon Treaty (PST[6]) and supporting this, research that furthered understanding of marine range and distribution of Pacific salmon. Multi-agency and -state organizations, such as PSC, PSMFC and NPAFC, of which ADFG and NMFS salmon scientists and managers participate, strive for compatibility in their salmon fishery management measures. These organizations recognize sustained yield and conservation as their highest priority, even in cases where different states (i.e., US and Canada) compete for the same fishery resource. Representatives of ADFG and NMFS routinely and actively participate in several relevant forums and organizations including, but not limited to, North Pacific.

[2] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main
[3] http://www.npafc.org/new/index.html
[4] http://www.psc.org
[5] http://www.psmfc.org
[6] https://www.nwcouncil.org/history/Trilateral

1.	**There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
	Anadromous Fish Commission (NPAFC); Pacific Salmon Commission (PSC); Pacific States Marine Fisheries Commission (PSMFC). These organizations actively foster cooperation among States with regard to salmon fisheries research and management. ADFG and various federal agencies participate in numerous organizations that collect information about aquatic and marine ecosystems, and status and management of Alaskan salmon fisheries. Management bodies such as NPAFC, PSC and PSMFC and their activities, which can affect Alaskan commercial salmon fishery management, are supported through national and international agreements[7][8][9]. 1.7. Review and Revision of conservation and management measures Alaska's salmon fisheries are managed by ADFG, and the agency's Division of Commercial Fisheries[10] manages commercial harvests and, in conjunction with the Division of Subsistence[11], removals by subsistence fishermen. The Division of Sport Fisheries[12] manages sport and personal use resource removals. Every three years (based on the Board of Fisheries (BoF) schedule) each Alaska Region updates its escapement information and submits a salmon stock status report to the BoF. This report (mandated in the Policy for the Management of Sustainable Salmon Fisheries, 5AAC 39.222[13] reviews the status of all stocks within each management area, recommends escapement goals based on the past three years' data, identifies stocks of concern, and develops management and action plans to address relevant issues. 1.8. Transparent management arrangements and decision making The management arrangements and decision-making processes for Alaska commercial salmon fisheries are organized in a very transparent manner, and are made available to the public through ADFG's website[14]. Both annual (pre-season) and in-season management arrangements are employed in Alaskan commercial salmon fisheries. Similarly, BoF and ADFG use both pre- and in-season decision-making processes that involve and consider public comment, to manage Alaskan salmon fisheries 1.9. Compliance with international conservation and management measures NOT APPLICABLE. Staff from US agencies participates within several international organizations responsible for high seas fisheries management.
References:	ALASKA-RFM-SALMON-REASSESSMENT-Final-Report-March-2017.pdf (rfmcertification.org) http://www.adfg.alaska.gov/index.cfm?adfg=process.main http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main NPAFC – North Pacific Anadromous Fish Commission http://www.psc.org http://www.psmfc.org https://www.nwcouncil.org/history/Trilateral

[7] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[8] http://www.psc.org/pubs/About/OrientationGeneralJune2015.pdf
[9] http://www.psmfc.org/psmfc-info
[10] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main
[11] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main
[12] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main
[13] https://www.sciencebase.gov/catalog/item/576d8505e4b07657d1a37732
[14] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main

1.	**There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
	http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf http://www.psc.org/pubs/About/OrientationGeneralJune2015.pdf http://www.psmfc.org/psmfc-info http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main https://www.sciencebase.gov/catalog/item/576d8505e4b07657d1a37732 http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main The Science Sub-Committee (SSC). 2016. North Pacific Anadromous Fish Commission Science Plan 2016–2022. NPAFC Doc. 1665 (Rev. 1). 8 pp. The Science Sub-Committee (SSC), the Committee on Scientific Research and Statistics.
Statement of consistency to the RFM Fishery Standard	The ADFG has a fishery management system based upon the responsible utilization of stocks and the conservation of the marine environment and continues to conform to the requirements of Fundamental Clause 1 of the RFM Fishery Standard.

7.9.1.2 Fundamental Clause 2. Coastal area management frameworks.

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.	
Summary of relevant changes:	2.1./2.2./2.3./2.4. Policy, legal and institutional frameworks adopted to achieve sustainable and integrated use of marine resources along with mechanisms to avoid conflict shall be in place. Representatives of the fisheries sector and fishing communities shall be consulted in decision making processes and information related to management measures shall be disseminated. An appropriate policy, legal and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, taking into account 1) the fragility of coastal ecosystems and finite nature of their natural resources; 2) allowing for determination of the possible uses of coastal resources and govern access to them, 3) taking into account the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, 4) States shall take due account of the risks and uncertainties involved. The salmon fishery management organizations in Alaska (principally, ADFG and NOAA, participate in coastal area management-related institutional frameworks processes that safeguard biological species and their habitats (i.e., NEPA, EFH). These frameworks include decision-making processes and activities relevant to the fishery resource and its users that support sustainable and integrated use of living marine resources, and limit or avoid conflict among users. ADFG is responsible for the protection, management, conservation, and restoration of Alaska's fish and game resources. The BoF is responsible for considering and adopting regulations to allocate resources among user groups; establishing fish reserves and conservation areas, fishing seasons, quotas, bag limits and size restrictions; habitat protection; stock enhancement; and developing commercial, subsistence, sport and personal use fisheries. ADFG has the statutory responsibility for protecting freshwater anadromous fish habitat and providing free passage for anadromous and resident fish in fresh water bodies (AS 16.05.841871)[15]. The Department of Environmental Conservation (DEC) implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for

[15] http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.	
	implementing the federal Clean Water Act and promotes high quality fish and wildlife habitat through pollution prevention. Through collaboration with other state, federal and local agencies, ADFG protects estuarine and marine habitats in Alaska. ADFG has legislative jurisdiction over streams that have been designated as anadromous fish streams. Some marine species also receive special consideration through the state Endangered Species program. The Department of Natural Resources (DNR) manages all state-owned land, water and natural resources except for fish and game. The MSFCMA include provisions concerning the identification and conservation of Essential Fish Habitat (EFH). The MSFCMA defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. NMFS and regional Fishery Management Councils (Councils) 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 relevant habitat conservation recommendations. All fishery management plans include a description and identification of EFH, adverse impacts, and actions to conserve and enhance habitat. Finally, NOAA Fisheries' Habitat Conservation Division (HCD) works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on Essential Fish Habitat (EFH) and living marine resources in Alaska. Multi-state and international organizations, such as North Pacific Fisheries Management Council (NPFAC), PSC, PFMSC, develop and provide mechanisms that promote coordinated conservation and management plans and actions. Historically, salmon management in Alaska has been implemented by several agencies, including the ADFG, and the National Oceanographic and Atmospheric Administration (NOAA). Networking among these groups has been critical to the conservation of Alaska’s salmon fishery resource. Alaska Department of Fish and Game's Habitat Division is delegated by the Commissioner to implement the state’s Title 16 authority for Fish Habitat and Special Area permitting. Unlike many of ADFG’s regulations, which are developed through the Board process and address harvest, Fish Habitat and Special Area laws address land use activities in fish-bearing streams and in the State’s legislatively designated refuges, critical habitat areas, and sanctuaries through a project review and permitting process. NOAA Fisheries' HCD works in coordination with industries, stakeholder groups, government agencies, and private citizens to avoid, minimize, or offset the adverse effects of human activities on EFH and living marine resources in Alaska. The public shall also be kept aware on the need for the protection and management of coastal resources and the participation in the management process by those affected. Representatives from fishery management organizations and fishing communities participate in coastal area management planning through the federal National Environmental Policy Act (NEPA) processes. This includes decision-making processes and activities relevant to the fishery resource and its users in support of sustainable and integrated use of living marine resources and avoidance of conflict among users. The review process requires participation by the project applicant; State resource agencies including the Alaska Departments of Environmental Conservation (DEC), Fish and Game (ADFG), and Natural Resources (DNR); the affected local coastal district office; and other interested members of the

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.	
	public, including and other interested members of the public, including fishermen's organizations and private individuals[16]. The BoF process, which establishes gear types and seasons for Alaska's commercial salmon fisheries, also serves to provide a forum for fishery conflict resolution. Further, the NEPA review process[17], deliberately takes into account all marine and fishery resources and users of those resources in order to resolve potential conflicts among users before project approvals are given. Members of the commercial and recreational fishery, the environmental community, and the public at-large are encouraged to testify at Council meetings and hearings. This involves speaking in a public forum. Public testimony to the Advisory Panel may lead to a proposal to the Council, which may then lead to a discussion paper and Council development of alternatives to address the problem or situation identified. 2.5. The economic, social and cultural value of coastal resources shall be assessed in order to assist decision-making on their allocation and use. The value of coastal salmon resources from economic, cultural and social perspectives is regularly assessed to inform allocation and use decisions. The Alaska Commercial Fisheries Entry Commission (CFEC) helps conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers. The National Environmental Policy Act (NEPA) processes provide the public with information and an opportunity for involvement at both state and federal levels. Decisions are made through public processes and involvement by fishery managers and stakeholders is encouraged through public advertisement and announcement of scheduled meetings. Assessment of the social and cultural value of coastal resources is integral to the decision-making process for fishery resource allocation and use in Alaska. The 2016 US Alaska Commercial Salmon AK RFM Reassessment Report[18] further describes the history and processes associated with merging economic, social and cultural values with resource allocation decisions that are relevant to Alaska's commercial salmon fishery. Management organizations like the North Pacific Anadromous Fish Commission (NPAFC), the Pacific Salmon Commission (PSC) and the Pacific States Marine Fisheries Council (PSMFC) derive their technical capacities from member parties and are funded by annual dues paid by participant governments (PSC), as well as federal grants and contracts (PSMFC). ADFG has an annual operating budget of approximately $200 million, supported by a variety of funding sources, including federal receipts, general fund receipts, and fish and game fund receipts 2.6./2.7/2.8. Research and monitoring of the coastal environment, mechanisms for cooperation and coordination, appropriate technical capacities and financial resources, conflict avoidance amongst user groups. Management organizations like the North Pacific Anadromous Fish Commission (NPAFC), the Pacific Salmon Commission (PSC) and the Pacific States Marine Fisheries Council (PSMFC) derive their technical capacities from member parties and are funded by annual dues paid by participant governments (PSC), as well as federal grants and contracts (PSMFC). ADFG has an annual operating budget of approximately $200 million, supported by a variety of funding sources, including federal receipts, general fund receipts, and fish and game fund receipts.

[16] http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main
[17] https://alaskafisheries.noaa.gov/fisheries/nepa-guidance
[18] https://rfmcertification.org/wp-content/uploads/2021/06/ALASKA-RFM-SALMON-REASSESSMENT-Final-Report-March-2017.pdf

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.	
	ADFG participates with federal, state and international agencies and institutions in numerous research and monitoring programs that assess physical, chemical, biological, economic and social parameters of the coastal area. ADFG regularly publishes their findings in agency technical reports that can typically be accessed online, through their website[19]. One of the functions of the NPAFC is to provide a venue for coordinating the collection, exchange, and analysis of scientific data regarding anadromous fishes, primarily Pacific salmon, and other ecologically-related species[20]. The NPAFC's scientific research focuses on trends in marine production of salmon stocks, their population structure and diversity in marine ecosystems of the North Pacific, and impacts from climate change.
References:	http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main https://alaskafisheries.noaa.gov/fisheries/nepa-guidance https://rfmcertification.org/wp-content/uploads/2021/06/ALASKA-RFM-SALMON-REASSESSMENT-Final-Report-March-2017.pdf http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#fisheries http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
Statement of consistency to the RFM Fishery Standard	ADFG participates in coastal area institutional frameworks and decision-making processes and continues to conform to the requirements of Fundamental Clause 2 of the RFM Fishery Standard.

7.9.1.3 Fundamental Clause 3. Management objectives and plan.

3.	Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.
Summary of relevant changes:	3.1. Long-term management objectives shall be translated into a plan or other management document and be subscribed to by all interested parties. The principal role of the Board of Fisheries (BoF) is to conserve and develop the fishery resources of Alaska. The Board achieves its mission in part by setting seasons and regulations for the state's subsistence, commercial, sport, guided sport, and personal use fisheries. The BoF also establishes policy and provides management direction for the state's fishery resources. The BoF is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. General precepts are established by the BoF and incorporated into regulation. The longterm objectives for Alaska's commercial salmon fisheries are primarily established through three policy statements, incorporated into state regulation, Title 5 Alaska Administrative Code, by the BoF: 39.220 Policy for the Management of Mixed Stock Salmon Fisheries[21], 39.222 Policy for the Management of Sustainable Salmon Fisheries[22], 39.223 Policy for State-wide Salmon Escapement Goals[23]. 3.2. Management measures should limit excess fishing capacity, promote responsible fisheries, take into account artisanal fisheries, protect biodiversity and allow depleted stocks to recover.

[19] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#fisheries
[20] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[21] https://casetext.com/regulation/alaska-administrative-code/title-5-fish-and-game/part-1-commercial-and-subsistence-fishing-and-private-nonprofitsalmon-hatcheries/chapter-39-general-provisions/article-2-general/section-5-aac-39220-policy-for-the-management-of-mixed-stock-salmon-fisheries
[22] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[23] https://casetext.com/regulation/alaska-administrative-code/title-5-fish-and-game/part-1-commercial-and-subsistence-fishing-and-private-nonprofitsalmon-hatcheries/chapter-39-general-provisions/article-2-general/section-5-aac-39223-policy-for-statewide-salmon-escapement-goals
[30] https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/CFEC_memo.pdf

3.	Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.
	Alaska has successfully managed sustained yield of its salmon fisheries since implementation of the limited entry permit system in 1973[30]. The Alaska Commercial Fisheries Entry Commission (CFEC) regulates the number of participating fishers, thereby conserving the resource and safeguarding the economic viability of the fishery[24]. Entry into regional salmon fisheries is controlled by the Commission, and the number of permits issued is regulated in accordance with the projected value of each fishery. While the BoF and ADFG continue to set and adjust biologically-based escapement goals to conserve Alaska's salmon stocks, the limited entry permitting process of the CFEC serves to safeguard the economic viability of dependent fisheries.
References:	http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/findings/ff93145x https://www.sciencebase.gov/catalog/item/576d8505e4b07657d1a37732 http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section223.htm https://www.cfec.state.ak.us/pregs/Homan30YrsLimitedEntrySummary.pdf http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1288&context=alr http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=10-202021&meeting=anchorage
Statement of consistency to the RFM Fishery Standard	ADFG fishery management objectives and actions continue to conform to the requirements of Fundamental Clause 3 of the RFM Fishery Standard.

7.9.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

7.9.2.1 Fundamental Clause 4. Fishery data

4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
Summary of relevant changes:	No relevant changes. 4.1. All fishery removals and mortality of the target stock(s) shall be considered by management. To facilitate stock-specific management, state waters have been classified and numbered into regions, areas, districts, sub-districts, individual river systems and sections within rivers when needed (see for example ADFG 2019) or the on-line map resources http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonmaps Both in-season and historic commercial catch data are readily available on the Commercial Fisheries website (http://www.cf.adfg.state.ak.us/geninfo /finfish/salmon/salmcatch.php). Catch and effort data is also available in annual management reports for each area. (See for example Tiernan *et al*., 2020 and Salomone *et al*., 2019). For sport fisheries, state-wide estimates of harvest (the state-wide harvest survey and guide logbook programs) are administered by the Research and Technical Services section (Romberg *et al.,* 2018). Sport fishery harvest and fishing effort estimates obtained from the state-wide harvest survey are available on the Sport Fish website (http://www.sf.adfg.state.ak.us/statewide/FishingSurvey/). 4.2. An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established. State regulations (5AAC; 39.140), Inspection of Fishing Establishments and Vessels), allow ADFG and Department of Public Safety personnel unobstructed access to all fishing vessels and processing establishments to inspect catch, gear and compliance with Alaska laws and regulations. However,

[24] https://www.cfec.state.ak.us/

4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
	observers are generally not needed to monitor compliance with regulations, or to collect data needed for management in Alaska's salmon fisheries. Alaska's commercial salmon fisheries occur close to shore or in-river and fish that are harvested are sold in Alaskan ports where the weight, number and location of harvest are reported on fish tickets. Biological samples of the harvests are typically sampled at the port of landing. Additionally, area management biologist and Department of Public Safety personnel often observe the fisheries to ensure compliance with time, area and gear requirements. When special needs arise, the ADFG has placed observers aboard salmon fishing vessels. For example, during implementation of the Pacific Salmon Treaty there was a need to verify estimates of immature Chinook salmon caught and released in Southeast troll fishery (Seibel *et al*., 1989) and to verify estimates of Chinook salmon caught in the Southeast purse seine fishery (Rowse and Marshall 1988). Another example was implementation of the Alaska Marine Mammal Observe Program that provided encounter and mortality estimates for both marine mammals and sea birds in several gillnet fisheries throughout the state (Wynne *et al*., 1991). <u>4.3. Management entities shall make data available in a timely manner and in an agreed format in accordance with agreed procedures.</u> There are processes in place to share catch data (and related data such as code microwire tag recoveries) with both Canada and the states of Oregon, Washington and Idaho where some stocks harvested in Alaska spawn. There is also a process for sharing catch and enhancement data with selected Pacific rim countries through the North Pacific Anadromous Fish Commission (NPAFC). Examples of sharing catch, effort and stock composition data with Canada for transboundary rivers in Southeast Alaska is PSC-TCTR (2021) and for Chinook salmon stock status is PSC-JTCC (2021). An example of sharing catch data through the NPAFC is Miyauchi and Saito (2021) <u>4.5. States shall stimulate the research required to support national policies related to fish as food and collect sufficient 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 U.S. Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), the U.S. National Institute of Health (NIH), and Alaska Seafood Marketing Institute (ASMI). ASMI is the state agency primarily responsible for increasing the economic value of Alaskan seafood through marketing programs, quality assurance and industry training. The powers of the ASMI Board (AS 1651.090) include conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state. The state of Alaska also operates the Kodiak Seafood and Marine Science Center (KSMSC). Among other things, KSMSC works to discover better methods to preserve, process, and package seafood. It has research kitchens, biochemistry labs and food labs with experimental seafood processing equipment that are used to test production techniques and develop new seafood products and evaluate fish as food. KSMSC staff work closely with the industry to convey research results and provide educational opportunities that help seafood workers improve efficiency and the quality. In fiscal year 2020 nine research projects were conducted by faculty and staff in the areas of seafood science, product development, fisheries anthropology, climate change, harmful algal blooms and safe subsistence harvest of shellfish. Thirteen peer reviewed publications and reports were produced by scientists based at KSMSC (KSMSC 2020). An example of research reports from these activities is Donkersloot *et.al* (2020).

