Alaska Responsible Fishery Management (Alaska RFM)

US Alaska Salmon Commercial Fisheries

Full Assessment Report

Certification Body (CB):	SAI Global
Assessment team:	Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assesor
Facilitated by:	Alaska Seafood Marketing Institute (ASMI)
Fishery client:	Alaska Fisheries Development Foundation (AFDF)
Assessment Type:	2nd Re-assessment
Report Code:	AK/SAL/003/2020
Report Date:	June 02, 2020

SAI Global/Global Trust Certification
Quayside Business Park,
Mill Street, Dundalk,
Co. Louth, Ireland.
T: + 353 42 932 0912
E: ClientServicesie@saiglobal.com
W: www.saiglobal.com

Foreword

The Alaska 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 Alaska RFM program may be found online at:
https://www.alaskaseafood.org/rfm-certification/.

1 Contents

Foreword 2
1 Contents 3
1.1 List of Figures 7
1.2 List of Tables 7
2 Glossary 8
3 Executive Summary 10
3.1 Assessment Team Details 10
3.2 Details of Applicable Alaska RFM Documents 11
4 Fishery Applicant Details 12
5 Units of Assessment and Certification 13
5.1 Units of Assessment 13
5.2 Units of Certification 14
6 Background to the Fishery 15
6.1 Species Biology 15
6.2 Fishery Location and Methods 17
6.3 Fishery Management History and Organization 20
6.3.1 ADFG and Board of Fisheries (BOF) Functions 23
6.3.2 Coastal Management Framework for Alaska Salmon Habitat Conservation 25
6.3.3 Federal Subsistence Management Program 26
6.4 Overview of the Alaska Salmon Hatchery Program 28
6.4.1 Alaska Salmon Hatchery Program History 28
6.4.2 Alaska Salmon Hatchery Program Description 29
6.4.3 Alaska Hatchery Policies 31
6.4.4 Alaska Permitting and Planning Procedures 31
6.4.5 Value of Hatchery Operations 33
6.4.6 Alaska State Management of Salmon Hatcheries 33
6.4.7 Alaska Hatchery Contribution to Alaska Fisheries 33
6.5 Stock Assessment Activities 36
6.6 Historic Biomass and Removals in the Fishery 38
6.7 Economic Value of the Fishery 53
7 Assessment Process 56
7.1 Scoring 56
7.1.1 Evaluation Parameters 56
7.1.2 Numerical Scoring based on Evaluation Parameters 56
7.1.3 Confidence Ratings and Non-conformances 57
7.1.4 Overall Assessment Scoring 57
7.2 Consultation Meetings 58
8 Summary of Assessment Outcomes 61
8.1 Assessment Outcomes by Clause 61
8.2 Certification Recommendation 64
8.3 Certification Determination 64
9 Assessment Outcomes 65
Topics that will trigger immediate assessment failure 65
Section A: The Fisheries Management System 66
Fundamental Clause 1. Structured and legally mandated management system 66
Supporting Clause 1.1. 66
Supporting Clause 1.2. 69
Supporting Clause 1.2.1. 71
Supporting Clause 1.3. 73
Supporting Clause 1.3.1. 75
Supporting Clause 1.4. 77

Supporting Clause 1.4.1 78
Supporting Clause 1.5. 80
Supporting Clause 1.6. 82
Supporting Clause 1.6.1. 83
Supporting Clause 1.7. 84
Supporting Clause 1.8. 86
Supporting Clause 1.9. 87
Fundamental Clause 2. Coastal area management frameworks 88
Supporting Clause 2.1. 88
Supporting Clause 2.1.1. 91
Supporting Clause 2.1.2. 93
Supporting Clause 2.2. 95
Supporting Clause 2.3. 97
Supporting Clause 2.4. 99
Supporting Clause 2.5. 101
Supporting Clause 2.6. 103
Supporting Clause 2.7. 105
Fundamental Clause 3. Management objectives and plan 107
Supporting Clause 3.1. 107
Supporting Clause 3.1.1. 109
Supporting Clause 3.1.2. 110
Supporting Clause 3.1.3. 111
Supporting Clause 3.2. 113
Supporting Clause 3.2.1. 113
Supporting Clause 3.2.2. 115
Supporting Clause 3.2.3. 116
Supporting Clause 3.2.4. 117
Section B: Science & Stock Assessment Activities, and the Precautionary Approach 119
Fundamental Clause 4. Fishery data 119
Supporting Clause 4.1. 119
Supporting Clause 4.1.1. 122
Supporting Clause 4.1.2. 124
Supporting Clause 4.2. 126
Supporting Clause 4.2.1. 128
Supporting Clause 4.3. 130
Supporting Clause 4.4. 132
Supporting Clause 4.5. 133
Supporting Clause 4.6. 135
Supporting Clause 4.7. 137
Supporting Clause 4.8. 138
Supporting Clause 4.9. 140
Supporting Clause 4.10. 141
Supporting Clause 4.11. 142
Fundamental Clause 5. Stock assessment 143
Supporting Clause 5.1. 143
Supporting Clause 5.1.1. 146
Supporting Clause 5.1.2. 147
Supporting Clause 5.2. 150
Supporting Clause 5.3. 152
Supporting Clause 5.4. 154
Supporting Clause 5.5. 155
Fundamental Clause 6. Biological reference points and harvest control rule 156

Supporting Clause 6.1. 156
Supporting Clause 6.2. 161
Supporting Clause 6.3. 163
Supporting Clause 6.4. 166
Supporting Clause 6.5. 169
Fundamental Clause 7. Precautionary approach 172
Supporting Clause 7.1. 172
Supporting Clause 7.1.1. 178
Supporting Clause 7.1.2. 179
Supporting Clause 7.2. 180
Section C: Management Measures, Implementation, Monitoring, and Control 181
Fundamental Clause 8. Management measures 181
Supporting Clause 8.1. 181
Supporting Clause 8.1.1. 183
Supporting Clause 8.1.2. 184
Supporting Clause 8.2. 187
Supporting Clause 8.3. 188
Supporting Clause 8.4. 189
Supporting Clause 8.4.1. 191
Supporting Clause 8.5. 193
Supporting Clause 8.5.1. 195
Supporting Clause 8.6. 198
Supporting Clause 8.7. 199
Supporting Clause 8.8. 201
Supporting Clause 8.9. 202
Supporting Clause 8.10. 204
Supporting Clause 8.11. 205
Supporting Clause 8.12. 207
Supporting Clause 8.13. 209
Fundamental Clause 9. Appropriate standards of fishers' competence 210
Supporting Clause 9.1. 210
Supporting Clause 9.2. 213
Supporting Clause 9.3. 215
Fundamental Clause 10. Effective legal and administrative framework 216
Supporting Clause 10.1. 216
Supporting Clause 10.2. 219
Supporting Clause 10.3. 220
Supporting Clause 10.3.1. 221
Supporting Clause 10.4. 222
Supporting Clause 10.4.1. 223
Fundamental Clause 11. Framework for sanctions 224
Supporting Clause 11.1. 224
Supporting Clause 11.2. 225
Supporting Clause 11.3. 228
Supporting Clause 11.4. 230
Section D: Serious Impacts of the Fishery on the Ecosystem 231
Fundamental Clause 12. Impacts of the fishery on the ecosystem 231
Supporting Clause 12.1. 231
Supporting Clause 12.2. 233
Supporting Clause 12.2.1. 233
Supporting Clause 12.2.2. 235
Supporting Clause 12.2.3. 237

Supporting Clause 12.2.4. 239
Supporting Clause 12.2.5. 242
Supporting Clause 12.2.6. 244
Supporting Clause 12.2.7. 246
Supporting Clause 12.2.8. 248
Supporting Clause 12.2.9. 249
Supporting Clause 12.2.10. 252
Supporting Clause 12.2.11. 254
Supporting Clause 12.3. 256
Supporting Clause 12.4. 258
Supporting Clause 12.5. 260
Supporting Clause 12.6. 261
Supporting Clause 12.7. 263
Fundamental Clause 13. Fisheries enhancement activities (remove if not applicable) 265
Supporting Clause 13.1. 265
Supporting Clause 13.1.1. 268
Supporting Clause 13.2. 270
Supporting Clause 13.2.1. 272
Supporting Clause 13.3. 274
Supporting Clause 13.4. 276
Supporting Clause 13.5. 278
Supporting Clause 13.6. 280
Supporting Clause 13.7. 284
Supporting Clause 13.7.1. 286
Supporting Clause 13.7.2 287
Supporting Clause 13.7.3. 288
Supporting Clause 13.8. 289
Supporting Clause 13.9. 291
Supporting Clause 13.10. 292
Supporting Clause 13.11. 293
Supporting Clause 13.12. 295
Supporting Clause 13.13. 297
10 Non-conformances and Corrective Actions 298
10.1 Non-conformances and associated Corrective Actions 298
10.1.1 Non-conformance 1 (of 1) 299
10.1.2 Corrective Action Plan 300
10.2 Recommendations 306
10.2.1 Recommendation 1 (of 2) 306
10.2.2 Recommendation 2 (of 2) 307
11 References 308
12 Appendices 318
12.1 Appendix 1. External Peer Review 318
12.1.1 Peer Reviewer 1 318
12.1.1.1 General comments – Peer Reviewer 1 318
12.1.1.2 Non-conformances raised – Peer Reviewer 1 319
12.1.1.3 Scoring element review – Peer Reviewer 1 321
12.1.1.3.1 Section A: The Fisheries Management System 321
12.1.1.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach 321
12.1.1.3.3 Section C: Management Measures, Implementation, Monitoring, and Control 325
12.1.1.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem 326
12.1.1.4 Conclusion – Peer Reviewer 1 328
12.1.2 Peer Reviewer 2 329

12.1.2.1 General comments – Peer Reviewer 2 329
12.1.2.2 Non-conformances raised – Peer Reviewer 2 330
12.1.2.3 Scoring element review – Peer Reviewer 2 332
12.1.2.3.1 Section A: The Fisheries Management System 332
12.1.2.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach 333
12.1.2.3.3 Section C: Management Measures, Implementation, Monitoring, and Control 334
12.1.2.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem 335
12.1.2.4 Conclusion – Peer Reviewer 2 336
12.2 Appendix 2. Stakeholder submissions and Assessment Team Responses 338
12.3 Appendix 3. Assessment Team and Peer Reviewer Bios 339
12.3.1 Assessment Team Bios 339
12.3.2 Peer Reviewer Bios 341
12.4 Appendix 4. Statewide Alaska salmon fishery locations 342
12.5 Appendix 5. Stock status of Alaskan salmon stocks 351