4.	**There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**	
		Knowledge of the economic, social and cultural aspects of fish and fishing are critical to management of Alaska's salmon fisheries. The need for these kinds of data is evident in the regulations and statutes. For example: 1. The BoF must (AS 16.05.251(17) (e)) consider seven social, economic and cultural criteria when adopting a regulation that determine how to distribute fishing opportunity among identified user groups. 2. The BoF must (AS 16.05.25) consider 13 socio-economic and cultural factors to determine what areas will be open or closed to subsistence fishing. 3. The Policy for the Management of Sustainable Salmon Fisheries (5AAC 39.222(c)(5)) requires the BoF to consider (among other things) the social, cultural and economic risks and needs of future generations. The state relies on several sources for social, cultural and economic information to develop management policy. There are 82 local Advisory Committees composed of interested citizens most of whom are participants in commercial, sport, subsistence or personal use fisheries (or hunting and trapping) to provide local knowledge of the social, economic and institutional factors to the BoF (5AAC 96.010). The Commercial Fisheries Division maintains data on the ex-vessel and wholesale value of commercial landings. The Sport Fish Division periodically estimates the value of recreational fishing Duffield *et al.* (2020). The Division of Subsistence publishes studies on the history and current use of salmon for subsistence. The University of Alaska maintains the Institute of Social and Economic Research that periodically conducts research on the salmon fisheries of Alaska. The Alaska Seafood Marketing Institute (ASMI) uses these data in developing marketing campaigns. The Alaska legislature is made aware of the social cultural and economic value of salmon when crafting statutes. The Division of Subsistence publishes numerous papers on the history and current use of salmon for subsistence (see for example Fall *et al*., 2019; Sill *et al*., 2019; Trainor *et al*., 2019). The Commercial Fisheries Entry Commission publishes research on the optimum number of permits that should be issued for a fishery (see for example Schelle et. al., 2004). The University of Alaska Institute of Social and Economic Research conducted research on the value of commercial fishing to local economies (Watson, 2021). Various institutions have also contracted to have economic studies done and made public. For instance, the public non-profit hatcheries contracted a study to evaluate the economic impact of hatchery production (McDowell Group, 2018) and the Salmon Alliance contracted to determine the value of the seafood industry in South Central Alaska (McDowell, 2015). <u>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.</u> Essentially all stock assessments used for commercially harvested salmon are based on modern fishery science methods. However, the state has conducted research to document traditional knowledge on commercially fished salmon (Trainor *et al*., (2019), Ream and Merriam (2017), Bronwyn and Kukkonen (2017). The Alaska Board of Fisheries provided a forum for traditional knowledge to be brought into the management process for the Kuskokwim area. The Kuskokwim River Salmon Management Working Group was formed in 1988 in response to requests from stakeholders who sought a more active role in the management of salmon fishery resources. The Working Group is made up of 14-members, seats are provided for elders, subsistence fishermen,

4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
	processors, commercial fishermen, sport fishermen, Kuskokwim River Inter-Tribal Fish Commission, member at large, federal subsistence regional advisory committee, and the Alaska Department of Fish and Game. Members participate on a voluntary basis. Participation in the Working Group process requires a great deal of time from its members and agency staff. 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. Alaska does not conduct salmon research aboard vessels in the waters of other states. There are, however cooperative studies in the Transboundary Rivers and ADFG employees may travel into Canada via skiffs to assist in field activities. All such activities are coordinated through the Transboundary Rivers Technical Committee or Yukon River Technical Committee. All cooperative research on the Transboundary Rivers is reported annually https://www.psc.org/publications/technical-reports/technical-committee-reports/transboundary/ . 4.8. States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas. There is no high seas salmon fishing on stocks originating in Alaska. There are circumstances where salmon stocks that spawn in Canada are harvested in the territorial waters of Alaska. Research and management of those stocks is subject to terms of the Pacific Salmon Treaty and discussed elsewhere. There is, however, coordination of salmon research on the high seas. This is accomplished through the North Pacific Anadromous Fish Commission (NPAFC). The NPAFC is an international organization established by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean signed in 1992. The member countries are Canada, Japan, Republic of Korea, Russian Federation and United States. The Convention area includes the North Pacific Ocean and its adjacent seas, north of 33 degrees North Latitude beyond 200-miles zones of the coastal States. While key convention measures are aimed at prohibiting directed fishing and retention of incidentally caught salmon in the Convention area, the Convention also authorizes coordinated research on anadromous stocks. As such, the Convention authorizes fishing for anadromous fish in the Convention Area for scientific purposes under national and joint research programs approved by the NPAFC. The NPAFC is active in coordinating scientific research under the Commission's Science Plan and has developed a consensus long-term research and monitoring plan for Pacific salmon in the North Pacific (The Science Sub-Committee (SSC), 2016). Under the research and monitoring plans, member countries are cooperating in collecting, reporting and exchanging biostatistical data, biological samples, fisheries data and organizing scientific communications, such as seminars, workshops, exchanges of scientific personnel and publications (See for example Park *et al*., Eds. (2009)). The Commission organized a coordinated multi-nation effort to conduct various research during the summer of 2022, preliminary findings can be found at https://npafc.org/iys/. The members also exchange catch, enhancement and other technical information and material pertaining to areas adjacent to the Convention Area from which anadromous stocks migrate into the Convention Area. NPAFC activities are outlined in annual reports, see for example NPAFC (2020). 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. These clauses are not relevant.
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4.	**There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**	
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4.	There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.
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Statement of consistency to the RFM Fishery Standard	The state of Alaska continues to maintain an effective fishery data collection and analysis system for salmon stock assessment and continues to conform to the requirements of Fundamental Clause 4 of the RFM Fishery Standard

7.9.2.2 Fundamental Clause 5. Stock assessment

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:	• This year new funds for Nushagak Chinook stock assessment - 5 year study BBNC matched 3.5 million for total project of $7 million
	• New - Kenai River tag program to verify sonar counts of sockeye. New programs initiated in 2022 include:
	  ○ A genetic based stock identification along the south side of the Alaska Peninsula to determine the origin of Chum salmon caught in the seine and gillnet fisheries in ADFG statistical Area M. It was noted that stocks of Chum salmon spawning in Western Alaska from Bristol Bay north to Norton Sound cannot be differential genetically.
	  ○ One and a half million dollars of new funding was obtained through the Pacific Salmon Commission process for Chinook and Chum salmon stock assessment activities on mainstem of the Yukon River.
	  ○ A program to study the productivity of waters in the North Pacific and Bering Sea.
	  ○ A five-year program to estimate the spawning escapement of Nushagak Chinook salmon. The $7.0 million study is funded equally by the State of Alaska and the Bristol Bay Native Corporation.
	  ○ A tagging program to estimate the abundance of Sockeye Salmon in the Kenai River. This study is designed to determine if the ongoing sonar counts of sockeye.
	
	<u>5.1 An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.</u>
	The conduct of diverse research concerning salmon is a collaborative effort of numerous state and federal agencies. ADFG supports a wide breath of research, including:
	• The Commercial Fisheries Division maintains programs that research effects of enhancement, ecology, stock assessment, genetics, pathology, and maintains several critical databases including; the value of salmon harvested, genetic profiles, otolith anatomy, coded wire tags and disease incidence that are used in collaboration with a number of agencies.
	• The Division of Subsistence researches the history and current use of salmon for subsistence.
	• The Sport Fish Division studies biology, ecology, and economics of recreational fishing. It also conducts stock assessments and makes recommendations on escapement goals.
	
	The State of Alaska, supports diverse biological, social and economic research in institutions other than ADFG, including:
	• The University of Alaska has an extensive undergraduate and graduate program on a broad array of topics including quantitative stock assessment, biology, enhancement, genetics, behavioral ecology. The University also offers associate degrees and certificates in fisheries technology at facilities located in Juneau, Seward, Kodiak and Fairbanks. The University of Alaska Institute of Social and Economic Research conducts research on the economics of Alaska's fisheries.
	• The Kodiak Marine Science and Seafood Center researches the biochemistry and nutritional value of seafood.
	• The Alaska Seafood Marketing Institute contracts studies to determine the value of Alaska's Seafood industry.
	• The Commercial Fishery Entry Commission publishes research on the optimum number of permits that should be issued for a fishery.

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		Federal Agencies and the University of Washington's Alaska Salmon Program support varied research, including: • The University of Washington maintains three field stations in Alaska to study a broad array of topics relating to management of salmon and to train graduate students. • The USFWS augments state stock assessment by conducting research on salmon production and habitat on federal lands. The U.S Forest Service, U.S. Park Service and U.S. Bureau of Land Management perform fisheries research projects and activities associated with management of subsistence fisheries on federal lands. Examples of the ADFG research on technology is Burwen *et al*. (2010), on genetics is, Habicht (2019) and McKinley *et al*. (2020) on pathology in support of enhancement is Purcell *et al*. (2018) on ecology is Loewen and Baechler (2014) on population dynamics is Matter and Tyers (2019). The Sport Fish Division has published reports on the value of recreational fishing Southwick *et al*. (2008). Examples of The Division of Subsistence research on the history, social-economic values and current use of salmon for subsistence Sill *et al*. (2019). An example of The Alaska Seafood Marketing Institute supported research on economics is McDowell (2017). An example of the University of Alaska Institute of Social and Economic Research on economics is Knapp (2011). An example of the Commercial Fishery Entry Commission research on the optimum number of permits that should be issued for a fishery is Schelle *et al.* (2004). Examples of the University of Alaska research in ecology are Adkison (2010) and Cunningham (2018). Examples of research conducted at the University of Washington on salmon are Clark *et al.* (2015) and Lincoln *et al*. (2020) other publications can be found at https://alaskasalmonprogram.org/wp-content/uploads/2020/12/ASP_pubs_through_2020.pdf Examples of the National Marine Fisheries Service Auke Bay Laboratory research include: Murphy *et al.* (2017 on early marine life history of salmon; Kondezla *et al*. (2016) and Guthrie *et al*. (2021) on genetics and stock identification and on environmental science and pollution is Farrow *et al.* (2016). An example of the research conducted by the USFWS on production and habitat in Alaska is Tanner and Suresh (2014). 5.2. The state of the stocks under management jurisdiction, including the impacts of ecosystem changes resulting from fishing pressure, pollution or habitat alteration shall be monitored. The ADFG Divisions of Commercial and Sport Fisheries take the primary lead on determining the status of salmon stocks. Alaska's salmon stock assessment program is extensive and comprehensive. The program to determine the number caught and their composition is explained in Clause 4. Research capacity in environmental science is also discussed in Clause 5.1.2. The program to estimate escapements and to set goals is explained in Clause 6. The Habitat Division performs research to monitor or evaluate the potential effects of development projects. The Sport Fish Division strategic plan prioritizes habitat research. The Sport Divisions also operates the Kachemak Bay Research Reserve which includes programs related to the effects of climate change, changes in sea level and marine and freshwater temperatures, frequency of storm events, rapid loss of coastal glaciers and coastal uplift. When evaluating stock status, ADFG research staff have access to a wealth of data collected and analysed by a number of other state, federal and non-profit sources as described below. The primary goal of the North Pacific Anadromous Fish Commission's Science Plan is to understand variations in Pacific salmon productivity in a changing climate. Research objectives include: (1) improve knowledge of Pacific salmon distribution, growth and survival in the ocean (current status);

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.**	
		(2) increase understanding of the causes of variations in Pacific salmon and steelhead trout production (mechanisms); and (3) anticipate future changes in the production of Pacific salmon and steelhead trout and the marine ecosystems. The National Oceanic and Atmosphere Administration's (NOAA) Habitat Conservation Division (HCD) responsibilities include conducting and/or reviewing environmental analyses for a large variety of activities including commercial fishing, coastal development, transportation and energy projects. The HCD focuses on activities in habitats used by federally managed fish species located offshore, nearshore, in estuaries and in freshwater areas important to anadromous salmon. NOAA administers the Saltonstall-Kennedy grant program for fisheries research and development. NOAA also administers the Pacific Coastal Salmon Recovery Fund that was established by Congress to provide funding to states and tribes of the Pacific Coast Region to protect, restore, and conserve Pacific Salmon and steelhead populations and their habitats. The U.S. Fish and Wildlife Service has recognized climate change as a potential driver in aquatic systems and supports research into the possible effects. The University of Alaska's Climate Research Center conducts basic climate research useful for understanding potential impacts on aquatic systems. The North Pacific Research Board (NPRB) distributes monies from the earnings of the Environmental Improvement and Restoration Fund, created by congress to "...conduct research activities on, or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean (including any lesser related bodies of water) .... [With]...priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs." The Bering Sea Integrated Ecosystem Research Program, a partnership between the NPRB and the National Science Foundation, funds research and ecosystem modelling to understand the impacts of climate change and dynamic sea ice cover on the eastern Bering Sea ecosystem. The Gulf of Alaska Integrated Ecosystem Research Project seeks to understand how environmental and anthropogenic processes, including climate change, affect trophic levels and dynamic linkages among trophic levels, with emphasis on fish and fisheries, marine mammals and seabirds within the Gulf of Alaska. Examples of ADFG's research on salmon stock status is shown in Clause 4. Examples of research in environmental science is discussed in Clause 5 the extensive reporting on to estimate escapements and to set goals is explained in Clause 6. An example of ADFG's Habitat Division's research to evaluate the potential effects of development projects is Brewster (2016). The Sport Fish Division strategic plan that prioritizes habitat research is ADFG- SF (2015). An example of the HCD focuses on activities in habitats is NOAA (2013). An example of the U.S. Fish and Wildlife Service work on climate change is Prucha *et al*. (2013). An example of Alaska's Climate Research Canter's work to understanding potential impacts on aquatic systems is Wendler *et al*. (2015). Examples of the research carried out by the NPAFC include a synopsis of research on production of salmon in a changing climate (NPAFC 2016) and finding of the 2022 field sampling https://npafc.org/iys/. 5.3. Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.

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 State of Alaska participates in the two international organizations that support and encourage research on salmon in and around Alaska to ensure optimum utilization. The North Pacific Anadromous Fish Commission (NPAFC) promotes conservation and sustainability of anadromous stocks and conducts regular meetings and communications in the areas of fisheries enforcement and scientific research. The Pacific Salmon Treaty between Canada and the United States was signed in 1985 and established a Commission, Panels and Technical Committees to develop agreed fishing regimes, monitor performance and manage a Northern Fund to help support research and enhancement. The Commission and Panels meet three times a year. The treaty process provides for policy guidance by sanctioning Panels to address harvest management issues of shared stocks in each covered fishing area and for Joint Technical Committees to provide annual stock assessments. The Yukon River Panel was established as Attachment B, Annex IV, Chapter 8, Pacific Salmon Treaty to develop and implement agreed research and management programs for shared salmon resources of the Yukon River. The Yukon Panel acts independently from other annexes under the Pacific Salmon Treaty. There is an extensive library of documents available explaining the processes followed for both the NPAFC and PSC available on their web sites at https://npafc.org/ and https://www.psc.org/. An example of the annual reports of the NPAFC is NPAFC (2021). An example of the annual reports of the PSC is PSC (2021). Likewise, there is an extensive library of technical documents, an example of PSC documents is PSC-JCTC (2022) and an example from the NPAFC is Akenhead *et al*. (2019). 5.4. The 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. As described in Clause 5.3 the Pacific Salmon Commission's Technical Committees, Yukon Panel Technical Committee and NPAFC develop collaborative technical and research programs to improve understanding of the biology, environment and status of transboundary aquatic stocks. There is an extensive and up-to-date library of technical reports written by the technical committees of the PSC and NPAFC available on their web sites noted in Clause 5.3. An example of PSC documents is PSC-JCTC (2022) and an example from the NPAFC is Akenhead *et al*. (2019). 5.5. Data generated by research shall be analysed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate. Alaska Statute 16.05.815 (Confidential Nature of Certain Reports and Records) requires strict confidentiality of an individual fisher's sales data. A fisher's data is protected and may not be released to the public. As a working rule, ADFG's policy is that if three or fewer fishers report sales within a fine scale time, area strata, the data will be redacted from public reports. There are processes in place to share data with other states through the Pacific States Marine Fisheries Commission (PSMFC) and with Canada through the Pacific Salmon Commission (PSC). The PSMFC maintains a coast-wide database of catch needed to interpret recoveries of coded micro-wire tags. A committee within the PSMFC composed of representatives of states, federal and tribal staff guide development and maintenance of the database in accordance with their respective agencies policies and regulations such as confidentiality. The PSC has established A Data Sharing Technical Committees to compile and evaluate stock assessment data also with representative of all participating agencies.

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.
	That confidentiality requirements are maintained is evident in the reports of the PSC and online data available through the PSMFC. These reports and databases only have aggregated catch data in large blocks of time and space such as an entire district's catch for a week. There are no individual records of sales in their data sets. Evidence of maintaining strict confidentially is often observed at Board of Fish meetings when a proposal seeks to place some kind of regulation on a small geographic location and the ADFG cannot release catch data because three or fewer fishermen have reported catches in that area, see for example Weiland *et al*. (2003). Evidence of the PSMFC efforts can be seen at http://www.psmfc.org/program/regional-mark-processing-center-coded-wire-tag-rmpc?pid=17). The report of the PSC's Joint Committee on Data Sharing (PSC-JTCDS 1989) explains the process used and an example of the work completed as a result of data sharing is a report of the Chinook Technical Committee PSC-JCTC (2022).
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Statement of consistency to the RFM Fishery Standard	The state of Alaska continues to maintain an effective and appropriate scientific stock assessment system that supports optimum itemization. Thus, the fishery continues to conform to the requirements of Fundamental Clause 5 of the RFM Fishery Standard.

7.9.2.3 Fundamental Clause 6. Biological reference points and harvest control rule

6.	The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.
Summary of relevant changes:	During the 2021/2022 Alaska Board of Fish Cycle (through the March 2022 meeting) the Board added 6 stocks to the Stocks of Concern list. They are Chinook Salmon stocks of the Stikine, Taku, Andrew, and Chickamin rivers and Sockeye Salmon in the Klukshu and the early run of the Chignik River. All were listed as stocks of "Management Concern". The Board also adopted management action plans for the Unuk, Chickamin, Stikine, Andrew rivers and for northern SE Chinook stocks. **Summarized Evidence:** 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.

6.	**The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.**	
	6.1 States shall establish safe target reference point(s) for management.	

Escapement goals are the primary reference points for Alaska salmon management. The Policy for Statewide Salmon Escapement Goals (5AAC 39.223) defines the types of escapements goals that may be established and the role of the ADFG and Board of Fisheries in setting and reviewing goals.

The Policy for the Management of Sustainable Salmon Fisheries (AAC 39.222) sets out (among other things) that salmon fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning.

The Alaska Board of Fisheries has the authority under 5 AAC 39.200 to establish management plans that provide ADFG guidelines to be followed when making in-season management decisions regarding the state's subsistence, commercial, sport and personal use fisheries. The primary goal of these management plans is to protect the sustained yield of the state's fishery resources while at the same time providing an equitable distribution of the available harvest between various users.
The Policy for State-wide Salmon Escapement Goals (5AAC 39.223) defines the types of escapements goals that may be established and the role of the ADFG and Board of Fisheries in setting and reviewing goals.

1. A Biological Escapement Goal (BEG) is defined as an escapement range that provides the greatest potential for maximum sustained yield. Once established, a BEG becomes the primary management objective unless the Board of Fisheries establishes an optimal escapement or in-river run goal. A BEG is developed with age specific data for a stock's catch and escapement over a series of years. Typically, a Ricker type stock – recruitment function is used to establish the BEG. ADFG seeks to maintain evenly distributed salmon escapements within the range.
2. A Sustainable Escapement Goal (SEG) is defined as a level of escapement, indicated by an index or a range of escapement estimates, that is known to have provided for sustained yield over a 5 to 10-year period. A SEG is used in situations where a BEG cannot be estimated because there is no stock-specific catch estimate. Once established, a SEG becomes the primary management objective unless an optimal escapement or in-river run goal has been adopted by the Board of Fisheries. An SEG is stated as a range that takes into account data uncertainty. The ADFG seeks to maintain escapements within the bounds of the SEG.
3. A Sustained Escapement Threshold (SET) is defined as a threshold level of escapement below which the ability of the salmon stock to sustain itself is jeopardized. In practice, a SET can be estimated based on the lower range of historical escapement levels for which the salmon stock has consistently demonstrated the ability to sustain itself. A SET is lower than the lower bound of the BEG and lower than the lower bound of the SEG. A SET is established by the ADFG, in consultation with the Board of Fish, as needed, for salmon stocks of management or conservation concern.
4. In special circumstances, the Board of Fisheries may determine it is appropriate to establish a optimum escapement goal (OEG). If the board establishes an OEG, it must provide an explanation of the reasons, and with the assistance of the ADFG an estimate of expected differences in production relative to maximum sustained yield.
5. The Board of Fisheries may also establish an in-river escapement goal to provide for harvest in addition to escapement.

A variety of methods are used to develop escapement goals (Munro 2021). A brief description of each is summarized below. The most commonly used methods are listed first, followed by the less common methods.