1.1 List of Figures

Figure 1. ADF&G Fishery management regions (Southeast, Central, Arctic-Yukon-Kuskokwim, and Westward). 17
Figure 2. Purse seiner. 18
Figure 3. Gillnetter. 19
Figure 4. Salmon troller. 20
Figure 5. Seasonality of Alaska salmon runs. 20
Figure 6. Alaska commercial salmon catch for all species combined, 1900-2018. 21
Figure 7. Functional management process of the Alaska salmon fishery. 24
Figure 8. Salmon hatcheries currently operating in Alaska. 29
Figure 9. Annual average Alaska hatchery production by species: 2008-2018. 30
Figure 10. Alaska salmon hatchery returns in numbers of fish by return category, 2009-2018 average. 34
Figure 11. Average Alaska hatchery contribution to commercial fishery harvest by species, 2009-2018. 35
Figure 12. Alaska commercial salmon harvest by species, 1975-2018 38
Figure 13. Marine protected Areas in Alaska. 264

1.2 List of Tables

Table 1. Relevant Alaska RFM program documents including applicable versions. 11
Table 2. Fishery Applicant details and key contact information. 12
Table 3. Unit of Assessment details. 13
Table 4. Unit of Certification details. 14
Table 5. Salmon species life-cycle, habitat and primary types of gear used by region. 15
Table 6. 2018 actual and forecasted harvests for the Alaska salmon commercial fishery [Region/Area,Species] (in 000's of fish). 52
Table 7. Alaska commercial salmon harvests (numbers and pounds) and ex-vessel values, 2018. 53
Table 8. Summary of Validation Assessment meetings, December 9-19 2019. 58
Table 9. Confidence ratings and conformance levels for each clause of the Alaska RFM Standard 61
Table 10. Stocks of concern thru 2011-2018 Board of Fish cycle 169
Table 11. Estimated production of pink and chum salmon in Prince William Sound. 176

2 Glossary

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.
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of the 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
IMS	Institute of Marine Sciences
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
IUCN	International Union of Conservation of Nature
KMA	Kodiak Management Area
KRAA	Kodiak Regional Aquaculture Association
KSMSC	Kodiak Seafood and Marine Science Centre
LCI	Lower Cooke Inlet
LLP	License Limitation Program
LOF	List of Fisheries
ISO	International Organization for Standardization

MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MSFCMA	Magnuson-Stevens Fisheries Management and Conservation Act
MT	Metric tons
MSY	Maximum Sustainable Yield
Ne	Effective Population
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPAFC	North Pacific Anadromous Fish Commission
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
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

This is the 2nd Reassessment Report (ref AK/SAL/003/2020) for the US Alaska Salmon Commercial Fisheries following original certification in March 11th, 2011.

The United States Alaska commercial salmon [all North American 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 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.

The reassessment was conducted according to the SAI Global procedures for Alaska RFM V2.0.

The assessment was conducted by a team of SAI Global appointed Assessors comprising of three externally contracted fishery experts and SAI Global internal staff (Appendix 1).

The Assessment Team recommends that the salmon fisheries reviewed be awarded continuing certification by the Alaska Responsible Fisheries Management Certification Program (Section 6 Assessment Outcome Summary).

3.1 Assessment Team Details

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

Dr. Ivan Mateo, Lead Assessor
SAI Global/Global Trust Certification Ltd.
Rhode Island, USA
Email: ivan.mateo@saiglobal.com

Scott Marshall, Assessor
Independent fishery expert
Eagle ID, USA

Dr. Brian Allee, Assessor
Independent fishery expert
Gilroy, California, USA.

Dr. Marc Johnson, Assessor
Independent fishery expert
Corvallis, Oregon, USA

3.2 Details of Applicable Alaska RFM Documents

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

Table 1. Relevant Alaska RFM program documents including applicable versions.

Document title	Version number, Issue Date	Usage
RFM Procedure 2: Application to Certification Procedures for the Alaska RFM Fishery Standard Version 2.0.	Version 5, January 2019	Process
Alaska Responsible Fisheries Management Certification Program Fisheries Standard.	Version 2.0, May 2018	Standard
Alaska Responsible Fisheries Management Certification Program Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska.	Version 2.0, May 2018	Guidance to Standard

4 Fishery Applicant Details

Table 2. Fishery Applicant 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		
Key Contact Name:		Julie Decker
Position:		Director
Address:	**Street:**	P.O. Box 2223
	City:	Wrangell
	State:	Alaska
	Country:	USA
	Zip code:	99929-2223
Phone:		907-276-7315
E-mail:		jdecker@afdf.org

5 Units of Assessment and Certification

5.1 Units of Assessment

The proposed Unit of Assessment for US Alaska Salmon Commercial Fishery is as described in Table 3 below.

Table 3. Unit of Assessment details.

Unit of Assessment 1 (of 1)		
Species:	**Common names:**	Chinook salmon Sockeye salmon Coho salmon Pink salmon Chum salmon
	Latin names:	*Oncorhynchus tschawytscha* *Oncorhynchus nerka* *Oncorhynchus kisutch* *Oncorhynchus gorbuscha* *Oncorhynchus keta*
Geographical areas:		ADFG Admin Region 1: Southeast ADFG Admin Region 2: Central ADFG Admin Region 3: Arctic-Yukon-Kuskokwim ADFG Admin Region 4: Kodiak, Chignik, Alaska Peninsula, Aleutian Islands
Stocks:		US Alaska Pacific Salmon stocks
Management system:		Alaska Department of Fish and Game (ADFG)
Fishing gear/methods:		▪ Troll ▪ Purse Seine ▪ Drift Gillnet ▪ Set Gillnet ▪ Fish wheel ▪ Beach seine ▪ Dip net
All eligible fishery participants:		Eligible fishery participants include all participants in the Alaska Salmon commercial fishery. The Alaska RFM program is built on the principle of 'One Fishery, One Certificate'; therefore, if the client group does not contain all eligible fishery participants the client group shall adhere to the certificate sharing requirements of the AKRFM program as appropriate.

5.2 Units of Certification

Based on the above Unit of Assessment, the Unit of Certification (i.e., what is covered by this fishery certificate) is as described in Table 4 below.

Table 4. Unit of Certification details.

Unit of Certification 1 (of 1)		
Species:	**Common names:**	Chinook salmon Sockeye salmon Coho salmon Pink salmon Chum salmon
	Latin names:	*Oncorhynchus tschawytscha* *Oncorhynchus nerka* *Oncorhynchus kisutch* *Oncorhynchus gorbuscha* *Oncorhynchus keta*
Geographical areas:		ADFG Admin Region 1: Southeast ADFG Admin Region 2: Central ADFG Admin Region 3: Arctic-Yukon-Kuskokwim ADFG Admin Region 4: Kodiak, Chignik, Alaska Peninsula, Aleutian Islands
Stocks:		US Alaska Pacific Salmon stocks
Management system:		Alaska Department of Fish and Game (ADFG)
Fishing gears/methods:		▪ Troll ▪ Purse Seine ▪ Drift Gillnet ▪ Set Gillnet ▪ Fish wheel ▪ Beach seine ▪ Dip net
Client group:		Alaska Fisheries Development Foundation (AFDF)

6 Background to the Fishery

6.1 Species Biology

The life histories of all Pacific salmon have been studied and reported on extensively. For the purpose of this 2nd Reassessment Report, Information was taken directly from the ADFG Wildlife Notebook series. A fundamental biological trait of Pacific salmon, with respect to how they are managed, is their anadromous life history: hatching in freshwater and migrating to the sea at various stages in development (species dependent) before returning to their natal stream to spawn. The following table provides a summary of the specific biology and life-cycle traits of each of the 5 species of salmon that are included in the assessment.

Table 5. Salmon species life-cycle, habitat and primary types of gear used by region.

Species	Life Cycle	Habitat/Feeding	Primary Gear Types by Region
Chinook/ King[1]	It is the largest of all Pacific salmon, with weights of individual fish exceeding 30 pounds. There is usually a single run from May to July. Each female deposits from 3,000 to 14,000 eggs in several redds, which she excavates in relatively deep, moving water. The eggs usually hatch in late winter or early spring, depending on time of spawning and water temperature. The newly hatched fish, called alevins, live in the gravel for several weeks until they wiggle up through the gravel by early spring. Most juvenile Chinook salmon remain in fresh water until the following spring when they migrate to the ocean in their second year of life. They are sexually mature from 2nd to 7th year.	Chinook is abundant from the south-eastern panhandle to the Yukon River. Major populations return to the Yukon, Kuskokwim, Nushagak, Susitna, Kenai, Copper, Alsek, Taku, and Stikine rivers. Redds are in relatively deep, moving water. Juvenile Chinook in fresh water feed on plankton, and then later eat insects. In the ocean, they eat a variety of organisms including herring, pilchard, sandlance, squid, and crustaceans. Chinook salmon grow rapidly in the ocean and often double their weight during a single summer season.	R1: Troll R2: Drift gillnet R3: Gillnet, fish wheel R4: Purse Seine
Chum/ Dog[2]	Chum salmon spawning is typical of Pacific salmon with the eggs deposited in redds located primarily in upwelling spring areas of streams. Female chum may lay as many as 4,000 eggs, but fecundity typically ranges between 2,400 and 3,100 eggs. After spawning in the fall, the salmon fry emerge in spring and move out to sea by fall. Most mature by 4 years age. There are a higher percentage of chums in the northern areas of the state. Chum varies in size from 4 to over 30 pounds, but usually range from 7 to 18 pounds, with females generally smaller than males.	Chum salmon are the most abundant commercially harvested salmon species in Arctic, north-western, and interior Alaska, but are of relatively less importance in other areas of Alaska. Chum salmon often spawn in small side channels and other areas of large rivers where upwelling springs provide excellent conditions for egg survival. Chum does not have a period of freshwater residence after emergence of the fry, as do Chinook, coho, and sockeye salmon. Chum fry feed on small insects in the stream and estuary before forming into schools in salt water where their diet usually consists of zooplankton	R1: Seine, gillnet R2: Seine, drift gillnet R3: Gillnet, fish wheel R4:Purse seine, gillnet

[1] http://www.adfg.alaska.gov/static/education/wns/chinook_salmon.pdf
[2] http://www.adfg.alaska.gov/static/education/wns/chum_salmon.pdf

Table 5. Salmon species life-cycle, habitat and primary types of gear used by region.