6.	**The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.**
	1. Spawner-Recruit Analysis: Analysis of the relationship between the number of fish in the escapement and subsequent production of adults in the next generation. The Ricker type production model is almost exclusively used. 2. Percentile Method: This method is used for establishing sustainable escapement goals and contrasts observed annual escapements (largest escapement divided by smallest escapement) and the exploitation rate of a stock to select percentiles of observed escapements for estimating lower and upper bounds of the goal Clark *et al*., 2014). 3. Risk Analysis: Risks Analysis evaluates the magnitude of management error in future years around a precautionary reference point established using past observations of escapement (Bernard *et al*., 2009). This method is primarily used to guide establishment of a lower-bound SEG for non-targeted stocks of salmon. 4. Yield Analysis: Graphical or tabular examination of yields produced from observed escapement indices from which the escapement range with the greatest yields is identified (Hilborn and Walters 1992). 5. Theoretical Spawner-Recruit Analysis: This method is used in situations where there are few or no stock specific harvest estimates and/or age data. Information from nearby stocks, or about the species, are used in a spawner-recruit production model to estimate the number of spawners needed to achieve maximum sustained yield (Clark 2005). 6. Empirical Observation: Goals are based on observed escapements over time and may be calculated as the average escapement or the value of a low escapement for which there is evidence that the stock is able to recover (ADFG 2004). 7. Zooplankton Model: This model estimates the number of sockeye salmon smolts of a threshold or optimal size that a lake can support based upon measures of zooplankton biomass and surface area of the lake. Adult production is then estimated from marine survival rates over a range of smolt sizes (Koenings and Kyle, 1997). 8. Spawning Habitat Model: Estimates of spawning capacity or number of spawners that produce maximum sustained yield (see for example Burgner *et al*., 1969). 9. Euphotic Volume Model: Measurement of the volume of a lake where sufficient light penetrates to support primary production is used to estimate sockeye salmon smolt biomass carrying capacity from which adult production is then estimated using marine survival rates (Koenings and Burkett, 1987). 10. Lake Surface Area: Similar to spawning habitat models, the relationship between the lake surface area and escapement are used to estimate adult sockeye salmon production (Nelson 2006). 11. Conditional Sustained Yield Analysis: Observed escapement indices and harvest are used to estimate if, on average, surplus production results from a particular goal range (Nelson *et al*., 2005). Estimated yields are conditioned on extreme values of measurement error in the escapement indices. 12. Brood Interaction Simulation Model: This model simulates production using a spawner–recruit relationship that modifies the simulated production for the year of return using an age-structured sub-model and estimates resulting catches and escapements under user-specified harvest strategies (Carlson *et al*., 1999). This is a hybrid of a theoretical SRA and yield analysis that has only been used to develop the escapement goal for Kenai River sockeye salmon. Recognizing the variety of methods used and quality of data available to establish an escapement goal, ADFG developed a rating system to convey their confidence in each goal (Munro and Volk 2015). • The highest rating is given when accurate estimates of escapement (by age) and stock-specific catch (by age) are available to develop a BEG.

6.	**The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.**
	• A good rating is given when fair to good accuracy and precision of estimates of escapement from mark-recapture experiments or multiple foot/aerial surveys and escapement and age estimates are available (but may have gaps) to develop a BEG or SEG. • A fair rating is given when fair to good accuracy of escapement estimates are available but some estimates are missing or inadequate, and age estimates are missing or incomplete, but sufficient data exists to estimate a sustainable escapement goal. • A poor rating is given when fair accuracy in escapement counts or index data (e.g., single foot/aerial survey) is available, but no harvest or age data is available to allow development of a SEG. The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) directs ADFG to provide the Board of Fisheries with reports on the status of salmon stocks and identify any salmon stock that is not producing at the expected level. The policy defines three levels of concern. 1. Yield Concern: A stock of yield concern is defined as "a concern arising from a chronic inability, despite the use of specific management measures, to maintain specific yields or harvestable surpluses above a stock's escapement needs. 2. Management Concern: A stock of management concern is defined as “a concern arising from a chronic inability, despite the use of specific management measures, to maintain escapements for a salmon stock within the bounds of the SEG, BEG, OEG, or other specified management objectives for the fishery. 3. Conservation Concern: A stock of conservation concern is defined as “a concern arising from a chronic inability, despite the use of specific management measures, to maintain escapements for a stock above a sustained escapement threshold (SET). Among other things, the Sustainable Salmon Policy (5AAC 39.222) requires fisheries be managed in a precautionary manner to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning as follows: 1. Salmon spawning escapements should be assessed both temporally and geographically; escapement monitoring programs should be appropriate to the scale, intensity, and importance of each salmon stock's use. 2. Salmon escapement goals, whether sustainable escapement goals, biological escapement goals, optimal escapement goals, or in-river run goals, should be established in a manner consistent with sustained yield; unless otherwise directed, the department will manage Alaska's salmon fisheries, to the extent possible, for maximum sustained yield. 3. Salmon escapement goal ranges should allow for uncertainty associated with measurement techniques, observed variability in the salmon stock measured, changes in climatic and oceanographic conditions, and varying abundance within related populations of the salmon stock measured. 4. Salmon escapement should be managed in a manner to maintain genetic and phenotypic characteristics of the stock by assuring appropriate geographic and temporal distribution of spawners as well as consideration of size range, sex ratio, and other population attributes. Escapement goals for a management area are reviewed every three years. In 2021 there were 264 active salmon stock escapement goals in the state. The ADFG publishes a summary of state-wide salmon escapement goals, the method used to establish those goals and the actual escapements in relation to those goals for the last ten years (Munro and Brenner, 2022). Escapement goals may be established for individual stocks when stock-specific catch and escapement data are available. Bristol Bay Sockeye Salmon provide a good example of where goals have been set for individual stocks

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		(Erickson *et al.,* 2015). In cases where catches cannot be assigned to a stock, an escapement goal for a group of stocks in a management are may be developed. A good example of where an escapement goal has been set for a geographic area is for pink salmon along the south side of the Alaska Peninsula (Schaberg *et al.,* 2019). 6.2 States shall establish safe limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point. Almost all of Alaska's escapement goals (whether BEGs, SEGs, or OEGs) are established as a range (see Clause 6.1). A few stocks with SETs have only a lower limit. The lower end of each range, or SET is essentially a limit reference point, because all fisheries must, by regulation (5AAC 39.222) be managed to provide escapements that are above the lower end of the escapement goal range. Prior to each season, the ADFG publishes management plans that outline expectations of run size and the management strategy for the upcoming season. The Management Plan for Southeast Alaska's District 15 gillnet fishery (Thynes *et al*., 2020) illustrates the intent to manage the fishery so as to obtain escapement goals for Chinook and Sockeye salmon. **Chinook salmon** "In September 2017, the department recommended to the Alaska Board of Fisheries (BOF) that the Chilkat River Chinook salmon run be designated as a stock of management concern. In 2018, the board accepted the department's Stock of Concern recommendations for Chilkat River Chinook salmon populations. Despite significant changes to the commercial fisheries in 2018, the Chilkat River Chinook salmon BEG was not achieved. In response, the department exceeded the BOF Action Plan in 2019 in order to reduce more Chinook salmon harvest. The 2019 drainage wide escapement estimate was 2,028 large Chilkat Chinook salmon, which was above the lower bound of the escapement goal of 1,750 fish. This was the first time the Chilkat River stock met the escapement goal since 2015. The 2020 preseason forecast for Chilkat River Chinook salmon is projected to be below the minimum in-river escapement goal range. Management strategies in 2020 will again focus on minimizing harvests of Chilkat River Chinook salmon stocks by employing a conservative management approach similar to 2019. Conservation measures implemented by the department to minimize Chinook salmon harvest may include a six-inch maximum mesh size restriction and night closures from 10:00 p.m. to 4:00 a.m. districtwide through July 18. Time and area restrictions outlined in the following sections will also be implemented to minimize the harvest of Chinook salmon. **Sockeye salmon** District 15 will open for directed sockeye salmon fishing on the third Sunday in June (June 21). District 15 management will be based on in-season observations of Chinook salmon returns to the Chilkat River and sockeye salmon returns to Chilkat and Chilkoot lakes. Run strength will be evaluated using fishery performance and stock assessment data. In-season stock composition of the sockeye salmon harvest in the District 15 commercial drift gillnet fishery will be estimated through genetic stock identification.

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		Sockeye salmon harvest will be affected by time, area, and gear restrictions due to Chinook salmon conservation. Section 15-A will be limited to two days a week through July 25 in those waters south of Eldred Rock Lighthouse and east of a line from Eldred Rock Lighthouse to a point 2.0 nmi from the eastern shoreline. A six-inch maximum mesh size restriction and night closures will be in effect and likely remain in place through July 25. In Section 15-C, time and area restrictions that may affect sockeye salmon harvest include limiting the open waters to the "Postage Stamp" (waters of Section 15-C south of the latitude of Vanderbilt Reef Light and east of a line from Vanderbilt Reef Light to Little Island Light) for a maximum of two days through July 11 (SW 28). A six-inch maximum mesh size restriction and night closures will likely be in effect through July 18. This includes outside waters of the Boat Harbor THA. Subsequent openings will be based on traditional Lynn Canal management practices through mid-August." Post season, annual management reports throughout the state detail how the season unfolded as stock assessment data became available. An extracted summary from the 2020 Annual Management Report for the Chignik Management Area (CMA) illustrates how ADFG used stock assessment data to manage for escapement goals for the Chignik River run of Sockeye Salmon (Renick and Stratton 2021). "All commercial salmon resources in the CMA are managed by emergency order based on in-season evaluation of local stock abundance and escapement objectives. The Chignik River weir was operational May 30 through August 26 in 2020 and provided daily escapement counts used to manage a majority of the commercial fisheries within the CMA…… During the 2020 season (Chignik River Sockeye return), ADF&G applied an average stock proportion curve developed from genetic data collected during the 2010–2019 seasons. The model from which the curve was developed assumed that Black Lake (early run) fish escape upriver through July 31. Chignik Lake (late run) sockeye salmon begin escaping in mid-June, and all fish passing the weir beginning August 1 are considered late run. Sockeye Salmon escapement into the Chignik River in early June was well below average, tracking below minimum interim escapement objectives. Poor salmon escapement early in the season resulted in no commercial salmon fishing periods in June for the Chignik Bay, Eastern and Central Districts, as well as the Inner Castle Cape Subsection of the Western District. As the transition from early- to late-run sockeye salmon occurred, escapement remained well below average. Similar to the early run, the late run failed to develop as forecasted and remained below interim escapement objectives throughout the entirety of the run. Therefore, no commercial salmon fishing periods were scheduled targeting late-run sockeye salmon and the CMA remained closed the remainder of the season. Perhaps the best evidence that the ADGF takes management action to achieve escapement goals is the fact that escapement goals are generally attained state-wide (Munro and Brenner, 2022). 6.3 Data and assessment procedures shall be installed measuring the position of the fishery in relation to the reference points. Accordingly, the stock under consideration shall not be overfished (i.e. above limit reference point or proxy) and the level of fishing permitted shall be commensurate

6.	**The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.**	
		with the current state of the fishery resources, maintaining its future availability, taking into account that long term changes in productivity can occur due to natural variability and/or impacts other than fishing. As stated in 6.1, ADFG has established a comprehensive program to estimate escapement goals. That process is based on methods for estimating the catch by all user groups (see clause 4) and escapement. Importantly, catch, catch per unit of effort, escapements and often biological data are collected in real time and for comparison with historic fishery performance and to historic run timing. The methods used to estimate escapement vary greatly depending upon local circumstances. For instance, counting towers are typically used for Sockeye Salmon in Bristol Bay, weirs are common for Sockeye Salmon in Kodiak, Chignik and Southeast. Mark recapture programs are common for Chinook salmon in Southeast. Foot surveys are commonly used for Coho salmon in Southeast. Aerial surveys are the normal practice for Pink and Chum salmon throughout the state. Sonar is used in large occluded rivers such as the Yukon, Copper and Kenai. A complete listing of the method used for each escapement goal is found in Munro and Brenner (2022). For systems that have developed BEG's such as Sockeye salmon stocks in Bristol Bay and Westward Region and several Chinook salmon stocks in the Yukon and Southeast Region there is a comprehensive program for estimating the age composition of both the catch and escapement. There is a mix of programs to estimate the stock specific catch in mixed stock fisheries. Coded microwire tags are used extensively in Southeast and Yakutat for Chinook and Coho salmon. Thermal marks on otoliths are used to identify hatchery Pink salmon in Prince William Sound and for Chum salmon in Southeast. Thermal marking of Pink and Chum salmon has begun in Kodiak. Genetic stock Identification has/is used for Chinook salmon in Cook Inlet and Southeast and for Sockeye salmon in Cook Inlet, Bristol Bay and Southeast. Environmental data such as river discharge and water quality are key observations for helping to interpret escapement data based on aerial and foot surveys. The data needed for in-season management of the fisheries is obtained, synthesized and interpreted in real time by area research and management staff. Emergency Orders are issued to describe the area, time and gear allowed for fishing if surplus production is identified. Munro and Brenner (2022) summarized the escapements relative to goals for 2021 as follows: "In 2021, 70% of the stocks assessed had escapements that met or exceeded their escapement goals. The percentage of all stocks assessed in 2021 that were within the goal range (or above the lower bound if a lower-bound SEG) was 40%, which is below the observed range for recent years (42–53%). In 2021, 30% of the goals were exceeded, which was an increase from 18% in 2020. In recent years the percentage of escapement goals that were exceeded ranged from 18% to 41%. The percentage of goals for which minimum escapement was not achieved in 2021 was 30%—a decrease from 35% in 2020—but above the recent average of 25% (2013–2020)". Annual Management Reports detail the management strategy going into the season, detailed explanations of the rational used for issuing emergency orders and details of the catch and escapements (e.g., Thynes *et al*., 2020; Renick and Stratton, 2021). Annual management reports may be supplemented with annual research papers that explain how specific estimates of escapement, age or stock compositions were estimated (Hamazaki, 2021). Every three years these data are

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		synthesized to re-evaluate escapement goals so that productivity changes can be detected and goals revised, if appropriate, for example Schaberg *et al.* (2019). 6.4 Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. The state-wide Sustainable Salmon Policy (5AAC 39.222) mandates, among other things, that escapement goals must be established for all exploited salmon stocks and that fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning. This basic policy sets the expectation among fishers that ADFG will, as needed, exercise its statutory authority to manage the time and area where fishing is allowed so as to achieve those escapement goals. This policy also requires ADFG to provide the Board of Fish, on a regular basis, a stock status report, a review of escapement goals and action plans that include management directives to promote recovery of any stock of concern. Further guidance and expectations for the ADFG's in-season management actions is found in the Policy for the Management of Sustainable Salmon Fisheries, "in the face of uncertainty, salmon stocks, fisheries, artificial propagation and essential habitats shall be managed conservatively". This regulation further defines the "precautionary approach" to involve consideration of; a) the uncertainties in salmon fisheries and habitat management, b) biological, social, cultural, and economic risks, c) consideration of the needs of future generations, and d) placement of the burden of proof on those activities that pose a risk to salmon habitat or production. Often the Board of Fisheries determines it is in the state's best interest to lay out specific management plans to guide the ADFG to achieve not only its biological goals, but also to meet Board of Fish allocation decisions. When this occurs, the Board develops specific management plans through its open public regulatory process. There are over 100 BoF salmon management plans that detail the specific management actions that are to be taken to ensure that management targets are met, these plans can be found in the Commercial fishing regulations, for example (ADFG 2020) outlines plans for the Cook Inlet area. The public Board of Fish process that permits individuals to submit regulatory proposals, to testify, present data and management options ensures that diverse points of view can be considered when crafting management plans. The authority, process and annual schedule for the BoF can be found at: http://www.adfg.alaska.gov/index. And schedule used cfm?adfg=fisheriesboard.main. A detailed example of a Board of Fish management plan is the Situk-Ahrnklin Inlet and Lost River King Salmon Management Plan (ADFG 2019). This plan includes specific management actions that are to be implemented for each fishery based on the projected in-river run at the weir. The BEG for Situk River Chinook salmon is 450 – 1050 three ocean-age or older fish. The management plans call for a stepwise procedure for closing/opening the fisheries depending upon the projected run size of Chinook salmon as follows: • Closure of all fisheries (subsistence, sport, personal use, commercial set gillnet, and near-shore troll commercial troll fishery) if the projected in-river escapement (based on weir counts and historic run timing) is below 350 fish. • If the projected in-river escapement is 350 – 450 Chinook salmon, the sport fishery will be closed by emergency order, the commercial troll fishery may be closed by EO, the set-net fishery may be limited to "non-sale" of Chinook salmon, and weekly fishing periods for the set-net fishery may be restricted. These regulations are designed to minimize the harvest of Chinook salmon while allowing the harvest of the Sockeye salmon and retention of Chinook salmon for subsistence use.

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	If the project return is 451-730 Chinook salmon, portions of the Situk River may be closed to sport fishing for Chinook salmon or the entire river may be restricted to catch and release fishing for Chinook salmon, the commercial troll fishery may be closed by EO, the set-net fishery may be limited to "non-sale" of Chinook salmon, and weekly fishing periods for the set-net fishery may be restricted. These actions will be taken, as needed to ensure a minimum escapement of 730 Chinook salmon. • If the projected Chinook salmon escapement is 730 – 1,050 fish, the set-net fishery will be managed based on Sockeye salmon run strength, and the sport, subsistence, and commercial troll fishery will be managed based on normal fishing regulations. If the projected escapement of Chinook salmon is greater than 1,050 fish, ADFG will implement liberalized regulations to harvest the surplus of Chinook salmon above the escapement goal range. Other examples of fishery management plans that contain pre-determined fishery management actions to meet escapement goals or other fishery targets are: • The Southeast Alaska King Salmon Management Plan (5AAC 47.055) contains numerous potential restrictions to the sport fishery to achieve the abundance-based allocation to the sport fishery. • The Kenai River Late-Run Sockeye Salmon Management Plan (5AAC 21.360) contains numerous potential regulatory actions to the commercial set gillnet fishery. • The Tanana River Salmon Management Plan (5AAC 05.367) provides guideline harvest limits for Chinook, summer Chum and fall Chum salmon and options for commercial fisheries based on escapement status of the runs. • The Southern District Management Plan for the Alaska Peninsula (5AAC 09.360) provides management directives for the mainland fishery based on harvestable surplus of Chignik River Sockeye Salmon. During the 2021/2022 Alaska Board of Fish Cycle (through the March 2022 meeting) the Board adopted management plans for the Unuk, Chickamin, Stikine, Andrew rivers and for northern SE Chinook stocks. The Board also made several changes (boundaries, fishing times for gear groups) to Special Harvest Areas where hatchery origin fish in excess of brood stock are harvested
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Statement of consistency to the RFM Fishery Standard		**Management of the Alaska salmon fishery continues to be based upon defining scientific escapement goals (reference points) and managing the fishery in-season by manipulating the time and area that may be fished to achieve the goals. Therefore, the fishery continues to conform to the**

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		requirements of Fundamental Clause 6 of the RFM Fishery Standard

7.9.2.4 Fundamental Clause 7. Precautionary approach

7.	**Management actions and measures for the conservation of stock and the ecosystem shall be based on the precautionary approach. Where information is deficient a suitable method using risk management shall be adopted to consider 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. Previous reports have outlined 2 examples of concern which are: 1. Depressed runs, declining productive, and biological changes in age and size of Chinook populations; 2. And, concern over hatchery origin pink salmon in Prince William Sound (PWS) and hatchery origin chum salmon in Prince William Sound and Southeast Alaska. Recently a third issue of concern is the return of hatchery fall chum to the remote facility in SE Alaska near Sitka in the Crawfish Inlet. Regarding the first issue please refer to previous discussions in this report in sections 7.5 and 7.5.1, respectfully (Table 7 and Table 8), and for more information on escapement and management in fundamental clause 6. Chinook salmon runs have continued to exhibit low productivity. There have been extensive season-long commercial fishery closures throughout western Alaska. In Bristol Bay, the 2020 and 2021 runs were below average. Copper River runs of Chinook salmon have been low periodically in recent years but near average in 2021. In the Southeast area, extensive closures of both the commercial and sport fisheries around mouths of the local stocks have dramatically reduced harvest rates and many stocks have not met escapement goals in recent years. Chinook (king) salmon have been returning in fewer numbers to many rivers across Alaska since 2007, requiring painful restrictions on fisheries that harvest these stocks. Chinook salmon has a life span of 3 to 8 years, with 5- and 6-year-old fish being especially important to the reproductive health of a Chinook salmon population having nearly all of the female fish. Fishery closures and restrictions have been necessary in many areas in the effort to pass as much of the Chinook run to the spawning grounds as possible. This unfortunately results in great burdens on Alaskans who rely on Chinook salmon for food, income and recreation. The State of Alaska recognizes the hardships that management restrictions have caused subsistence, personal use, commercial, and sport fishermen, as well as guides, local fish processors, and other local and regional businesses. In the context of new initiatives for state-wide salmon stock assessment; • This year new funds for Nushagak Chinook stock assessment - 5-year study BBNC matched 3.5 million for total project of $7 million. • New - Kenai River tag program to verify sonar counts of sockeye.