Species	Life Cycle	Habitat/Feeding	Primary Gear Types by Region
Coho/ silver[3]	Coho enter spawning streams from July to November. The female digs a nest, called a redd, and deposits 2,400 to 4,500 eggs. The eggs develop during the winter, hatch in early spring, and the embryos remain in the gravel utilizing their egg yolk until they emerge in May or June. They spend one to three winters in streams and may spend up to five winters in lakes before migrating to the sea as smolts. Adults usually weigh 8 to 12 pounds and are 24 to 30 inches long, but individuals weighing over 30 pounds have been landed.	Coho are found in coastal waters of Alaska from Southeast to Point Hope on the Chukchi Sea and in the Yukon River to the Alaska-Yukon border. Coho salmon enter spawning streams from July to November, usually during periods of high runoff. The emergent fry occupy shallow stream margins, and, as they grow, establish territories which they defend from other salmonids. They live in ponds, lakes, and pools within streams and rivers, usually among submerged, woody debris in quiet areas free of current from which they dart out to seize drifting insects.	R 1: Troll, gillnet, purse seine R2:Drift gillnet R3:Gillnet R4:Purse seine, gillnet
Pink/ humpback[4]	Pink salmon enter spawning streams between late June and mid-October and hatch mid- winter. Late winter or spring the fry swim up out of the gravel and migrate downstream into salt water. They mature in 2 years which means that odd-year and even year populations are essentially unrelated. The pink salmon is the smallest of the Pacific salmon found in North America with an average weight of about 3.5 to 4 pounds and average length of 20-25 inches.	Pink salmon are native to Pacific and arctic coastal waters from northern California to the Mackenzie River, Canada, and to the west from the Lena River in Siberia to Korea. Most spawn within a few miles of the coast and spawning in the intertidal zone or the mouth of streams is very common. Shallow riffles where flowing water breaks over coarse gravel or cobble-size rock and the downstream ends of pools are favored spawning areas. Following entry into salt water, the juvenile pink salmon move along the beaches in dense schools near the surface, feeding on plankton, larval fishes, and occasional insects.	R1: Purse seine R2:Purse seine, gillnet R3:Gillnet R4:Purse seine, gillnet
Sockeye/ red[5]	Eggs hatch during the winter, and the young sac-fry, or alevins, remain in the gravel, living off the material stored in their yolk sacs, until early spring. After hatching, juvenile sockeye salmon may spend up to four years in fresh water before migrating to sea. In systems with lakes, juveniles usually spend one to three years in fresh water before migrating to the ocean in the spring as smolts. However, in systems without lakes, many juveniles migrate to the ocean soon after emerging from the gravel and spend 1 – 4 years in the ocean before returning to spawn during summer	This species ranges south as far as the Klamath River in California and northern Hokkaido in Japan, to as far north as far as Bathurst Inlet in the Canadian Arctic and the Anadyr River in Siberia. Freshwater systems with lakes produce the greatest number. Spawning usually occurs in rivers, streams, and upwelling areas along lake beaches. At this time they emerge from the gravel as fry and move into rearing areas. In systems with lakes, juveniles usually spend one to three years in fresh water before migrating to the ocean in the spring as smolts.	R1: Gillnet, purse seine R2: Gillnet R3: Gillnet R4: Purse seine, gillnet

[3] http://www.adfg.alaska.gov/static/education/wns/coho_salmon.pdf
[4] http://www.adfg.alaska.gov/static/education/wns/pink_salmon.pdf
[5] http://www.adfg.alaska.gov/static/education/wns/sockeye_salmon.pdf

Table 5. Salmon species life-cycle, habitat and primary types of gear used by region.

Species	Life Cycle	Habitat/Feeding	Primary Gear Types by Region
	months. Returning adults usually weigh between 4 and 8 pounds, although weights in excess of 15 pounds have been reported.		

Note, gillnet may include both drift and set net (unless type is specified i.e. drift gillnet).

6.2 Fishery Location and Methods

ADFG divides the salmon fisheries geographically, for management purposes, into four major fishery management regions: R1-Southeast, R2-Central, R3-Arctic-Yukon-Kuskokwim, and R4-Westward (Figure 1). ADFG staff based in each region is assigned responsibility for in-season management of salmon fisheries. Within each of these regions, there are a series of Management Areas, with one or more Area Management Biologists assigned to each. Management Areas are further divided into Districts, which represent watersheds and coastlines, that can extend well into the marine environment for certain fisheries such as troll fisheries (Appendix 5: Figures 1-17):

- Region 1. Southeast Alaska/Yakutat (Fig. 1: Juneau and Northern Southeast Alaska Area, Fig. 2: Ketchikan and Southern Southeast Alaska Areas, Fig. 3: Sitka & Central Southeast Alaska Areas, Fig. 4: Yakutat &NW Southeast Alaska Areas)
- Region 2. Central (Fig. 5: Prince William Sound, Fig. 6: Cook Inlet and Fig. 7: Bristol Bay Areas).
- Region 3. Arctic-Yukon-Kuskokwim (Fig. 8: Kotzebue, Fig. 9: Norton Sound-Port Clarence, Fig. 10: Yukon Northern, Fig. 11: Upper Yukon, Fig. 12: Lower Yukon and Fig. 13: Kuskokwim Areas).
- Region 4. Westward (Fig. 14: Kodiak, Fig. 15: Aleutians, Fig. 16: Chignik Areas and Fig. 17: Peninsula Area).