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	New programs initiated in 2022 include: • A genetic based stock identification along the south side of the Alaska Peninsula to determine the origin of Chum salmon caught in the seine and gillnet fisheries in ADFG statistical Area M. It was noted that stocks of Chum Salmon spawning in Western Alaska from Bristol Bay north to Norton Sound cannot be differential genetically. • One and a half million dollars of new funding was obtained through the Pacific Salmon Commission process for Chinook and Chum salmon stock assessment activities on mainstem of the Yukon River. • A program to study the productivity of waters in the North Pacific and Bering Sea. • A five-year program to estimate the spawning escapement of Nushagak Chinook salmon. The $7.0 million study is funded equally by the State of Alaska and the Bristol Bay Native Corporation. In addition, a new set of studies is being initiated in the Yukon River by both ADFG and Canada. The ADFG study is focusing on the role of Ichthyophonus infection in Yukon Chinook salmon which is increasing the prespawning mortality. Apparently under the stress of the spawning migration the fish immune system is weakening and this allows the infection increases in severity and mortality occurs. The impact of high temperature and low oxygen can exacerbate the physiological response to Ichthyophonus. Concurrently, the Fisheries and Oceans Canada staff are conducting a radio tagging study designed to determine when and where adult Chinook are dying in the Yukon River. https://wwww.CBC.CA/news/canada/north/yukon-chinook-research-1.6679608 In 2018, runs improved for several stocks across the state and in general the forecasts for 2019 are for continued increases; however, some systems are still experiencing below average production with continued poor forecasts for 2019. The returns of precocial "jacks" have recently taken an upturn, some evidence that the brood (parent) years represented by these fish are experiencing improved production. Numerous physical and biological factors can influence production and survival of Chinook salmon in the freshwater and marine phases of their lifecycle. Research through this initiative suggests that most of the Chinook salmon mortality is occurring in the first few months of life at sea and freshwater survival has been average or even above average. Additional research is needed to gain a better understanding of the primary factors that are affecting Chinook productivity and abundance especially in the marine environment. Fluctuations in the survival of Chinook salmon smolt can significantly alter run strengths at local, regional, and state-wide scales. For instance, the long-term marine survival for four Southeast stocks has been about four percent, meaning for every 100 smolt that emigrate to sea, four fish will return as adults over the next one to five years. Research has shown that during the recent period of poor production, marine survival has dipped below one percent. This decrease in marine survival, even in the face of some very good freshwater production in several systems, has been driving the downturn in overall adult production. The exact mechanisms behind the increased mortality rates are unknown, but environmental conditions such as precipitation, air and ocean temperatures and water currents, to name a few, are believed to affect juvenile salmon survival. In October of 2012, the Alaska Department of Fish and Game hosted a research symposium to "identify key knowledge gaps and assemble a list of research priorities" to better understand the factors affecting Chinook salmon abundance in Alaska. Following this symposium, a team of department scientists and biologists, in collaboration with federal agencies and academic partners,

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	developed a research plan which recommended studies to address the questions identified in the gap analysis. The first phase in the implementation of this plan was funded by the Alaska Legislature in 2013. The core of the plan is stock specific, life history-based research focused on 12 indicator stocks from across Alaska. For more information see Chinook salmon Stock Assessment and Research Plan at https://www.adfg.alaska.gov/index.cfm?adfg=chinookinitiative.main. Research efforts under this plan fall into four general categories. • Stock assessment programs targeting specific knowledge gaps on individual, indicator stocks. • Compilation of local and traditional knowledge regarding Chinook salmon trends in abundance, distribution, and physical appearance. • Research on juvenile Chinook salmon in the near shore marine environment, which is thought to be a critical life history stage, and one little studied. • Life history process studies intended to examine a range of environmental factors affecting Chinook salmon growth and productivity. The original plan was to allocate $30 million covering research over a five-year period. In response to this plan, the legislature appropriated $15 million to this effort in two separate appropriations and money was mostly allocated to adult and juvenile stock assessment studies, various subsistence studies, marine stock composition and harvest studies, the University of Alaska Fairbanks for ecological process studies, genetic stock composition and harvest studies, and programmatic support, in that order. In total the initiative funded over three dozen specific research projects through this effort. The department recognizes the public has a keen interest in the results of this work and final publications are available on the above listed website and are continuing to be updated as they become available. In addition to the Chinook Salmon Research Initiative funds, in 2012 the State of Alaska requested fishery federal disaster determinations from the U.S. Secretary of Commerce for Chinook salmon fisheries on the Yukon and Kuskokwim Rivers, and Cook Inlet. In September 2012, the Secretary of Commerce, after reviewing information from the state, determined that a commercial fishery failure due to a fishery resource disaster exists for three regions of the Alaska Chinook salmon fishery. As a result, in 2014 Congress appropriated $20.8 million for fishery disaster relief under the Magnuson-Stevens Fisheries Management and Conservation Act. In 2014, $7.8 million of the appropriated funds went to Cook Inlet, Yukon, and Kuskokwim commercial salmon harvesters. In 2015, the National Oceanic and Atmospheric Administration distributed the remaining $13 million to a variety of sport and commercial users. Broken down further, $4.5 million went to the recreational fishing sector and related businesses for loss of income, $6.4 million for salmon research in the Yukon/Kuskokwim region, $1.1 million for salmon research in Cook Inlet, and $700,000 to salmon buyers in the Cook Inlet region. In the Southeast region, each year around $5 million is provided by the U.S. federal government, the Pacific Salmon Commission Northern Endowment Fund and the State of Alaska for implementation of the Pacific Salmon Treaty and Chinook salmon research and management specifically. The second issue of concern in the context of precautionary management of hatchery stocks, it is important to review the annual report published in 2021 which discusses the recent Alaska salmon fisheries enhancement program (Wilson, 2022). The success of the enhancement program is attributable to the development of statutes, regulations, and policies that require hatcheries to be located away from important natural salmon stocks and to use local brood stock sources. To maintain

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	genetic diversity, Alaska hatcheries do not selectively breed for size or other traits and use large numbers of broodstock for production. Most hatchery releases are marked so that fisheries managers can estimate the strength of wild stocks in the harvest in season and manage wild stocks conservatively. Hatchery production in Alaska is designed to supplement—not replace—wild stock production. Alaska's salmon harvests in 2013, 2015, and 2017 were 3 of the 4 highest wild stock returns in history dating back to the late 1800s. Abundance-based wild stock management priority, habitat protection, and record wild-stock harvests reflect the state's commitment to conservation of wild stocks, and provide the foundation of its salmon fisheries enhancement program. Currently, 30 salmon hatcheries are operating in the state. Twenty-six facilities are operated by private non-profit corporations, which are funded primarily from the sale of a portion of hatchery returns. Two sport fish hatcheries are operated by the state, one research hatchery by the National Marine Fisheries Service, and one production hatchery by the Metlakatla Indian Community. In 2021, the commercial fleet caught about 64 million hatchery-produced salmon worth an estimated $142 million dollars in exvessel value. Hatchery fish contributed 28% of the state-wide commercial salmon harvest and 25% of the state-wide commercial harvest exvessel value. An additional 230,000 Alaska hatchery fish were caught in the sport, personal use, and subsistence fisheries. In preparation for future production, Alaska hatcheries released 1.7 billion juvenile salmon and took 2.1 billion salmon eggs. Based on concerns over hatchery pink salmon and chum salmon in PWS and hatchery Chum salmon in Southeast Alaska and in the context of evaluating the risk of hatchery straying the Alaskan the Alaska Department of Fish and Game (ADFG) organized a science panel in 2011 composed of current and retired scientists from ADFG, University of Alaska, aquaculture associations, and National Marine Fisheries Service to discuss ways to systematically evaluate the interaction between wild and hatchery-produced salmon in Alaska. The science panel designed a long-term research project to address three top priority research questions: 1. What is the genetic stock structure of pink salmon in Prince William Sound (PWS) and chum salmon in Southeast Alaska (SEAK)? 2. What is the extent and annual variability in straying of hatchery pink salmon in PWS and chum salmon in PWS and SEAK? What is the impact on fitness (productivity) of wild pink and chum salmon stocks due to straying of hatchery pink and chum salmon? The following is a short description of progress made to through 2020 to provide answers to these questions. **Population Structure** – Laboratory analysis of the genetic stock structure for both the odd-year and even-year runs of pink salmon populations in PWS using DNA microsatellites has been completed. A report of the current population structure of odd-year lineage (2013, 2015) is available online and the results on the even-year population structure (2014) were presented in May 2018 at the American Fisheries Society meeting in Anchorage; the report is under review. As observed elsewhere in their range, variation among odd-year populations was larger than among even-year populations. In preliminary comparisons of historic (mid-1990's) and contemporary samples, populations are genetically similar across time (10+ generations), but not identical. Among odd-year collections, early and late spawners within some creeks showed genetic differences. Population structure in PWS is comparable to structure found in wild pink salmon elsewhere in its geographic

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	range. A similar analysis of even-year pink salmon collections is currently in progress and should provide more historic perspective on population structure in the presence of hatchery production. **Straying Studies** – Following a robust design focused on estimating the extent and variability of hatchery pink and chum salmon straying in PWS and SEAK, field work was completed in 2015. Otoliths were sampled from spawned-out fish in representative chum salmon streams in SEAK, and pink and chum salmon streams in PWS, to estimate the hatchery fraction in natural spawning populations on a district scale. Previous studies have documented strays in individual streams in SEAK and PWS, but this is the first study designed to provide an unbiased estimate for an entire region. The sample results (Table 1 and Figure 1) are available in reports online and two separate manuscripts (one for PWS and one for SEAK) have been published in peer-reviewed journals and are available online (see References below). Things that we can infer from work to date: 1. Hatchery proportions of pink salmon in streams across PWS ranged from 5 to 11% in the two odd years and was 15% in the event year and was highly variable among streams and districts. The distribution of hatchery fish across districts was consistent across years, with higher proportions near hatcheries similar to previous observations. 2. Hatchery proportions of chum salmon in streams across PWS ranged from 3 to 9% across the three years and was highly variable among streams and districts. The distribution of these hatchery fish across districts was fairly consistent across years, with higher proportions in the districts where fish are remotely released and/or few wild fish spawn. 3. Hatchery proportions of chum salmon in streams across SEAK ranged from 3 to 6% across the three years. Seven of the eight observations of hatchery proportions over 20% were in three streams within 22 km of release sites, while, while 86% of observations in streams over 50 km from hatcheries had hatchery proportions below 5%. **Estimating Production in PWS** – Ocean sampling in the entrances to PWS provided an unbiased estimate of the hatchery fraction in the total return of pink and chum salmon. This information, when combined with estimates from the streams and known removals through harvest and hatchery take for cost recovery and broodstock provided a means to estimate: 1) the number of natural-origin salmon spawning in streams, 2) the number of hatchery salmon spawning naturally (Hatchery strays), 3) total production of hatchery salmon (including strays; Hatchery run), and 4) total production of natural salmon (excluding hatchery strays; Natural run). With knowledge of the total number of fish spawning in streams and the total return of natural fish, it is possible to estimate the return per spawner, an important measure of productivity (Table 9). These results were included in the PWS manuscript mentioned previously and referenced below. Additional information on this project is available at: http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main The following table can be found in the ADFG report.

Table 9. Estimated production of pink and chum salmon in Prince William Sound.

Species Year	Estimated Run sizes Hatchery	Natural	Estimated Harvest Rates Hatchery	Natural
Pink salmon				
2013	69,890	33,100	0.99	0.53
2014	42,760	6,960	0.98	0.26
2015	77,340	63,530	0.95	0.40
Chum salmon				
2013	3,010	1,140	0.98	0.22
2014	1,230	1,180	0.96	0.21
2015	2,480	1,130	0.95	0.21

Things that we can infer from the PWS production estimates (Table 9):

1. Estimated harvest rates indicate that ADFG achieved its policy to preferentially harvest hatchery-produced fish (>90%) while sustainably harvesting naturally produced fish (≤50%) in 2013-2015.
2. Between 1% and 6% of the Pink salmon hatchery returns, and 1% and 4% of the hatchery Chum salmon returns in PWS spawned naturally during the three study years (i.e., donor stray rate).
3. The natural production of PWS Pink salmon was unusually robust in the three brood years represented (after 18 generations of hatchery/natural interaction). For example, 17 million spawners in 2013 produced an estimated natural run of just under 64 million returns in 2015, a 4 to 1 return-to-spawner ratio.

Fitness Studies - This ground-breaking work is based on first identifying the origin (hatchery/natural using otolith marks) of parents and offspring spawning in study streams and subsequently using genetics to identify parent-offspring relationships via genetic pedigree reconstruction. This information will allow estimation of the relative reproductive success (RRS; fitness) of hatchery strays and naturally produced fish spawning in streams.

Evaluation at this scale is important because it will provide insight into the ecological and genetic consequences of hatchery strays on fitness of natural spawners at the drainage scale. The field crews have completed 8 years of intensive sampling directed toward studies of the relative fitness of hatchery and natural fish in 5 Pink salmon study streams in PWS and 3 Chum salmon study streams in SEAK. 2020 was the final year of field sampling for PWS Pink salmon, however, field sampling for SEAK Chum salmon is expected to continue through 2023. Collectively 235,590 PWS Pink salmon and 16,450 SEAK Chum salmon have been sampled for this research through 2020. Otoliths have been read for ~180,000 PWS Pink salmon samples and all SEAK chum salmon samples. Genetic analysis began in 2018 using single nucleotide polymorphism (SNP) genetic markers to determine pedigrees for Pink salmon in PWS. The first step in this analysis was refining methods to use cost-effective genotyping by sequencing technology to screen samples taken from carcasses. To date, genotyping has been completed for ~107,000 PWS pink salmon. Pedigree data for a total of 14 full generations (parents and offspring; 6 odd-year brood years and 8 even-year brood years) across 5 streams have been completed to date. Generally, stray hatchery fish produced significantly fewer progeny than natural fish during this first generation, with considerable variation by sex, stream, and year.

Modelling has been employed to better understand how differences in body size, run timing, and spawning location (i.e., intertidal vs. upstream) between hatchery- and natural-origin fish affect their fitness. Those modelling results indicate that hatchery-origin Pink salmon spawning in streams produce ~ ½ the number of returning adult offspring as natural-origin Pink salmon. These results were reported in the summer of 2019 and at subsequent public meetings. A manuscript summarizing the 1st generation fitness results for odd- and even-year PWS Pink salmon from Hogan Bay and Stockdale Creek (2013–2016) is in preparation for submission to a peer reviewed journal in spring 2021. This program encompasses additional years from these streams, additional streams, and an additional generation (grandparents), all of which will provide a better understanding of what is driving the observed variation and how to assess the impact on fitness of hatchery fish in the wild.

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		Funding – In 2015, a finance committee was formed comprised of hatchery operators, a processor representative, and the ADFG commissioner's office and aquaculture section. This team has focused attention on maintaining the funding to meet the targeted research costs of $18.4 million to complete the work intended to answer the fundamental questions about spawner fitness. In 2016, ADFG successfully secured funding from NOAA's Saltonstall-Kennedy Grant Program ($250,000) and North Pacific Research Board ($289,000) to genetically analyse adult and offspring Pink salmon from 2 streams in PWS over 2 brood years as part of the fitness study. To date, NSRAA has received $755,000 in grants from the Pacific Salmon Commission to support sampling of Chum salmon in SEAK. Seven of Alaska's largest hatchery corporations (SSRAA, NSRAA, DIPAC, PWSAC, VFDA, KRAA, and CIAA) have combined to provide $3.6 million. This project has received $3.9 million from the 2016 Pink Salmon Disaster to fund the completion of the Pink salmon-related portions of this project. These funds are restricted to Pink salmon applications and continued funding is necessary to complete the Chum salmon studies. Those funds in concert with existing funds, and the processor's requested contribution of $500,000 will provide for this year's field work. To date, funding received in support of the project totals $13.72 million. Of this, the Seafood Processors Association has provided $3.5 million, the State of Alaska appropriated $3.5 million, PNP operators combined have provided $3.6 million, and $0.92 million is from grants. The current State of Alaska budget precludes additional state funds; however, ADFG will continue to provide considerable in-kind support. **Future** –Field work for Questions 1 and 2 has been completed; portions of which have been published in peer-reviewed scientific journals (referenced below). While the scope of work for the research project to address the fitness question (Question 3) was narrowed, there are still significant costs. The science panel considers the fitness studies to be the most important to long-term understanding of hatchery-wild fish interactions. Some funding has been secured from federal grants (NPRB, SK, Northern Fund of the Pacific Salmon Commission, and the 2016 Disaster Relief) but continued funding for the remaining portion of this component of the project is currently being provided by fishermen through the hatchery organizations via additional cost recovery, as well as the processor community through a consensus agreement. ADFG is actively pursuing additional grant funding to support this work. It is particularly important that hatchery operators and processors continue their support of the project, both for financial reasons as well to show a commitment to maintaining this ground-breaking research that is designed to directly address questions about the Alaska salmon hatchery program. Processors had initially committed to 5 years; we hope they will be able to continue their same level of support for the remainder of the project. The field portion of this project is expected to end in 2023 and conclude in 2024-5 with the completion of the fitness analysis of Chum salmon in SEAK. The field portion of this project is expected to end in 2023 and conclude in 2024-5 with the completion of the fitness analysis of Chum salmon in SEAK. Additional information on this project is available at: http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main, showing a commitment to maintaining this ground-breaking research that is designed to directly address questions about the Alaska salmon hatchery program. Processors had initially committed to 5 years; we hope they will continue their same level of support for the remainder of the project. This project is expected to end in 2023 with the conclusion of the fitness analysis of Chum salmon in SEAK. Additional information on this project is available at:

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	http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/ak_hatchery_research_project_synopsis_2019.pdf Recently a 3rd issue has surfaced concerning the NSRAA remote release of fall chum in SE Alaska. This first adult return began in 2018 based the return of the first 4-year-old fall Chum salmon. This remote release project was approved by the Regional Planning team and approved by the Commissioner of ADFG. It is designed for a 30 million eggs and subsequent release of fed fry (2 and 4 gms) at a net pen imprinting facility in Crawfish Inlet. The purpose of this remote release facility is to contribute returning fish to the SEAK Troll fishery located near Sitka. This facility is designed to harvest all the returning chums in the troll fishery or in the SHA for cost recovery or a seine/gillnet rotation. It is important to harvest the fish in order to avoid straying of fall hatchery Chum salmon in the West Crawfish spawning streams. More information may be found at NSRAA website: https://www.nsraa.org. In an effort to improve the management of the Fall Chum salmon returning to the remote release site in SE Alaska at Crawfish Inlet, the RFM team recommends that the general manager of NSRAA and the ADFG SEAK area management biologist collaborate to present the last 5 years of operation to the SEAK Regional Planning Team (RPT) at the April 2023 RPT meeting. Summarizing the last 5 years of operation at the April 2023 meeting would be an excellent opportunity to learn, share and adapt a more inclusive and effective management plan. We recognize the NSRAA Board of Directors have targeted the SEAK troll fishery for this return and that to minimize straying of returning fall Chum salmon that regulations require NSRAA to harvest the adult fall chum in the THA one day per week through a cost recovery harvest or a seine/gillnet rotation. In addition, it is important to note that after the cost recovery goal is met, the purse seine openings will begin in the Special Harvest Area (SHA) as needed to keep up with the return. However, ADFG may direct either cost recovery or common property seine openings to occur in West Crawfish Inlet if a significant abundance of returning fall chum occurs. Given this as background it is incumbent that NSRAA and the ADFG area management biologist are closely coordinated during this critical timeframe. It is our understanding that if a larger than expected number of fall Chum salmon enter the West Crawfish spawning stream area it is possible that negative interactions on limited spawning habitats might cause redd super-imposition. In order to document whether these negative interactions might occur it is recommended that NSRAA and ADFG prepare a monitoring plan to evaluate any impacts of repeat spawning in limited spawning habitat from wild summer chum and later spawning hatchery fall chum. It is further acknowledged that the management plan for this remote release site is to harvest all the returning hatchery fall chum to the fishery for cost recovery and for broodstock needs so as not to allow fall hatchery origin Chum salmon on the spawning grounds. Based on the MSC/RFM discussion at the site review in Alaska on December 2022 a response to our request for more information on assessment and management efforts and plans for Crawfish Inlet hatchery straying was prepared by AFDF and NSRAA staff. This document provides more detail and was very helpful. See Reference for Americus, Ben et. al. 2023. Also please refer to the RFM Recommendation in this report in 9.1. 7.2. For new and exploratory fisheries, procedures shall be in place for promptly applying precautionary management measures, including catch or effort limits.