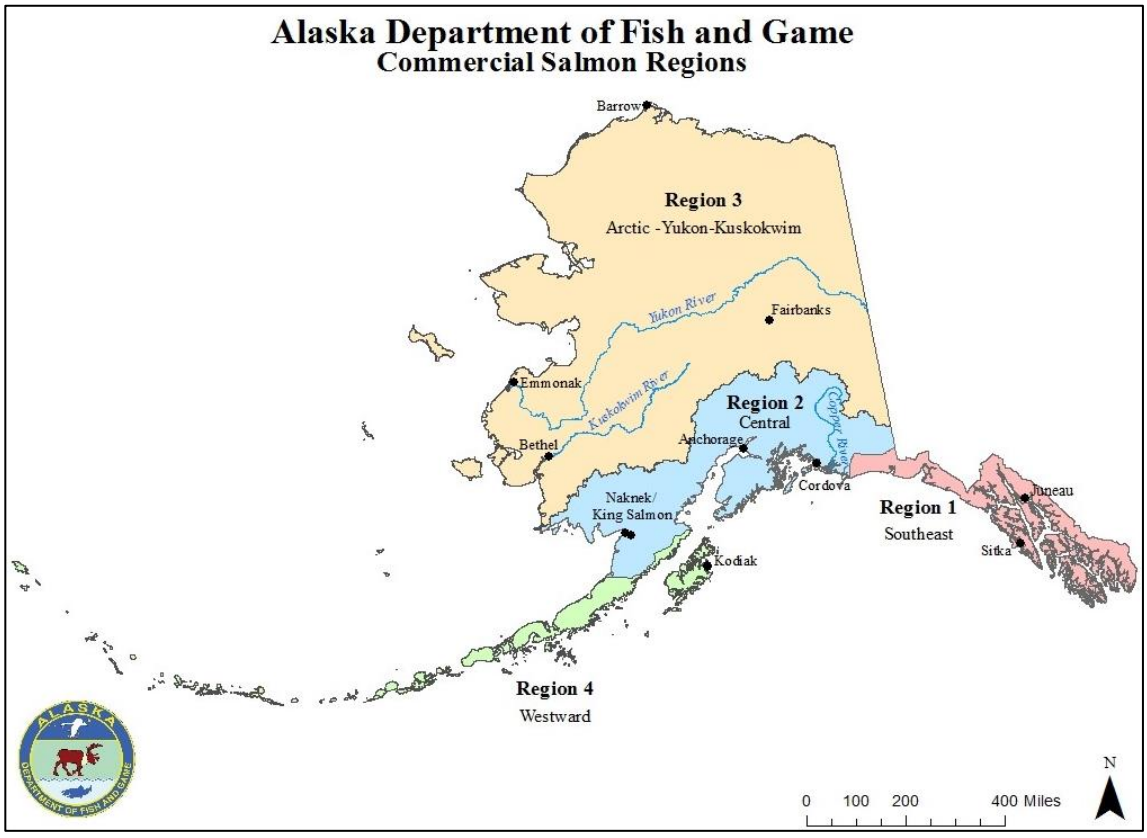

Figure 1. ADF&G Fishery management regions (Southeast, Central, Arctic-Yukon-Kuskokwim, and Westward).

Salmon are harvested commercially in each ADFG Regulatory area mainly through the use of purse seine, gillnet (set or drift gillnet), and troll gear. All gear types are managed through state statutes and regulations that specify design and deployment, which are often specific to individual regions and areas. Regulations for each region are readily available to all fishers and the general public at each area office of ADFG and AWT as well as online[6].

Fishing Methods

Purse Seining

Purse seiners[7] (Figure 2) catch salmon, primarily pink salmon, by encircling them with a long net and then drawing (pursing) the bottom closed to capture them. Alaska laws limit the length of purse seiners to 58 feet to help manage fishing effort. The net is first stacked on the stern of the purse seiner and then deployed into the water while the boat travels in a large circle around the fish. The far end of the net is attached to a power skiff, which helps the seiner complete the circle. The top of the net stays on the surface of the water because of the float line (comprised of colored floats) and the bottom of the net falls vertically because of its weighted lead line. A series of metal rings are attached to the bottom of the net, and a purse line passes through all of them. When the power skiff returns the end of the net to the seiners, the purse line is pulled, which draws the rings close to one another and closes the bottom of the net so that the fish cannot escape. The lines and the net are then pulled in with a hydraulic power block (winch). Once most of the net has been retrieved, with the remainder of it lying in a *bag* alongside the vessel, the fish are dipped from the bag and into the vessel hold. Directed purse seine fisheries for Alaska salmon occur in fisheries in Southeast, Prince William Sound, Lower Cook Inlet, Kodiak, Chignik, Alaska Peninsula and the Aleutian Islands.

Figure 2. Purse seiner.

Gill netting (Set and Driftnets)

Gillnetters (Figure 3) catch salmon, primarily sockeye, chum, and coho salmon, by setting curtain-like nets perpendicular to the direction in which the salmon are travelling as they migrate along the coast toward their natal streams[8]. To keep it suspended vertically in the water, the net has a floatline (headline) on the top and a weighted lead line (foot rope) on the bottom. Gillnets are either drifted or set.