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	Alaska State Regulation, the Policy for the Management of Sustainable Salmon Fisheries specifies "The principles and criteria for sustainable salmon fisheries shall be applied using the best available information... ADFG will provide the BoF with reports on the status of salmon stocks and salmon fisheries under consideration for regulatory changes, which should include identification of any management actions needed such as the identification of a new fishery or expanding fishery" (5 AAC 39.222 (d)(1)(D)(I)) and that the reports will be the basis for "developing a management plan [that] will (A) contain goals and measurable and implementable objectives that are reviewed on a regular basis and utilize the best available scientific information; (B) minimize the adverse effects on salmon habitat caused by fishing; (C) protect, restore, and promote the long-term health and sustainability of the salmon fishery and habitat; (D) prevent overfishing; and (E) provide conservation and management measures that are necessary and appropriate to promote maximum or optimum sustained yield of the fishery resource [and] if any new fisheries or expanding fisheries, or yield concerns, stock management concerns, or stock conservations concerns exist. The BoF will amend or develop salmon fishery management plans" ((5 AAC 39.222 (d) (2) and (3). Also, 5AAC 39.210, the Management Plan for High Impact Emerging Fisheries requires that high impact emerging fisheries be closed until an interim management plan and associated regulations are developed. The fundamental objective of Alaska salmon fishery management is that escapement goals must be achieved. When stock status justifies allowing a fishery, ADFG local biologists specify a time and area for the fishery to occur. The contingency plan to respond to an adverse environmental change or depressed stock status determination is simply to not open the fishery. The state wide Sustainable Salmon Policy (5AAC 39.222) mandates that escapement goals must be established for all exploited salmon stocks. This policy also requires ADFG to provide the BoF on a regular basis, a stock status report, a review of escapement goals, and action plans that include management directives to promote recovery of any stocks of concern.
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Statement of consistency to the RFM Fishery Standard	**The ADFG fisheries management continues to be based on the precautionary approach to ecosystem management and conform to the requirements of Fundamental Clause 7 of the RFM Fishery Standard**

7.9.3 Section C: Management Measures, Implementation, Monitoring, and Control

7.9.3.1 Fundamental Clause 8. Management measures

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 based upon verifiable evidence and advice from available objective scientific and traditional sources.**
Summary of relevant changes:	The Alaska State Constitution Section 4 states "Sustained Yield. Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses. The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.22), directs management measures to ensure sustainability of yield. The Policy is implemented through the various fishery management plans for different fisheries in different regions and areas of the state. The BoF has the power to develop management plans and allocate fishery resources among personal use, sport, guided sport, and commercial fisheries under state law (AS 16.05.251). Management plans are developed in an open public process that permits all citizens the opportunity to propose alternative schemes. When developing such plans and deciding how the conservation burden will be shared, the Board uses the following criteria: ▪ The history of each personal use, sport, and commercial fishery; ▪ The characteristics and number of participants in the fisheries; ▪ The importance of each fishery for providing residents the opportunity to obtain fish for personal and family consumption; ▪ The availability of alternative fisheries resources; ▪ The importance of each fishery to the economy of the state; ▪ The importance of each fishery to the economy of the region and local area in which the fishery is located;

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	▪ The importance of each fishery in providing recreational opportunities for residents and non-residents. Legislation was passed in 1973 to establish a "limited entry" system to allow the state to limit the number of Participants in a specific fishery. State statute AS 16.43.140 states, "After January 1, 1974, a person may not operate gear in the commercial taking of fishery resources without a valid entry permit or a valid interim-use permit issued by the commission. The Commission established an "Optimum Number" of permits for each salmon fishery through its research on the economics of the individual and management needs of that fishery. Various reports prepared by the Commission can be found at: https://www.cfec.state.ak.us/Publications/salmon.htm Implementation of limited entry, other actions have been taken to improve economic viability of Since the fishing fleet, for example, in 2008, the Southeast Revitalization Association conducted a permit buy-back program in the Southeast Alaska salmon purse seine fishery which resulted in the purchase and subsequent relinquishing of 35 limited entry permits to CFEC. 8.2. States shall prohibit dynamiting, poisoning and other comparable destructive fishing practices. Under Alaska regulations (5AC39.150), the use of an explosive, chemical or poison in the taking of fish or shellfish is prohibited, except for the use of chemical baits or lures to attract shellfish 8.3. States shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. Four general classes of salmon users have been identified; commercial, subsistence recreational, and personal use. Both state (AS 16.05.258 (b)) and federal (ANILCA Title VIII) laws prioritize subsistence uses over all other consumptive uses of fish and game. State law (16.05.251(e)) requires that "allocation decisions deal with identifying parties with a legitimate interest in the use and management of the fishery. Allocation of the harvest among users is the responsibility of a citizen panel comprised of a membership representative of all users—the BoF. The BoF receives formal proposals and advice from 82 Advisory Committees that representative all classes of resource users in local communities. Fishery management plans, based on scientific research and fishery data conducted by ADFG, are not adopted by the BoF until it also considers effects on the various domestic parties with a legitimate interest in the use and management of the affected fisheries. This information is obtained from Advisory Councils, public testimony, and information provided by ADFG. Criteria used by the BoF when making decisions regarding how the conservation and utilization of resources will be shared is outlined in Supporting Clause 8.1 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. See supporting clause 8.1 8.5. Technical measures shall be taken into account, where appropriate, in relation to: fish size, mesh size or gear, closed seasons, closed areas, areas reserved for particular (e.g. artisanal) fisheries, protection of juveniles or spawners.

8.	**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 based upon verifiable evidence and advice from available objective scientific and traditional sources.**	
		Types of legal gear for Alaska fisheries are listed in regulation (5 AAC39.105). Specific requirements for gear (i.e., gillnet and purse seine length, depth, and mesh sizes) are defined for each management area as well as in specific management plans and regulations. Within each management area, zones are established, typically near the mouths of streams that are permanently closed to fishing. Likewise, within each management area, times when fishing may be permitted. Size of fish that may be retained is generally not implemented for commercial fisheries. One notable exception is that a minimum size of 28 inches is established for the troll caught Chinook salmon in Southeast. Harvest of juveniles is not permitted. Waters near spawning grounds are closed to fishing. In addition, state law (AS 16.10.010) prohibits Interference with salmon spawning streams and water regulation activities in and or around streams in either fresh or salt water. The regulations for Southeast are good example of the scope of these types of regulations[25]. 8.6. Fishing gear shall be marked. By statute, (AS16.05.510 and AS 16.05.520) salmon fishing vessels are required to be licensed by the State of Alaska, and to display their permanent vessel license plate. The fishing gear itself must be marked in accordance with state regulations (5AAC 06.334). Also, there are region-specific regulations which require how salmon fishing gear must display their names and permit numbers. All Alaska salmon fishing, except for a very small troll fishery in Southeast Alaska, is conducted in state waters ("internal waters"). This means it is very unlikely that any fishing gear deployed by Alaskan salmon fishers will be encountered by vessels of other nations. 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. The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) outlines the process for identifying a depleted resource and the process to facilitate recovery. It also identifies actions to address habitat issues critical to the fishery resources. In part, the policy states the following: 1. At regular meetings of the board, the department will, to the extent practicable, provide the board with reports on the status of salmon stocks and salmon fisheries under consideration for regulatory changes, which should include: a. A stock-by-stock assessment of the extent to which the management of salmon stocks and fisheries are consistent with the principles and criteria contained in the policy under this section; b. Descriptions of habitat status and any habitat concerns; c. Identification of healthy salmon stocks and sustainable salmon fisheries; d. Identification of any existing salmon escapement goals, or management actions needed to achieve these goals, that may have allocative consequences such as the: i. Identification of a new fishery or expanding fishery; ii. Identification of any salmon stocks, or populations within stocks, that present a concern related to yield, management, or conservation; and iii. Description of management and research options to address salmon stock or habitat concerns.

[25] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_se_yakutat_salmon_regulations.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 based upon verifiable evidence and advice from available objective scientific and traditional sources.**	
		2. In response to the department's salmon stock status reports, reports from other resource agencies, and public input, the board will review the management plan, or consider developing a management plan, for each affected salmon fishery or stock; management plans will be based on the principles and criteria contained in this policy and will: a. Contain goals and measurable and implementable objectives that are reviewed on a regular basis and utilize the best available scientific information; b. Minimize the adverse effects on salmon habitat caused by fishing; c. Protect, restore, and promote the long-term health and sustainability of the salmon fishery and habitat; d. prevent overfishing; and e. Provide conservation and management measures that are necessary and appropriate to promote maximum or optimum sustained yield of the fishery resource. 3. In the course of review of the salmon stock status reports and management plans described in (1) and (2) of this subsection, the board, in consultation with the department, will determine if any new fisheries or expanding fisheries, stock yield concerns, stock management concerns, or stock conservation concerns exist. If so, the board will, as appropriate, amend or develop salmon fishery management plans to address these concerns; the extent of regulatory action, if any, should be commensurate with the level of concerns and range from milder to stronger as concerns range from new and expanding salmon fisheries through yield concerns, management concerns, and conservation concerns. 4. In association with the appropriate management plan, the department and the board will, as appropriate, collaborate in the development and periodic review of an action plan for any new or expanding salmon fisheries, or stocks of concern; action plans should contain goals, measurable and implementable objectives, and provisions, including: a. Measures required to restore and protect salmon habitat, including necessary coordination with other agencies and organizations; Identification of salmon stock or population rebuilding goals and objectives a. Fishery management actions needed to achieve rebuilding goals and objectives, in proportion to each fishery's use of, and hazards posed to, a salmon stock; b. Descriptions of new or expanding salmon fisheries, management concern, yield concern, or conservation concern; and c. Performance measures appropriate for monitoring and gauging the effectiveness of the action plan that are derived from the principles and criteria contained in this policy. 5. Each action plan will include a research plan as necessary to provide information to address concerns; research needs and priorities will be evaluated periodically, based on the effectiveness of the monitoring described in (4) of this subsection <u>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.</u> The traditional gear used in the Alaska salmon fishery includes purse seines, gill nets (drift and set) and hook and line troll. These gear types are generally environmentally benign except in the rare cases when a drift net is lost; it can entangle many types of fish and wildlife. Concern for the status of Chinook salmon in the Yukon River has led to the use of fish wheels to harvest Chum Salmon while permitting the release of Chinook. In addition, dip nets and beach seines have become an alternative

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 based upon verifiable evidence and advice from available objective scientific and traditional sources.**	
		gear in the lower river to replace gillnets to save chinook. Finally, non-retention regulation for Chinook salmon in Kodiak purse seine fisheries has permitted harvest of comingled Sockeye and Pink Salmon. The use of the above-mentioned gear types coupled with specific time and area openings to target salmon stocks where surplus production exists has led to very low incidence of by-catch of non target species. In addition to the practical aspects of why by-catch is low, ADFG regulation (5 AAC 93.310.) requires operators of all salmon fishing gear to minimize incidental harvest of non-target species. The potential for lost or abandoned fishing gear and subsequent effects of ghost fishing due to this lost gear would seem to be very small for purse seines, troll gear, and fish wheels. Gill nets would appear to have the greatest potential for both loss and ghost fishing. Lost or abandoned salmon gill net gear has been addressed in the Bristol Bay salmon fishery, where a regulation (5 AAC 06.331(t) requires permit holders to report a lost a gillnet, or portion of a gillnet, to the local ADFG office within 15 hours of the loss. Fishery regulations in Alaska are extremely detailed with regard to the configuration of acceptable gear for use in each fishery, as well as how to deal with impacts on fishery resources and other users due to gear selectivity and fishing. For example, see the Southeast regulations regarding gear specifications[26]. It would be extremely difficult to circumvent this regulation, and even if such a situation occurred, the regulatory and management system would be able to effectively respond. In the two fisheries where selective fishing practices are in place, circumventing the definition of a legal purse seine or fish wheel gear appears to be nearly impossible. ADFG has participated in research programs on an international basis on issues such as fishing gear selectivity and improvements to fishing methods and strategies. The NPAFC is the primary international venue for promoting the conservation of anadromous stocks and ecologically-related species, including marine mammals, sea birds, and nonanadromous fish, in the high seas area of the North Pacific Ocean. The NPAFC encourages research programs such as fishing gear selectivity and fishing methods. It also serves as a venue for coordinating the collection, exchange, and analysis of scientific data regarding these species and coordinates high seas fishery enforcement activities by member countries Overall, there has been little need for new research undertaken on the selectivity of traditional salmon gear types with regard to non -target species because by-catch has been demonstrated to be very low. However, research into the selectivity by size and sex of gillnet gear of the target species has been undertaken on several occasions. 8.14. Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures.

[26] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_se_yakutat_salmon_regulations.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 based upon verifiable evidence and advice from available objective scientific and traditional sources.**
	For Information on developments in other fisheries: The placement of artificial structures in marine waters of Alaska is limited to pilot research projects in Prince William Sound near Whittier and in Lynn Canal near Juneau, and to the sinking of two old vessels for scuba diving recreational purposes, also near Juneau. These structures have had little to no impact on salmonid fishes in the area and are likewise unlikely to affect salmon fishing.
References:	https://www.cfec.state.ak.us/Publications/salmon.htm http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_seyakutat_salmon_regulations.pdf [1]http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_seyakutat_salmon_regulations.pdf
Statement of consistency to the RFM Fishery Standard	ADFG fishery management measures continue to conform to the requirements of Clause 8 of the RFM standard.

7.9.3.2 Fundamental Clause 9. Appropriate standards of fishers' competence

9.	**Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards, guidelines and regulations.**
Summary of relevant changes:	9.1./9.2./9.3. Education and training programs. The Alaska Institute of Technology (formerly called Alaska Vocational Training & Education Center), is within the Department of Labor Workforce Development, operates the Alaska Maritime Training Center. The goal of the Alaska Maritime Training Centre is to promote safe marine operations by effectively preparing captains and crew members for employment in the Alaskan maritime industry. The Alaska Maritime Training Centre is a USCG approved training facility located in Seward, Alaska, and offers USCG and international Standards of Training, Certification, & Watchkeeping -compliant maritime training. The University of Alaska Sea Grant Marine Advisory Program (ASGMAP) provides a robust variety of online education and training courses in several sectors, including fisheries management and ranging to seafood safety, and in the form of seminars and workshops. In addition, the program conducts sessions of their Alaska Young Fishermen's Summit. Each Summit is an intense, 3-day course in all aspects of Alaska fisheries, from fisheries management & regulation (e.g. MSFCMA), to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. ASMI provide educational information across a whole range of fishery and fish related matters, including quality, hygiene, food safety, sustainability, and environmental protection. ADFG publishes a variety of documents, booklets and pamphlets that provide information on Alaska salmon, including regulations, educational items, and news stories. Data on fishers is held in a number of agencies, including Alaska Fisheries Information Network and CFEC. Some of the information is confidential, while a substantial amount is published in summary form annually. https://alaskaseagrant.org/tag/marine-advisory-program/
References:	https://alaskaseagrant.org/tag/marine-advisory-program/
Statement of consistency to the RFM Fishery Standard	Alaskan Fishery operations continue to conform to the requirements of Fundamental Clause 9 of the RFM Standard.

7.9.3.3 Fundamental Clause 10. Effective legal and administrative framework

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:	**No relevant changes** have been made to the State of Alaska's legal and administrative framework, which ensures compliance with applicable laws and regulations through regular monitoring, surveillance, and enforcement activities. 10.1. Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures: The Alaska commercial salmon fishery is managed primarily by ADFG, which regularly conducts in-season monitoring and surveillance of the fishing fleet at the area level[27] to ensure compliance with fisheries regulations[28]. Enforcement of fisheries-related statutes and regulations is conducted by Alaska Wildlife Troopers (AWT), a Division of the Alaska Department of Public Safety[29], that maintains and operates a large fleet of water- and aircraft to perform its mission[30]. ADFG Area Management Biologists also monitor the commercial salmon fishery in their area through aerial surveys and on-the-ground observations. They and their regional staff biologists are deputized law enforcement officers, trained to assist AWT with law enforcement activities[31]. Citizens can also report fish and wildlife violations in Alaska through AWT's Safeguard organization.[32] Botz & Somerville (2021) offer an account of synergy between Alaska's law enforcement and salmon fishery management in and around the Copper River system. 10.2./10.3/10.4. Fishing permit requirements: No recent changes have been made with regard to the permitting system used in Alaska's commercial salmon fisheries, initiated nearly 50 years ago. In 1973, Alaska Statute AS 16.43.140 established that, "After January 1, 1974, a person may not operate gear in the commercial taking of fishery resources without a valid entry permit or a valid interim-use permit issued by the commission." Under Alaska's limited entry system, only legally permitted vessels can operate in commercial salmon fisheries[33]. Commercial fishing permits are issued and managed by the Commercial Fisheries Entry Commission (CFEC), whose mission is to promote conservation of Alaska's fishery resources and economic health of Alaska's commercial fisheries by controlling entry into commercial fisheries[34]. CFEC issues permits and vessel licenses to qualified individuals, and provides due process hearings and appeals for those individuals denied permits. A permit holder database and portal for permit application is accessible through CFEC's website.[35] Individuals must also apply for and maintain a state-issued Crewmember License to participate in Alaska commercial salmon fisheries.[36] In accordance with Alaska Statute 16.43.140, only state-permitted vessels can participate in Alaska commercial salmon fisheries. The CFEC maintains an online database of vessels permitted to participate in Alaska commercial salmon fisheries.[37] The CFEC also maintains and publishes vessel census data, describing the number and types of vessels participating in Alaska commercial fisheries.[38] Supporting Clauses 10.3 and 10.4 are not applicable, here, because Alaska commercial salmon fisheries occur entirely within the State's jurisdiction and EEZ.