[6] http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial
[7] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/whatkindofboat_cf.pdf
[8] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/whatkindofboat_cf.pdf

The mesh material is multifilament nylon, and mesh size is designed to allow the targeted species to only get their head through the mesh, but not their body. The salmon's gill covers (operculum) get caught in the mesh as the fish tries to swim free. Gillnets work best in silty or turbid water, which makes them difficult for the fish to see, and mesh material can be ordered in various colors to make the net harder to see under various conditions. Gillnet vessels are usually 30 to 40 feet long. However, Alaska laws limit vessel length for Bristol Bay salmon fisheries to 32 feet. Net retrieval is accomplished by using hydraulic power to wind the gillnet around a drum located on either the bow or stern of the boat. Fish are removed from the net by hand, collecting them from the mesh as the net is reeled on-board. Driftnets have a floatline on the top and a weighted lead line on the bottom to hold them vertical in the water. These nets must be connected to the fishing vessel, which cannot be anchored or grounded.. Set-netting is a small scale type of gillnetting done by hand (without hydraulic power), from a skiff or from shore, often by local families. Net are fixed in place with anchors. Skiffs are used to set nets, with one end fixed on shore, the other anchored offshore. Gillnet fisheries occur in all regions.

Figure 3. Gillnetter[9].

Trolling

Troll vessels (Figure 4) catch salmon, principally Chinook and coho salmon, by dragging (trolling) bait or lures through feeding concentrations of salmon[10]. Typically, four to six main wire lines are fished, each of which may have up to a 60 pound lead or cast iron sinker (*cannon ball*) on its terminal end, and 8 to 12 nylon leaders spaced out along its length, each of which ends in either a lure or baited hook. To retrieve hooked fish, the main lines are wound about small, on-board spools via hand crank (hand trollers) or with hydraulic power (power trollers), and large salmon are gaffed when alongside the vessel to bring them aboard. The Alaska salmon troll fishery occurs only in Region 1.

[9] http://www.cf.adfg.state.ak.us/geninfo/pubs/pubshome.php#vessels
[10] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/whatkindofboat_cf.pdf

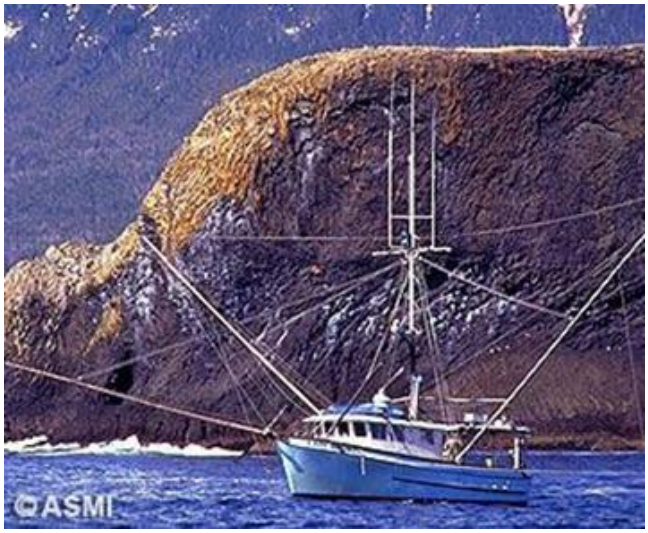

Figure 4. Salmon troller[11].

All Alaska salmon fisheries are based on the seasonal migrations of the different salmon species returning to Alaska. A descriptive figure (Figure 5) is provided below.

Salmon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chinook												
Sockeye												
Coho												
Pink												
Chum												

Figure 5. Seasonality of Alaska salmon runs[12].

6.3 Fishery Management History and Organization

Commercial salmon fishing in Alaska began in the 1880s[13]. These harvests were primarily salted until canning became predominant at the turn of the century. After Alaska was purchased by the United States in 1867, the U.S. federal government had jurisdiction over these fisheries and the White Act, passed in 1924, required a closure of each fishery after the halfway point of the targeted run was reached. At that time, much of the catch was taken in large fish traps and federal management was ineffectively enforced and poorly funded. Consequently, the salmon fisheries were managed for maximum economic return and there were few conservation-based input or output controls.

After World War II, at the request of the salmon processing industry, W. F. Thompson of the University of Washington began investigations of salmon and the salmon management program in Alaska. After Statehood in 1959, ADFG implemented an escapement goal-based salmon fisheries management system using principles laid out by W. F. Thompson and his students. Principally, it is this science-based management system that remains in place today (Woodby *et al.*, 2005).

[11] http://www.cf.adfg.state.ak.us/geninfo/pubs/pubshome.php#vessels.
[12] http://www.alaskaseafood.org/the-catch/seasonality/
[13] http://www.adfg.alaska.gov/FedAidpdfs/Sp05-09.pdf

Consequently, Alaska's salmon fisheries have been rebuilt from the low levels that prevailed at the end of the territorial period to the highest level of sustained production recorded since commercial fishing began in 1878 (ADFG). The management system, using both federal and state statutes (laws), provides authority to local area biologists to manage the salmon resources in an effective decision-making manner, based on real time information. This allows fishing opportunities to be maximized, without compromising the over-riding policies of sustained use and conservation.

It is the combination of local authority and a transparent, accessible overarching legal framework (which includes: comprehensive research, analysis, and planning; plus effective stakeholder participation) that makes the management of Alaska salmon fisheries both effective and successful.

The historical harvest of Alaska salmon clearly shows the impact of input controls (limited entry in 1978) on the progressive development of the fishery (Figure 6)[14]. Average catches over the last 5 years have been 199 million fish compared to catches of about 20 million fish in the early 1970s.