[27] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonareas
[28] https://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial
[29] https://dps.alaska.gov/AWT/Home
[30] https://dps.alaska.gov/AWT/Mission
[31] http://www.dps.state.ak.us/AWT/mission.aspx
[32] https://dps.alaska.gov/awt/safeguard
[33] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.main
[34] https://www.adfg.alaska.gov/index.cfm?adfg=divisions.cfecmission
[35] https://www.cfec.state.ak.us/
[36] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.main
[37] https://www.cfec.state.ak.us/pstatus/mnusalm.htm
[38] https://www.cfec.state.ak.us/fishery_statistics/vessels.htm

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.**
References:	Botz, J., M.A. Somerville. 2021. Management of Salmon Stocks in the Copper River, 2018–2020: A Report to the Alaska Board of Fisheries. https://adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2021-2022/pws/SP21-08.pdf.
Statement of consistency to the RFM Fishery Standard	The State of Alaska maintains an effective legal and administrative framework to ensure compliance with fishery laws and regulations. Therefore, the fishery continues to conform to the requirements of Fundamental Clause 10 of the RFM Fishery Standard

7.9.3.4 Fundamental Clause 11. Framework for sanctions

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:	**No relevant changes** have been made to state and federal sanctions associated with violations of Alaska's commercial salmon fishery regulations. 11.1/11.2/11.3. State and federal laws and regulations include sanctions of adequate severity so as to ensure compliance: ADFG publishes commercial salmon fishing regulations by area and year, which can be obtained through its website at https://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial. Included with regulations are clear descriptions of fines, sanctions and penalties associated with violations, following the intent of Alaska statutes (e.g. AS 16.05.710, AS 16.05.722, AS 16.05.723, and AS 16.43.850) aimed to protect wild salmon stocks and sustained resource yield. Alaska's Fish and Game Code, codified through Alaska Statute Title 16.5, provides the legal framework for establishment and enforcement of regulations governing the state's commercial salmon fisheries. Violations of fishing regulations result in strict penalties that can include fines, suspension of permits, imprisonment and seizure of catch, gear and/or vessel. In accordance with Alaska Statute 16.43.850[39], a demerit system involving serious sanctions has been developed and is enforced over commercial fishing vessels in Alaska. This Statute states that: (a) For the purpose of identifying frequent violators of commercial fishing laws in salmon fisheries, the commission shall adopt regulations establishing a uniform system for the suspension of commercial salmon fishing privileges by assigning demerit points for convictions for violations of commercial fishing laws in salmon fisheries that are reported to the commission under Alaska Statute 16.43.880. The commission shall assess demerit points against a permit holder for each violation of commercial fishing laws in a salmon fishery in accordance with (b) and (c) of this section. The commission shall assess points against a permit holder for the salmon fishery in which the violation of commercial fishing laws occurred. (b) The commission shall assess demerit points against a permit holder for a conviction of a violation of commercial fishing laws in a salmon fishery under AS 16.05.722, 16.05.723, 16.05.831; AS 16.10.055, 16.10.070 - 16.10.090, 16.10.100, 16.10.110, 16.10.120, 16.10.200 - 16.10.220, and 16.10.760 - 16.10.790 for the following violations in accordance with this schedule: (1) fishing in closed waters ..... 6 points; (2) fishing during closed season or period ..... 6 points; (3) fishing with more than the legal amount of gear ..... 4 points; (4) fishing with gear not allowed in fishery ..... 6 points;

[39] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter43/Section850.htm

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

(5) fishing before expiration of transfer period ..... 6 points;
(6) interfering with commercial fishing gear ..... 4 points;
(7) fishing with more than the legal amount of gear on vessel ..... 4 points;
(8) improper operation of fishing gear ..... 4 points;
(9) permit holder not present when required ..... 4 points;
(10) fishing with underlength or overlength vessel ..... 6 points;
(11) wanton waste of fishery resources ..... 4 points.

(a) Notwithstanding (b) of this section, if a permit holder's first conviction of a violation of commercial fishing laws in a salmon fishery in a 36-month period is a conviction under AS 16.05.722, the number of demerit points assessed against the permit holder for the violation must be one-half of the points assessed for the violation under (b) of this section.

(b) The commission shall suspend a permit holder's commercial salmon fishing privileges for a salmon fishery for a period of

(1) one year if the permit holder accumulates 12 or more points during any consecutive 36-month period as a result of convictions for violations of commercial fishing laws in the salmon fishery;
(2) two years if the permit holder accumulates 16 or more points during any consecutive 36-month period as a result of convictions for violations of commercial fishing laws in the salmon fishery;
(3) three years if the permit holder accumulates 18 or more points during any consecutive 36-month period as a result of convictions for violations of commercial fishing laws in the salmon fishery.

Following upon this law and in accordance with AS 16.43.860[40]:

(a) A permit holder whose commercial salmon fishing privileges for a salmon fishery are suspended under AS 16.43.850 - 16.43.895 may not obtain an entry permit or interim-use permit for that salmon fishery during the period of the suspension of the privileges. During the period for which the permit holder's privilege to obtain an entry permit or interim-use permit for a salmon fishery is suspended under this section, the commission may not issue a permit card to the permit holder for that fishery.

(b) A permit holder whose privilege of obtaining a commercial fishing permit for a salmon fishery is suspended under AS 16.43.850 - 16.43.895 may not

(1) engage in the salmon fishery under a crewmember license; or
(2) lease or rent the permit holder's interest in a boat to another person if the boat would be used in the salmon fishery for which the permit holder's fishing privileges are suspended.

(c) If, during the period for which a permit holder's commercial fishing privileges for a salmon fishery are suspended, the commission establishes a limited entry system for the salmon fishery, the permit holder shall be eligible to obtain an entry permit for that fishery to the extent that the permit holder qualifies for the entry permit under regulations adopted by the commission. If the permit holder qualifies for an entry permit for the fishery, the commission shall withhold issuance of the entry permit until the period of the suspension imposed under AS 16.43.850 - 16.43.895 has expired.

(d) The commission may not transfer a commercial fishing permit for a salmon fishery under an emergency transfer under AS 16.43.180 if, at the time of the application for the emergency

[40] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter43/Section860.htm

11.	There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.
	transfer, the permit holder's commercial salmon fishing privileges for the salmon fishery have been suspended. Moreover, Alaska Statute 16.5.723 states that: a) A person who negligently violates AS 16.05.440 - 16.05.690, or a regulation of the Board of Fisheries or the department governing commercial fishing, is guilty of a misdemeanor and in addition to punishment under other provisions in this title, including AS 16.05.195 and 16.05.710, is punishable upon conviction by a fine of not more than $15,000 or by imprisonment for not more than one year, or by both. In addition, the court shall order forfeiture of any fish, or its fair market value, taken or retained as a result of the commission of the violation, and the court may forfeit any vessel and any fishing gear, including any net, pot, tackle, or other device designed or employed to take fish commercially, that was used in or in aid of the violation. Any fish, or its fair market value, forfeited under this subsection may not also be forfeited under AS 16.05.195 . For purposes of this subsection, it is a rebuttable presumption that all fish found on board a fishing vessel used in or in aid of a violation, or found at the fishing site, were taken or retained in violation of AS 16.05.440 - 16.05.690 or a commercial fisheries regulation of the Board of Fisheries or the department, and it is the defendant's burden to show by a preponderance of the evidence that fish on board or at the site were lawfully taken and retained. b) If a person is convicted under this section of one of the following offenses, then, in addition to the penalties imposed under (a) of this section, the court may impose a fine equal to the gross value of the fish found on board or at the fishing site at the time of the violation: (1) commercial fishing in closed waters; (2) commercial fishing during a closed period or season; (3) commercial fishing with unlawful gear, including a net, pot, tackle, or other device designed or employed to take fish commercially; or (4) commercial fishing without a limited entry permit holder on board if the holder is required by law or regulation to be present. c) Upon a third misdemeanor conviction within a period of 10 years for an offense listed in (b) of this section or any combination of offenses listed in (b) of this section, the court shall impose, in addition to any penalties imposed under (a) of this section, a fine equal to three times the gross value of the fish found on board or at the fishing site at the time of the offense, or a fine equal to $10,000, whichever is greater. On December 14, 2022, our assessment team met with Alaska Wildlife Trooper, Captain Aaron G. Frenzel, to discuss the status and future of law enforcement in Alaska's commercial salmon fishery. Capt. Frenzel reported that during 2022, AWT contacted 1,870 commercial salmon fishers, issued 70 warnings, and charged 155 individuals with offenses. He further reported that these numbers represent a decline in offenses, that no vessels were seized in 2022, and that the fishery has generally improved over time in terms of compliance with regulations. He noted that staffing has recently been an issue for AWT, but that in the coming year the number of AWT staff will increase from 88 (statewide) to 91, returning AWT to be fully staffed. At the Federal level, NMFS has also published a schedule of penalties associated with illegal retention of salmon and other violations of fishery regulations[41]. Moreover, commercial fishing regulations are enforced by ADFG and AWT, with support from the United States Coast Guard (USCG) and the National Marine Fisheries Service's Office of Law Enforcement[42]. Alaska Statute 16.5.150 formally authorizes ADFW employees, State police and others deputized individuals to enforce Alaska's Fish

[41] https://www.gc.noaa.gov/documents/gces/AK%20SS%20and%20Fix-it_FINAL.pdf \
[42] https://www.fisheries.noaa.gov/about/office-law-enforcement

11.	There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.	
	and Game Code[43]. Electronic catch records and reporting requirements aid with adherence to and enforcement of Alaska's commercial salmon fishery regulations.	
References:		
Statement of consistency to the RFM Fishery Standard		State and federal government provide a framework for sanctions of adequate severity to discourage violations and illegal activity in Alaska's commercial salmon fisheries. Therefore, the fishery continues to conform to the requirements of Fundamental Clause 11 of the RFM Fishery Standard

7.9.4 Section D: Serious Impacts of the Fishery on the Ecosystem

7.9.4.1 Fundamental Clause 12. Impacts of the fishery on the ecosystem

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.	
Summary of relevant changes:	**No relevant changes** have been made with respect to assessing and mitigating adverse impacts from Alaska's commercial salmon fishery on the ecosystem, habitat or associated species. 12.1. The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem. The abundance and distribution of salmon are influenced by environmental factors. Both ADFG and NOAA Fisheries regularly monitor oceanographic and biological conditions that can affect salmon. They share and incorporate these data into predictive models that generate salmon survival and abundance forecasts (e.g., Haeseker *et al.,* 2005; Miller *et al.*, 2022; Murphy *et al.,* 2019, Ovando *et al*., 2022), which are in turn used by ADFG's fisheries managers to set salmon escapement and harvest goals (e.g., Brenner *et al.,* 2021, 2022; Johnson, 2021; Thynes *et al.,* 2021, Vega *et al.,* 2022) per Alaska's Policy for the Management of Sustainable Salmon Fisheries[44]. This approach serves to align harvest activities with natural fluctuations in salmon abundance, and supports statutorily mandated sustained yield. ADFG publishes and distributes annual salmon harvest and escapement goals, by area, through their website[45]. 12.2. The most probable adverse impacts from human activities, including fishery effects on the ecosystem/environment, shall be assessed and, where appropriate, addressed and or/corrected, taking into account available scientific information and local knowledge. NOAA Fisheries produces ecosystem reports for the Eastern Bering Sea[46], Aleutian Islands[47], Gulf of Alaska[48] and Arctic[49] regions. These reports consider the condition and abundance of salmon in Alaska's marine environments and effects from commercial fisheries on marine ecosystems. Significant management actions have been implemented to limit incidental take of Chinook salmon by Alaska's groundfish trawl fisheries[50]. Where Chinook salmon are intentionally harvested by

[43] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section150.htm
[44] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[45] https://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main
[46] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2019EBSecosys.pdf
[47] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2018ecosysAI-508.pdf
[48] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2019GOAecosys.pdf
[49] https://archive.fisheries.noaa.gov/afsc/REFM/Docs/2015/ecosystem.pdf#nameddest=Arctic
[50] https://www.fisheries.noaa.gov/alaska/bycatch/chinook-salmon-bycatch-management-alaska

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.	
	Alaska's commercial fleet, management has been designed to limit harvest on Alaska's stocks of concern, and Pacific Salmon Treaty[51] negotiations define harvest limits on salmon that migrate from other areas into Alaskan waters. These management actions not only limit harvest impacts to sensitive Chinook salmon populations, but also limit impacts to salmon predators, such as resident killer whales, Stellar sealions, various bear species and more. NOAA Fisheries conducts regular stock assessments[52] of various salmon predators, including killer whales and Steller sea lions, and promotes research on the environmental and social impacts of commercial salmon fishing in Alaska. Alaska's Policy for the Management of Sustainable Salmon Fisheries states that, "salmon escapement and harvest management decisions should be made in a manner that protects non-target salmon stocks or species". Regulations clearly specify where, when, and how salmon can be harvested in Alaska, limiting undesirable interactions with non-target species and stocks. To assess the effectiveness of this approach, impacts from Alaska's commercial salmon fisheries on non-target species are monitored and recorded through a variety of state- and federally-administrated programs. Take of ESA-listed salmon occurs in some Alaskan commercial salmon fisheries, but is accounted for and authorized through the Pacific Salmon Treaty. Impacts from Alaska's commercial salmon fisheries on protected seabirds are occasionally reported, but are thought to be rare and unlikely to have population-level impacts. Efforts to address data gaps surrounding the scope and magnitude of negative interactions between seabirds and the commercial salmon fishery are currently being proposed by AFDF and collaborators. With regard to impacts on the physical environment, gear used in commercial salmon fisheries does not typically contact or affect benthic habitats, and is thought to have little environmental impact. Hatcheries used to enhance stocks are carefully sited and strictly regulated to limit impacts to native species and habitats[53]. 12.3./12.4. The role of the *stock under consideration* in the food web shall be considered; there shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators. Salmon are widely recognized as important species in the natural food webs of Alaska's marine, aquatic and terrestrial ecosystems (Aydin *et al.,* 2007; Walsh *et al.,* 2020; Wipfli *et al.,* 1999). Alaska's Policy for the Management of Sustainable Salmon Fisheries directs that "the role of salmon in ecosystem functioning should be evaluated and considered in harvest management decisions and setting of salmon escapement goals"[54]. In accordance with this policy, ADFG regularly publishes information regarding the ecological role of salmon, and the effects from salmon enhancement and commercial fisheries on natural ecosystems[55], and employs this information when setting escapement goals for major salmon populations throughout their spawning distribution. Escapement is then estimated with data collected through aerial surveys, sonar-based counts and other methodologies[56].

[51] https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/pacific-salmon-treaty-and-pacific-salmon-commission
[52] https://repository.library.noaa.gov/view/noaa/20606
[53] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery
[54] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[55] https://www.adfg.alaska.gov/index.cfm?adfg=afrb.salmon
[56] http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.	
	During the 2019 renegotiation of the Pacific Salmon Treaty, harvest allocation of Chinook salmon by the Southeast Alaskan (SEAK) troll fishery was reduced by 7.5% to reduce adverse impacts from the fishery on ESA-listed Southern Resident Killer Whales, which preferentially feed on Chinook salmon[57]. The adequacy of this harvest reduction is currently the subject of biological and legal review. 12.5. States shall introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). 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., including Alaska, the Convention is implemented through the Act to Prevent Pollution from Ships (APPS). Under the provisions of the Convention, the United States can take direct enforcement action under U.S. laws against foreign-flagged ships when pollution discharge incidents occur within U.S. jurisdiction. When incidents occur outside U.S. jurisdiction or jurisdiction cannot be determined, the United States refers cases to flag states, in accordance with MARPOL. These procedures require substantial coordination between the Coast Guard, the State Department, and other flag states. Different regulations apply to vessels, depending on the individual state. 12.6. Research shall be promoted on the environmental and social impacts of fishing gear especially on the impact of such gear on biodiversity and coastal fishing communities. A significant body of research has also focused on social aspects of commercial salmon fisheries in Alaska. With funds from the NOAA administrated Saltonstall-Kennedy Program, the Alaska Fisheries Development Foundation conducted research and published a report[58] describing social responsibility compliance aboard small commercial fishing vessels in Alaska, which included data from surveys of the commercial salmon fleet. Their findings suggested a high degree of safety compliance and social responsibility aboard small commercial fishing vessels in the state, but also suggested that some international standards were not particularly applicable to small craft fisheries in Alaska. They used this information to develop a list of priority criteria to evaluate social responsibility aboard commercial fishing vessels that included: no slave labor, no child labor (except for nearshore fishing families), no discrimination, reasonable working/rest hours, required documentation and compliance with immigration and human rights policies. 12.7 The fishery management organization shall make use, where appropriate, of Marine Protected Areas (MPAs). The general objectives for establishing MPAs shall include ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats. The state of Alaska has established a network of marine protected areas (MPAs) to promote the conservation of marine species and their habitats. These MPAs promote sustainable harvest of salmon and other marine species in Alaska[59, 60].
References:	Aydin, K.Y., S.K. Gaichas, I. Ortiz, D.H. Kinzey, N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p https://repository.library.noaa.gov/view/noaa/22894/noaa_22894_DS1.pdf

[57] https://www.adfg.alaska.gov/index.cfm?adfg=fisherymitigation.background
[58] https://www.afdf.org/wp-content/uploads/Social-Responsibility-on-Vessels-in-Alaska-High-Res-FINAL-2019-03-08-WEB.pdf
[59] https://www.coris.noaa.gov/activities/mpa_us/
[60] https://www.npfmc.org/fisheries-issues/issues/habitat-protections/

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.	
	Brenner, R.E., S.J. Donnellan, A.R. Munro, editors. 2022. Run forecasts and harvest projections for 2022 Alaska salmon fisheries and review of the 2021 season. Alaska Department of Fish and Game, Special Publication No.22-11, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/SP22-11.pdf Brenner, R.E., S.J. Larsen, A.R. Munro, A.M. Carroll, editors. 2021. Run forecasts and harvest projections for 2021 Alaska salmon fisheries and review of the 2020 season. Alaska Department of Fish and Game, Special Publication No. 21-07, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/SP21-07.pdf Haeseker, S.L., R. M. Peterman, Z. Su, C.C. Wood. 2005. Retrospective evaluation of preseason forecasting models for pink salmon. North American Journal of Fisheries Management, 25(3), 897-918. https://doi.org/10.1577/M04-085.1 Johnson, R. 2021. Chignik Management Area commercial salmon fishery harvest strategy, 2021. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K21-06, Kodiak. https://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.2021.06.pdf Miller, S.E., J.M. Murphy, S.C. Heinl, A.W. Piston, E.A. Fergusson, R.E. Brenner, W.W. Strasburger, J.H. Moss, 2022. Southeast Alaska Pink Salmon Forecasting Models. https://www.adfg.alaska.gov/FedAidPDFs/FMS22-03.pdf Murphy, J.M., E.A. Fergusson, A. Piston, S. Heinl, A. Gray, E. Farley. 2019. Southeast Alaska pink salmon growth and harvest forecast models. North Pacific Anadromous Fish Commission Technical Report No. 15:75–81, Vancouver, Canada. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2021-2022/se/SP20-09.pdf Ovando, D., c. Cunningham, P. Kuriyama, C. Boatright, R. Hilborn. 2022. Improving forecasts of sockeye salmon (*Oncorhynchus nerka*) with parametric and nonparametric models. Canadian Journal of Fisheries and Aquatic Sciences, 99(999), pp.1-13. https://doi.org/10.1139/cjfas-2021-0287 Thynes T., A. Dupuis, D. Harris, B. Meredith, A. Piston, P. Salomone. 2021. 2021 Southeast Alaska purse seine fishery management plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J21-09, Douglas. https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2021.09.pdf Vega, S.L., J.M. Head, T. Hamazaki, J.W. Erickson,T.R. McKinley. 2022. Review of Salmon Escapement Goals in Bristol Bay, Alaska, 2021. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2022-2023/bb/FMS22-07.pdf Walsh, J.C., J.E. Pendray, S.C. Godwin, K.A. Artelle, H.K. Kindsvater, R.D. Field, J.D. Reynolds, (2020). Relationships between Pacific salmon and aquatic and terrestrial ecosystems: implications for ecosystem-based management. Ecology, 101(9), e03060. https://doi.org/10.1002/ecy.3060 Wipfli, M.S., J.P. Hudson, D.T. Chaloner, J.P. Caouette, 1999. Influence of salmon spawner densities on stream productivity in southeast Alaska. Canadian Journal of Fisheries and Aquatic Sciences, 56(9), 1600-1611. https://doi.org/10.1139/f99-087
Statement of consistency to the RFM Fishery Standard	Managers of Alaska's commercial salmon fisheries use information from the best available science, local knowledge, and a risk assessment approach when considering interactions between the fishery and the ecosystem. Impacts from the fishery are assessed and appropriately addressed. The fishery continues to conform to the requirements of Fundamental Clause 12 of the RFM Fishery Standard.

7.9.4.2 Fundamental Clause 13. Fisheries enhancement activities

13.	**Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.**
Summary of relevant changes:	**Important Note:** Fundamental Clause 13 (and all underlying Clauses) is only applicable when the fishery under assessment utilizes fisheries enhancement techniques—if the fishery under assessment is not an enhanced fishery, this Section should be removed. **No relevant changes** have been made to the approaches by which managers assess the genetic diversity and ecosystem integrity of populations and communities potentially affected by production of hatchery salmon in Alaska. Noteworthy and ongoing efforts to improve marking of hatchery salmon produced by the Kodiak Regional Aquaculture Association demonstrate progress toward full conformance for this Fundamental Clause. 13.1. The fishery management organization shall promote responsible development and management of fisheries enhancement, including an advanced evaluation of the effects of fisheries enhancement on genetic diversity and ecosystem integrity. Alaska's commercial salmon fisheries harvest both wild- and hatchery-produced fish. Salmon hatcheries in Alaska are operated by private non-profit corporations that must obtain state-issued permits to operate. In accordance with Alaska Statute 16.10.400, ADFG administrates the state's salmon hatchery permitting process[61], guided by the Alaska Finfish Genetics Policy[62], the Alaska Fish Health and Disease Control Policies[63], and the Policy for the Management of Sustainable Salmon Fisheries[64]. Together, these policies promote responsible development and management of salmon hatcheries in Alaska, and have not undergone significant revision in recent years. Evenson *et al.* (2018) provides a thorough account of the history, permitting process, and regulatory oversight of salmon hatcheries in Alaska. As referenced therein (Evenson *et al.,* 2018), ADFG's Genetic Policy establishes restrictions and guidelines "for stock transport, protection of wild stocks, and maintenance of genetic variance. Policy guidelines include (1) banning importation of salmonids from outside the state for enhancement (except U.S./Canada transboundary rivers); (2) restricting transportation of stocks between the major geographic areas in the state (Southeast, Kodiak Island, PWS, Cook Inlet, Alaska Peninsula, (2) Bristol Bay, Arctic-Yukon-Kuskokwim, and Interior); (3) requiring the use of local broodstocks and broodstocks with appropriate phenotypic characteristics; (4) maintaining genetic diversity among hatchery stocks by limiting the number of hatchery stocks derived from a single donor stock; and (5) maintaining genetic diversity within hatchery stocks by use of large broodstock sizes collected across the entire run. The Genetic Policy also discusses the identification and protection of significant and unique wild stocks". 13.2. The fishery management organization shall produce and regularly update fishery enhancement development strategies and plans, as required, to ensure that fishery enhancement development is ecologically sustainable and to allow the rational use of resources shared by enhancement and other activities. Fisheries enhancement policies are implemented by ADFG, through research and regulatory oversight of hatchery operations. Private non-profit hatcheries are required by law to produce annual reports[65] that document egg take, juvenile releases, and adult returns. Any proposed

[61] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery
[62] https://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf
[63] http://www.sf.adfg.state.ak.us/FedAidPDFs/RIR.5J.2010.01.pdf
[64] https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[65] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.annual

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	alteration to hatchery production requires a Permit Alteration Request (PAR), which typically relates to a change in production, new release site or stock used by the hatchery. PARs are reviewed by regional planning teams, which make recommendations for their approval or denial to the commissioner, who may then approve or deny requests. As required by statute (AS 16.05.092), ADFG prepares and publishes Annual Fisheries Enhancement Reports[66] that describe annual levels of hatchery salmon production in Alaska, as well as harvest numbers of hatchery and wild stocks. 13.3. Effective procedures specific to fisheries enhancement activities shall be established to undertake appropriate environmental assessment and monitor (with the aim of minimizing) adverse ecological changes caused by inputs (e.g., pollution, disease) and their related economic and social consequences. Alaska Statute 16.10.420 lists a series of conditions that must be met to qualify issuance of a salmon hatchery permit. These conditions include required measures aimed to limit potential negative impacts from hatchery operations on wild salmon populations, including risks from genetic introgression and disease, and surrounding ecosystems. Furthermore, Alaska Statute 16.10.460 states, "(a)As a condition of and in consideration for a permit to operate a hatchery under AS 16.10.400- 16.10.470, an inspection of the hatchery facility by department [ADFG] inspectors shall be permitted by the permit holder at any time the hatchery is operating. The inspection shall be conducted in a reasonable manner. (b) The cost of an inspection performed by the department under AS 16.10.400 - 16.10.470 shall be borne by the department." In accordance with AS 16.10.460, ADFG has regularly inspected salmon hatcheries throughout the state and, beginning in 2011, developed reports describing levels of compliance with each facility's permit, state policies (e.g., Finfish Genetics Policy, Fish Health and Disease Control Policy, etc.) and prescribed management practices. ADFG also publishes recommendations for improved compliance and operation for each hatchery inspected through these reports. 13.4. With due regard to the assessment approach employed, stock assessment of enhanced fisheries shall consider the separate contributions from enhanced and natural production. To facilitate the identification of hatchery salmon that are harvested, collected by hatcheries, or escape to natural spawning grounds, hatcheries in Alaska use a variety of techniques to apply recognizable marks to the otoliths of juvenile salmon they produce (Volk *et al.,* 1999; Wilson, 2021, 2022). Coded wire tags are also used by some hatcheries to allow identification of salmon they produce. In 2022, ADFG announced a request for proposals[67] to address three core areas associated with the SEAK Chinook Salmon Fishery Mitigation Program, these being 1) to expand hatchery fish marking, tagging and evaluation, 2) expand hatchery production of Chinook salmon, and 3) conduct hatchery research to improve understanding of marine-survival, life histories, migration, and other fisheries-related information. This request demonstrates ADFG's interest to continue and expand capacity to estimate the separate contributions from natural and enhanced salmon production to Alaskan fisheries. Systematic sampling and analyses of otoliths and tags from fish encountered on spawning grounds and in the commercial harvests allow managers to consider the separate contributions of hatchery- and wild-origin salmon in their stock assessments.

[66] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports
[67] https://www.adfg.alaska.gov/static/fishing/pdfs/fisherymitigation/2022_chinookmitigation_rfp_hatchery.pdf

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	However, as we have documented in past reports, Kitoi Bay Hatchery on Kodiak Island represented an exception to an otherwise comprehensive marking program implemented by Alaskan salmon hatcheries. Until recently, pink and chum salmon had been released, unmarked, from this facility. Accordingly, these hatchery salmon could not be recognized or accounted for in stock assessments, resulting in a Minor Non-conformance for Supporting Clause (SC) 13.4 during RFM Reassessment in 2016. In late 2016, the Kodiak Regional Aquaculture Association (KRAA), in partnership with Alaska Fisheries Development Foundation (AFDF), developed a Corrective Action Plan (CAP) to address the Minor Non-conformance associated with release of unmarked salmon from KRAA's Kitoi Bay Hatchery. The CAP outlined a series of actions to be taken, culminating with marking and monitoring of pink salmon produced by Kitoi Bay Hatchery and subsequently sampled as adults. As noted in previous reports, KRAA has made remarkable progress toward full implementation of their CAP. On December 12, 2022, KRAA Executive Director, Tina Fairbanks, met with our Assessment Team and provided an update of KRAA's most recent CAP activities. During that meeting, Ms. Fairbanks reported that comprehensive otolith marking was ongoing at KRAA's facilities, but that heavy rain had made stream sampling for pink salmon otoliths challenging in 2022 (844 otoliths collected), relative to 2021 (1,637 otoliths collected). Nevertheless, she reported that biologists and technicians at KRAA's recently established Mark/Age Lab[68] are currently working to analyze approximately 5,000 previously collected otolith samples. For samples collected from Kodiak streams in 2021, Weber (2022) reports: "During stream escapement surveys, a total of 1,637 pink salmon otoliths were collected from seven rivers on Kodiak and Afognak Islands of which readers verified 732 unmarked samples and 905 marked samples. Of the unmarked total (n=732), 633 were not marked, 55 were unreadable samples, 23 otoliths were lost, and 21 samples could not be confirmed by reader as marked (unknown mark). The total confirmed marked samples (n=905) were referenced using the ADF&G voucher database. Of the confirmed hatchery mark codes, 318 samples originated from the Kitoi Bay Hatchery facility while the remaining 587 confirmed mark codes originated from multiple Alaska salmon aquaculture facilities outside the KMA. During stream escapement surveys, a total of 442 chum salmon otoliths were collected from four rivers on Kodiak and Afognak Islands of which readers verified 427 unmarked samples and 15 marked samples. Of the unmarked total (n=427), 390 were not marked. 20 samples were unreadable, 12 samples could not be confirmed by reader as marked (unknown mark), and 3 otolith samples were lost. All confirmed hatchery mark codes (n=15) originated from multiple Alaska salmon aquaculture facilities outside the KMA. No KRAA-Kitoi Bay Hatchery marks were detected in the sample set in 2021." Otolith sampling of salmon harvested in the Kodiak region also continues, providing evidence of hatchery (39%) and wild (61%) contributions to pink salmon catch in the Kodiak area common property fishery, and with high percentages of KRAA- produced fish harvested near KRAA facilities (Tina Fairbanks, pers. communication in December 2022). Mark and recovery data are currently being incorporated into a forthcoming report.

[68] https://kraa.org/research/mark-age-lab/

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These noteworthy accomplishments by KRAA demonstrate significant progress toward meeting full conformance with SC 13.4. In a recent annual report (Wilson 2022), ADFG also acknowledged KRAA's move toward comprehensive marking of the salmon it produces at its hatcheries:

> "For several years, pink salmon were not marked because they return to a release site on Afognak Island where there are no substantial wild pink salmon stocks. In recent years, Kodiak Regional Aquaculture Association has been using innovative techniques to increase the number of otolith-marked fish including using thermally stratified lake water, dry marking, and saltwater marking. These techniques are useful for when traditional otolith thermal marking methods are logistically challenging. Starting in 2012, a portion of sockeye were otolith marked using a dry mark technique. Starting in 2013, 100% of chum salmon were otolith marked using thermally stratified lake water and a portion of coho salmon were otolith marked with a dry mark. In 2017 and 2018, a portion of pink salmon were otolith marked using salt water. Starting in 2018, 100% of late-run sockeye salmon were otolith marked with a dry mark; and starting in 2019, 100% of pink salmon were otolith marked using salt water, and 100% of coho were otolith marked with a dry mark technique."

Although KRAA's commitment toward enabling identification of its contribution to harvested salmon stocks in Alaska demonstrates significant progress toward full conformance with RFM SC 13.4, , several aspects of the CAP remain to be completed. Namely, to fulfill obligations of the CAP, KRAA must: 1) provide evidence that it has collaborated with ADFG to develop otolith sampling of salmon harvested or recovered from Kodiak spawning grounds; 2) produce a report of otolith marking, sampling, and analyses conducted in 2022; and (3) complete a third year of otolith sampling, analyses and reporting, as described through the CAP. Full implementation of the CAP requires completion of these actions.

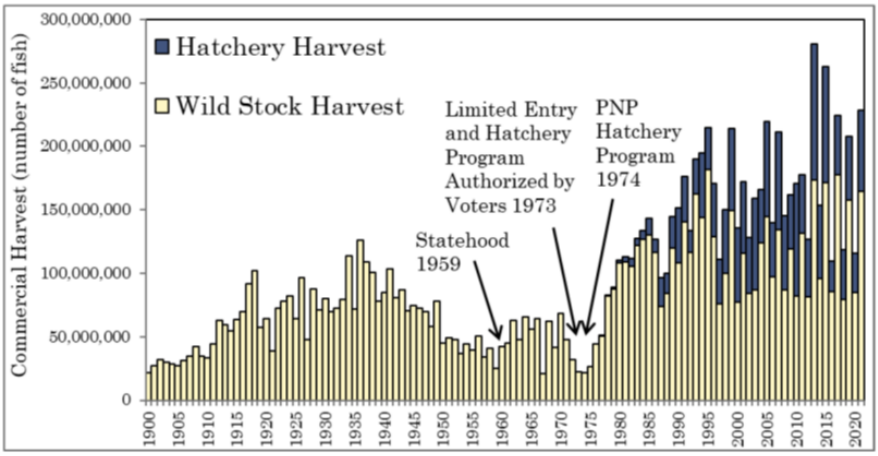

Figure 2. Commercial salmon harvest in Alaska, 1900-2021. (Source: Wilson (2022)).

13.5. Regarding the enhanced components of the *stock under consideration*, the species shall be native to the fishery's geographic area, there shall be natural reproductive components of the *stock under consideration*, and the growth during the post-release phase shall be based upon food supply from the natural environment

As discernable from Figure 2, Alaska's commercial salmon fisheries harvest both hatchery- and natural-origin fish. Hatchery permitting, administrated by ADFG, ensures that only appropriate *local* broodstocks are used to found hatchery populations, per Alaska's Finfish Genetics Policy.

13.	**Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.**
	Hatchery production of salmon in Alaska is designed to supplement, and not supplant, natural production. Alaska's Policy for the Management of Sustainable Salmon Fisheries[69], states that: (1) wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yields, (2) salmon fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning, (3) effective management systems should be established and applied to regulate human activities that affect salmon, (4) public support and involvement for sustained use and protection of salmon resources should be sought and encouraged, (5) in the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats shall be managed conservatively. Regular escapement monitoring and in-season management serves to meet these policy objectives. In the case of both hatchery- and natural-origin salmon, the majority of the organism's life cycle transpires in the marine environment, where they feed on natural prey, and where the majority of harvest occurs. Post-release growth in the natural environment is established by statute (AS 16.40.210), which prohibits "finfish farming". In Alaska, a "person may not grow or cultivate finfish in captivity or under positive control for commercial purposes", but can operate "a nonprofit corporation that holds a salmon hatchery permit under AS 16.10.400 to sell salmon returning from the natural water of the state, as authorized under AS 16.10.450 , or surplus salmon eggs, as authorized under AS 16.10.420 and 16.10.450". Importantly, the sale of hatchery salmon is permissible only *after returning from the natural water of the state*, where supplemental feeding does not occur. 13.6. Naturally reproductive components of enhanced stocks shall not be overfished, and naturally reproductive components of the stock under consideration shall not be displaced by enhanced components, and in particular, displacement shall not result in a reduction of the stock under consideration below abundance-based target reference points. Salmon fisheries in Alaska are managed to meet target escapement levels that protect wild stocks from overharvest. Estimates of hatchery and wild contributions to harvest are regularly published by ADFG[70] as are annual estimates of escapement[71]. Where salmon stocks have chronically failed to meet escapement goals, they have been recognized by managers as stocks of concern[72] and awarded protections from harvest. By siting hatcheries away from major wild salmon populations, per Alaska's state policies, wild stocks are protected from displacement on spawning grounds and fisheries managers are able to direct harvest effort toward "terminal fisheries" in the vicinity of hatchery release sites, where hatchery-origin fish comprise the majority of the catch. Alaska has developed several policies and regulations that serve to protect wild fish from overfishing or displacement by hatchery: 5 Alaska Administrative Code 40.005, which states:

[69] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[70] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[71] http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[72] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks

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	"Where hatchery returns enter a segregated location near the release site and can be harvested without significantly affecting wild stocks, a special harvest area may be designated by regulation adopted by the board, within the hatchery permit, or by emergency orders issued by the commissioner." Alaska Statute 16.10.400 Permits for Salmon Hatcheries, which states: Except for permits issued before June 16, 1976, a permit may not be issued for construction or operation of a hatchery on an anadromous fish stream unless the stream has been classified as suitable for enhancement purposes by the commissioner. The commissioner shall undertake to make such classifications in conjunction with the development of the comprehensive plan under AS 16.10.375; and During the development of a comprehensive plan for a region a permit may not be issued for a hatchery unless the commissioner determines that the action would result in substantial public benefits and would not jeopardize natural stocks. Alaska Statute 16.10.420 Conditions of a [Hatchery] Permit "a hatchery be located in an area where a reasonable segregation from natural stocks occurs, but, when feasible, in an area where returning hatchery fish will pass through traditional salmon fisheries." Policy for the Management of Sustainable Salmon Fisheries, which states: "wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yields." 13.7. Any modification to the habitat for enhancing the stock under consideration is reversible and does not cause serious or irreversible harm to the natural ecosystem's structure and function. State administrated permitting of hatcheries in Alaska involves a careful review process that considers siting of construction and any potential impacts to habitat and the ecosystem. Moreover, Alaska Statute 16.10.400[73] states that "a permit may not be issued for construction or operation of a hatchery on an anadromous fish stream unless the stream has been classified as suitable for enhancement purposes by the commissioner". This statute further states that "a permit may not be issued for a hatchery unless the commissioner determines that the action would result in substantial public benefits and would not jeopardize natural stocks". 13.7.1/13.7.2/13.7.3. Efforts shall be undertaken to minimize the adverse impacts of introducing non-native species or genetically altered stocks, and to minimize adverse genetic, disease, and other effects of escaped farmed fish (aquaculture) on wild stocks. The introduction of non-native or genetically altered fish into Alaska is strictly regulated and generally prohibited. Alaska's Finfish Genetics Policy[74] clearly states: "Live salmonids, including gametes, will not be imported from sources outside the state". Both natural- and hatchery-origin salmon that survive to adulthood and escape harvest return to freshwater systems to spawn and complete their lifecycle. Homing instincts compel most hatchery salmon to return to their production or release facilities as adults, where they can be harvested in terminal fisheries or otherwise collected, but some escape and stray onto natural spawning grounds, where potentially negative interactions can occur between hatchery and wild fish. When stray hatchery fish are less fit than wild fish, they can lower natural population productivity and negatively

[73] http://ak.elaws.us/as/16.10.400
[74] https://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

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impact diversity through introgression. ADFG has engaged in several collaborative research efforts to examine the extent and possible consequences of straying by hatchery salmon, as reviewed by Wilson (2021):

> "Straying of hatchery-produced fish to wild stock systems has been monitored for many years. Hatchery chum salmon straying has been assessed in Southeast Alaska (Piston and Heinl 2012a, 2012b) and Prince William Sound systems (Brenner *et al.,* 2012). Hatchery Chinook salmon straying has been monitored on several Southeast Alaska systems for decades (Ed Jones, ADF&G fishery biologist, Juneau, personal communication). Hatchery sockeye salmon straying studies have been conducted on Kodiak Island (Baer and Honnold, 2002), in the Copper River basin (Bidlack and Valentine, 2009), and the Kenai River (Habicht *et al.,* 2013; Stopha, 2012). Pink salmon straying has been monitored in Prince William Sound (Brenner *et al.,* 2012) and Cook Inlet (Hollowell *et al.,* 2017)."

More recently, Josephson *et al.* (2021) revealed a pattern of strong hatchery influence near chum salmon production facilities in Southeast Alaska (SEAK) that quickly dissipated with distance. These authors reported that for "most streams sampled in this study, the pHOS [proportion of hatchery-origin salmon on spawning grounds] values that were observed both at the stream and aggregate scales were generally less than 0.10, and most were less than 0.05. Conversely, some streams close to hatchery release sites had pHOS values ranging as high as 0.85".

In Prince William Sound, Brenner *et al*. (2012) had previously documented high proportions of hatchery pink and chum salmon near hatchery release sites, with decreasing levels of influence in more distant streams. These authors also noted temporal patterns of hatchery influence, whereby the proportion of hatchery-origin spawners increased (pink) or decreased (chum) through the course of the season, possibly offering some level of segregation between hatchery and wild spawning populations (also see Knudsen *et al*., 2021).

The relative fitness of hatchery pink salmon in Prince William Sound was unknown until recently, when Shedd *et al*. (2022) reported significantly lower fitness for hatchery origin spawners in multiple streams of the region. However, their study also revealed differences in the spatial distribution of hatchery- and wild-origin spawners, whereby hatchery-origin pink salmon tended to migrate higher into the watershed than wild-origin spawners.

Taken together, these study results underscore the risk that hatchery populations can pose to wild salmon populations in Alaska, but also identify limited scope of influence and potentially mitigating effects from spatio-temporal segregation between hatchery and wild populations. Continued high productivity by naturally spawning pink salmon in Alaska suggests that effects from stray hatchery fish may be ephemeral or effectively mitigated through some form of reproductive isolation. Ongoing research by ADFG and others is expected to advance understanding in this area and inform future management.

13.8. The fishery management organization shall protect transboundary aquatic ecosystems by supporting responsible enhanced fishery practices within the States jurisdiction and cooperating to promote sustainable enhanced fishery practices.

There have been no relevant changes to transboundary management of salmon since the last RFM Assessment. Since 1985, the Pacific Salmon Treaty[75] (re-negotiated in 2019) has provided policy

[75] https://www.psc.org/download/45/miscellaneous/2337/pacific-salmon-treaty.pdf

13.	Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.
	direction for the responsible management of salmon fisheries and fishery enhancement activities along transboundary rivers of Alaska and Canada. 13.9. The fishery management organization shall, with due respect to their neighboring States and in accordance with international law, ensure responsible choice of species, siting, and management of enhanced fisheries activities that could affect transboundary aquatic ecosystems As noted for SC 13.8, the Pacific Salmon Treaty outlines policy for salmon fisheries enhancement activities that affect transboundary ecosystems. Chapter 1 of this treaty states that participating parties (including Alaska) will "identify existing and/or future enhancement projects that: i. assist the devising of harvest management strategies to increase benefits to fishermen with a view to permitting additional salmon to return to Canadian waters; ii. have an impact on natural transboundary river salmon production" Choice of species, stock, hatchery siting and management of fisheries activities are regulated through Alaska Statutes 16.10.375 – 16.10.560, guided by Alaska's Policy for the Management of Sustainable Salmon Fisheries and subject to agreements of the Pacific Salmon Treaty. 13.10. The fishery management organization shall consult with their neighboring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems The Alaska Finfish Genetics Policy prohibits the import on non-indigenous stocks, thereby precluding the release of non-indigenous salmon into transboundary waters. 13.11. The fishery management organization shall establish databases and information networks to collect, share, and disseminate data related to their enhanced fishery activities For decades, massive amounts of data have been collected for Chinook, coho, pink, chum and sockeye salmon in Alaska and throughout the northern Pacific. Fisheries performance, monitoring, and other relevant data are disseminated by ADFG through various publicly-accessible online databases (e.g. data for commercial harvest[76], fish marks and tags[77]). 13.12. The fishery management organization shall cooperate in the elaboration, adoption, and implementation of international codes of practice and procedures for introductions and transfers of enhanced fish Turner (1988)[78] developed internationally recognized codes of practice for introductions and transfers of marine and freshwater organisms, which includes specific guidelines for salmonids. Introductions and transfers of salmon in Alaska are also guided by the Finfish Genetics Policy[79], which states: A. Interstate: Live salmonids, including gametes, will not be imported from sources outside the state. Exceptions may be allowed for trans-boundary rivers. B. Inter-regional: Stocks will not be transported between major geographical areas: Southeast, Kodiak Island, Prince William Sound, Cook Island, Bristol Bay, AYK and Interior. C. Regional: Acceptability of transport within regions will be judged on the following criteria: 1. Phenotypic characteristics of the donor sock must be shown to be appropriate for the proposed fish culture regions and the goals set in the management plan

[76] https://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.statisticsanddata
[77] https://mtalab.adfg.alaska.gov/
[78] http://www.fao.org/3/ae989e/ae989e00.htm
[79] https://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

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	2. No distance is set or specified for transport within a region. It is recognized that transplants occurring over greater distances may result in increased straying and reduce the likelihood of a successful transplant. Although the risk of failure affects the agency transporting the fish, transplants with high probability of failure will be denied. Proposals for long distance transport should be accompanied by adequate justification for non-local stock. Finally, Alaska Statute 16.10.445[80] states, "Where feasible, salmon eggs utilized by a hatchery operator shall first be taken from stocks native to the area in which the hatchery is located, and then, upon department approval, from other areas, as necessary". 13.13. The fishery management organization shall promote appropriate practices and procedures for the selection and improvement of broodstock, the introduction of non-native species, and production, sale and transport of eggs, larvae, fry, broodstock. Alaska Statute 16.10.445, Alaska's Finfish Genetics Policy and associated conditions for hatchery permitting explicitly promote the use of local brood as initial egg source for hatchery production, limit salmon and egg transfer among regions, and generally prohibit the introduction of salmon from sources outside Alaska. Salmon hatcheries in Alaska do not intentionally select on specific traits such as size, run timing or disease resistance, once a broodstock has been established. This practice aims to limit genetic divergence from and genetic risk to the wild populations from which they are derived, in accordance with the State Finfish Genetics Policy, the Policy for the Management of Sustainable Salmon Fisheries and various state statutes. To limit disease risk and transfer, ADFG conducts regular diagnostic testing of salmon reared at hatcheries throughout the State. This work directly supports mandate from Alaska Statute 16.10.420[81], which states "diseased salmon be destroyed in a specific manner and place designated by the department".
References:	Baer, R.T., and S.G. Honnold. 2002. A straying assessment of an introduced sockeye salmon stock on northern Afognak Island as determined by two methods of stock identification. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K02-56, Kodiak. http://www.adfg.alaska.gov/FedAidpdfs/RIR.4K.2002.56.pdf Brenner, R.E., S.D. Moffitt, W.S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes:1–17. http://dx.doi.org/10.1007/s10641-012-9975-7 Bidlack, A., E.M. Valentine. 2009. Assessment of Gulkana Hatchery sockeye straying into Upper Copper River tributaries. Ecotrust Copper River Program. Cordova, Alaska. Evenson, D.F., C. Habicht, M. Stopha, A.R. Munro, T.R. Meyers, W.D. Templin. 2018. Salmon hatcheries in Alaska – A review of the implementation of plans, permits, and policies designed to provide protection for wild stocks. Alaska Department of Fish and Game, Special Publication No. 18-12, Anchorage. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf Josephson, R., A. Wertheimer, D. Gaudet, E.E. Knudsen, B. Adams, D.R. Bernard, W.D. Templin. 2021. Proportions of Hatchery Fish in Escapements of Summer-Run Chum Salmon in Southeast Alaska, 2013–2015. North American Journal of Fisheries Management 41(3): 724-738. https://doi.org/10.1002/nafm.10580

[80] http://ak.elaws.us/as/16.10.445
[81] http://ak.elaws.us/as/16.10.420

13.	Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.
	Habicht, C., T.M. Tobias, G. Fandrei, N. Webber, B. Lewis, W.S. Grant. 2013. Homing of sockeye salmon within Hidden Lake, Alaska, can be used to achieve hatchery management goals. North American Journal of Fisheries Management 33(6):777–782. https://doi.org/10.1080/02755947.2013.808290 Hollowell, G., E.O. Otis, E. Ford. 2017. 2016 Lower Cook Inlet area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 17-26, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR17-26.pdf Piston, A.W., S.C. Heinl. 2012a. Hatchery chum salmon straying in Southeast Alaska, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-45, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FDS12-45.pdf Piston, A.W., S.C. Heinl. 2012b. Hatchery chum salmon straying studies in Southeast Alaska, 2008–2010. Alaska Department of Fish and Game, Fishery Manuscript Series No. 12-01, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMS12-01.pdf Shedd, K.R., E.A. Lescak, C. Habicht, E.E. Knudsen, T.H. Dann, H.A. Hoyt, D.J. Prince, W.D. Templin. 2022. Reduced relative fitness in hatchery-origin Pink Salmon in two streams in Prince William Sound, Alaska. Evolutionary applications, 15(3), pp.429-446. https://doi.org/10.1111/eva.13356 Stopha, M. 2012. An evaluation of the Trail Lakes salmon hatchery for consistency with statewide policies and prescribed management practice. Alaska Department of Fish and Game, Regional Information Report No. 5J12-21, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2012.21.pdf Turner, G.E. 1988. Codes of practice and manual of procedures for consideration of introductions and transfers of marine and freshwater organisms. EIFAC/CECPI Occasional paper No. 23 44 p. Volk, E.C., S.L. Schroder, J.J. Grimm. 1999. Otolith thermal marking. Fisheries Research, 43(1-3), 205-219. https://doi.org/10.1016/S0165-7836(99)00073-9 Weber, N.L. (2022). A seasonal summary of the Kodiak pink and chum salmon otolith recovery monitoring project for 2021. Kodiak Regional Aquaculture Association Report no. 22-03. 27 pp. Weber, N.L. (2021). A seasonal summary of the Kodiak pink and chum salmon otolith recovery monitoring project for 2020. Kodiak Regional Aquaculture Association Report no. 21-03. 27 pp. Wilson, L. (2022). Alaska salmon fisheries enhancement annual report 2021. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J22-02, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2022.02.pdf
Statement of consistency to the RFM Fishery Standard	Minor Non-conformance Overall, management of Alaska's commercial salmon fishery and stock enhancement programs considers the genetic diversity of wild salmon populations and the integrity o f natural ecosystems. A single Minor Non-conformance is maintained during this Surveillance period, as mass marking used to identify the contributions from hatchery-producedfish continues to improve and integrate with stock assessment methodologies.

8 Update on compliance and progress with non-conformances and agreed action plans

This section details compliance and progress with non-conformances and agreed action plans including:

a) A review of the performance of the Client specific to agreed corrective action plans to address non-conformances raised in the most recent assessment or re-assessment or at subsequent surveillance audits including a summary of progress toward resolution.
b) A list of pre-existing non-conformances that remain unresolved, new nonconformances raised during this surveillance, and non-conformances that have been closed during this surveillance.
c) Details of any new or revised corrective action plans including the Client's signed acceptance of those plans.
d) An update of proposed future surveillance activities.

8.1.1 Closed non-conformances

There are no new non-conformances.

8.1.2 Progress against open non-conformances

Non-conformance 1 (of 1)	
Clause:	13.4
Non-conformance level:	Minor
Non-conformance:	A Minor Non-conformance was associated with ASMI RFM v1.3 sub-clause 13.4, which states that "with due regard to the assessment approach employed, stock assessment of fisheries that are enhanced through aquaculture inputs shall consider the separate contributions from aquaculture and natural production", not met in full due to releases of unmarked hatchery pink salmon by the Kodiak Regional Aquaculture Association (KRAA)
Rationale:	No evidence available to demonstrate that evaluation of straying pink salmon has been conducted in Kodiak region since the 1980's. At this time (August 2016) a plan for implementation of marking of Kodiak hatchery pink salmon has not been finalized. Furthermore, there is no formal commitment by ADFG to initiate marking of pink salmon. The Assessment team considers that marking of the enhanced component of pink salmon will support the assessment approach employed considering the separate contributions from aquaculture and natural production
Corrective Action Plan (CAP):	In late 2016, the Kodiak Regional Aquaculture Association (KRAA), in partnership with Alaska Fisheries Development Foundation, developed a Corrective Action Plan (CAP) to address the Minor Non-conformance associated with release of unmarked salmon from KRAA's Kitoi Bay Hatchery. The CAP outlined a series of actions to be taken, culminating with marking and monitoring of pink salmon produced by Kitoi Bay Hatchery and subsequently sampled as adults. For more details about the CAP Please see https://cdn.rfmcertification.org/wp-content/uploads/2021/06/AK_SAL-Alaska-salmon-___2nd-Reassessment-Report-Final-1.pdf
Progress against the CAP:	**Year 1** Progress against the CAP: KRAA has made remarkable progress with implementation of their CAP. Ahead of the plan's schedule, otolith marking of pink salmon produced at the Kitoi Bay Hatchery began in 2019 and continues until present. KRAA Executive Director, Tina Fairbanks, offered evidence of further progress with CAP implementation during our offsite meeting on 16 December 2021, referencing otolith sampling and analysis efforts by KRAA and ADFG. Results from adult pink and chum salmon sampled from the commercial harvest

Non-conformance 1 (of 1)	
	and streams of Kodiak and Afognak islands were provided in a report produced by KRAA (Weber, 2021), partially summarized here in Table 11 (1st surveillance report). Non-conformance 1 (of 1) In ADFG's 2020 Alaska Salmon Fisheries Enhancement Annual Report, Wilson (2021) recognized KRAA's transition to mass marking of all fish produced at its facilities, and reported the percent of Alaska's commercial salmon harvest attributable to hatchery production (Figure 2). KRAA's commitment to enabling identification of its contribution to harvested salmon stocks in Alaska demonstrates major progress toward full compliance of RFM Supporting Clause 13.4. However, given the novelty of the KRAA otolith marking program and statistical uncertainties associated with extrapolating estimates from the small number of samples collected from Kodiak's commercial harvesters toward stock assessments, no change of conformance level is as of yet warranted. Future surveillances will continue to monitor progress of the KRAA otolith marking program and applications to management. **Year 2** The Corrective Action Plan developed in 2016 by AFDF and KRAA outlines a series of tasks to be completed to meet full conformance with Supporting Clause 13.4. Through collaboration with ADFG and their own initiative, KRAA has made significant progress toward completion of nearly all tasks listed in their plan. Reports by Weber (2021, 2022) document this progress, highlighting KRAA's successful establishment of a comprehensive otolith marking program at Kitoi Bay Hatchery, sampling of salmon harvested or recovered from streams in the Kodiak region, as well as analysis and reporting of otolith mark results. Notably ahead of schedule, KRAA has completed nearly all tasks described in their CAP. Tasks 5-1 and 5-2 remain to be completed in full through reporting of results from a third year of PHOS study and clear demonstration that sampling was conducted in accordance with study designs that involved ADFG collaboration and approval. Lastly, continued marking of salmon produced by KRAA and other hatcheries will be necessary to satisfy the conditions of SC 13.4 into the future.
Non-conformance status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

8.1.3 New non-conformances

There are no new non-conformances.

8.1.4 New or revised corrective action plans

There are no new corrective action plans or pre-existing plans that have been revised as well as Client-signed acceptance of the action plan

8.1.5 Proposed surveillance activities

This fishery will be assessed again on the 3rd surveillance

9 Recommendations for continued certification

9.1 Certification Recommendation

Following this surveillance audit, the Assessment Team recommends that, the United States Alaska commercial salmon [Chinook *Oncorhynchus tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta*] fisheries employing troll , purse seine, drift gillnet, set gillnet, fish wheel, dip net and beach seine gears in the four administrative Regions of Alaska that are principally managed by the Alaska Department of Fish and Game (ADFG) fishery be awarded continuing certification against RFM Certification Program Fisheries Standard Version 2.1.

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11 Appendices

11.1 Appendix 1 – Assessment Team Bios

11.1.1 Assessment Team Bios

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

Ivan Mateo, Ph.D. (Lead Assessor)

Dr. Ivan Mateo has over 20 years' experience working with natural resources population dynamic modelling. 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 bioenergetics modelling for Atlantic cod. Dr. Mateo 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 Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently, Dr. Mateo worked as National Research Council post-doctoral research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modelling of Alaska sablefish and early life history/recruitment dynamics Pacific Ocean perch.

Brian Allee, Ph.D. (Assessor 1)

Dr. Brian Allee attended the University of California Berkeley majoring in zoology. He received his Ph.D. from the University of Washington in fisheries. Dr. Allee has worked extensively with salmonid fish specializing in salmon research, restoration and enhancement of salmon and steelhead in freshwater, estuarine, and marine ecosystems in Alaska, Washington and Oregon. After working in Washington and Oregon as a fisheries biologist, he first came to Alaska in 1982 and worked for Prince William Sound Aquaculture Association as operations manager and later as president. He subsequently served as Director of the Fisheries Rehabilitation and Enhancement, Development Division (FRED) of the Alaska Department of Fish and Game. His responsibilities included the state-wide public hatchery program, the private non-profit permitting and planning program, and oversaw the genetic, pathology, limnology, and coded wire tagging laboratories, fisheries engineering and regional and area FRED staff. While serving as Director, Dr. Allee was appointed by the Governor to the Alaska Science and Engineering Commission and the Alaska Science and Technology Foundation.

Dr. Allee returned to Alaska in 2003 to be the Alaska Sea Grant Director at the University of Alaska Fairbanks where he was active in funding fisheries research, education and extension for coastal Alaska. He more recently worked for the National Marine Fisheries Service in Portland on Mitchel Act hatchery funding in the Columbia River and participated on hatchery reform efforts. In addition, he was past President of the Fish Culture Section of the American Fisheries Society and a member of the Scientific and Statistical Committee of the Pacific Fisheries Management Council. During Dr. Allee's 44-year career as a fisheries scientist and administrator, he had broad management experience at the policy and technical level, supervising large and small organizations in public (state, federal and tribal), private and private non-profit sectors.

Scott Marshall (Assessor 2)
Mr. Marshall received a B.S. in Fisheries Science at Oregon State University, an M.S. Fisheries Science University of Washington 1974 – 1980. Mr. Marshall was the Fisheries Scientist and Project Leader at the Fisheries Research Institute, University of Washington. His primary emphasis was on researching sockeye salmon productivity in the Chignik Lakes, Alaska, on determining the origins of Chinook salmon harvested by foreign vessels operating in the North Pacific Ocean, and on the population dynamics of sockeye salmon in the Lake Washington watershed of Washington.

1980 - 2001. Alaska Dept. Fish and Game: Mr. Marshall served in three primary capacities, Research Project Leader, Principal Fishery Scientist for Pacific Salmon Commission Affairs and Regional Supervisor. As a Project Leader Mr. Marshall lead research teams in the study of population structure and dynamics of the state's Pacific Salmon and Pacific herring stocks. As a Principal Scientist Mr. Marshall served as a Co-Chairman or as Alaska's senior representative on several international technical teams established by the Pacific Salmon Treaty (e.g., Chinook Salmon, Transboundary Rivers, Canadian/Alaska Boundary Area Fisheries, Interceptions Accounting Committee, Data Sharing Committee, Editorial board). Mr. Marshall served on Scientific and Statistical Committee of the North Pacific Management Council. As the Division of Commercial Fisheries Regional Supervisor for Southeast Alaska, Mr. Marshall represented the Department at Alaska Board of Fisheries meetings, reviewed and/or critiqued numerous regulatory proposals for the fisheries of Southeast Alaska. He oversaw the daily research and management of the Southeast Region's commercial, personal use and subsistence fisheries. He also served as Co-Chairman of the Transboundary Rivers Panel of the Pacific Salmon Commission. Undertook numerous administrative responsibilities, such as budgeting, hiring HR etc.

2000- 2005. Idaho Department of Fish and Game Mr. Marshall served as the Fisheries Bureau's Staff Biologist for Endangered Species Act Affairs. This included developing Biological Assessments, Applications for ESA Section 7 & 10 permits, and writing reports for incidental take of endangered Pacific salmon that occurred during the conduct of research activities, recreational fisheries and hatchery operations. I also served as the Department's representative on the Habitat Committee of the Pacific Fishery Management Council.

2005 - 2013 U.S Fish and Wildlife. Mr. Marshall was a Fisheries Administrator in charge of the Lower Snake River Compensation Plan (a hatchery mitigation program to compensate for construction and operation of four hydroelectric dams on the Lower Snake River in Washington Oregon and Idaho). He developed, presented and negotiated budgets for the program to the Bonneville Power Administration (roughly $30 million annually). He reviewed and negotiated annual budgets, contracts, annual spending and scientific reports developed by our fish and wildlife agency co-operators who implemented the program (3 states, 3 tribal agencies and several U.S Fish and Wildlife Service field offices). Mr Marshall developed a series of three Programmatic Reviews (one for each of the primary species raised in our hatcheries) as required by the Northwest Power Planning Council's implementation legislation.

Marc Johnson, Ph.D. (Assessor 3)
Dr. Marc Johnson studied at Oregon Department of Fish and Wildlife Corvallis Research Laboratory, Oregon State University Department of Fisheries and Wildlife. Dr. Johnson gained a PhD in Fisheries Science Oregon State University Corvallis, Oregon Completed June of 2009. MSc in Ecology University of Brasília, Federal District (Brazil) Completed June of 1999. BSc in Zoology Oregon State University Corvallis, Oregon Completed June of 1996.

Experience in fisheries science includes; Oregon Department of Fish and Wildlife (Period: 2/2010 – present) Location: Corvallis, Oregon Position: Technical Analyst Research with an objective of Developing research and provide technical advice for studies of spring Chinook salmon (*Oncorhynchus tshawytscha*) and winter steelhead

(*O. mykiss*) in support of the 2008 (NMFS) Willamette Valley Project Biological Opinion Cooperative Institute for Marine Resources Studies (Period: 7/2009 – 8/2009) Location: Newport, Oregon / Seattle, Washington Position: Academic Wage Researcher Research Objective: Design and use novel qPCR assays to investigate the influence of acclimation site exposure on olfactory receptor gene expression in juvenile spring Chinook salmon.