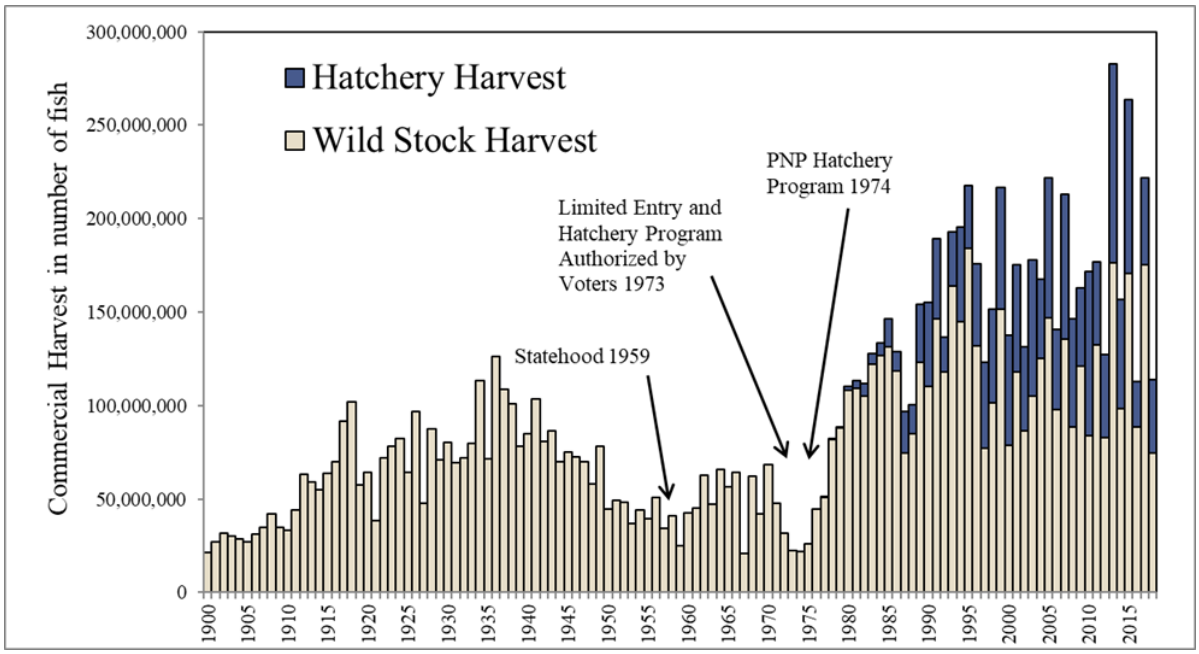

Figure 6. Alaska commercial salmon catch for all species combined, 1900-2018.

The 2018 Alaska commercial salmon fishery all species harvest was approximately 114.5 million fish with an estimated preliminary ex-vessel value of $595.2 million, a 13% decrease from the 2017 value of $685.0 million[15]. Sockeye salmon accounted for 59 percent of total value at $349.2 million and 44 percent of total harvest at 49.9 million fish. Chum salmon were the second most valuable species comprising 21 percent of total ex-vessel value at $125.0 million and 18 percent of total harvest at 20.1 million fish. Pink salmon represent approximately 12 percent of total value at $69.2 million, and 36 percent of total harvest at 40.7 million fish. Coho salmon account for approximately 6 percent of total value at $35.5 million and 3 percent of total harvest at 3.6 million fish. The Chinook salmon harvest was estimated at 234,614 fish with an estimated preliminary value of $16.3 million. Estimates of value are based on preliminary ex-vessel prices and do not include any post-season adjustments paid to fishermen.

[14] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch
[15] https://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr&release=2018_11_02

In terms of pounds of fish, the all species salmon harvest of 605.1 million pounds ranks 34th in the 1975-2018 time series, with chum salmon harvest ranking 8th, sockeye salmon harvest ranking 13th, coho salmon harvest ranking 31st, and pink salmon harvest ranking 39th in the 1975-2018 time series. Total harvest value for Chinook salmon in 2018 was the lowest since limited entry began in 1975.

Alaska's fisheries management system can be described as organized and has served well for over five decades, as demonstrated by the sustainability of Alaska's salmon harvests. The BOF sets harvest policies, regulations, and allocations, and ADFG conducts biological research and management enforcing the BOF's decisions.

The dominant goal is the salmon harvest policy known as "fixed escapement". This means that management's first priority is to ensure that sufficient numbers of adult spawning salmon escape capture in the fishery and are allowed to spawn in the river systems, thus maintaining the long-term health of the stocks. All human uses of salmon, especially commercial fishing, are subordinate to this guiding principle. Because of the natural variability of environmental conditions (i.e. Pacific Decadal Oscillation, El Niño, etc.) the total number of adult salmon returning to spawn varies considerable each year. In order to achieve spawning goals, which are set within a range, the commercial harvest also fluctuates from year to year.

State and Federal Management Regimes

Article VIII of the Alaska Constitution is dedicated to natural resources. In 1973, the Alaska legislature passed a bill creating the first comprehensive limited entry program for commercial fisheries in the United States. The limited entry program implemented for commercial salmon fisheries in Alaska stabilized the number of fishermen and, therefore, the amount of gear used in each of the State's salmon fisheries. Furthermore, the 1985 Pacific Salmon Treaty (PST) established an International management regime designed to rebuild some salmon stocks, limit harvests in specific fisheries, and define equitable allocations between U.S and Canadian fishermen (Woodby 2005). In 1976, Congress adopted the Magnuson-Stevens Fisheries Management and Conservation Act (MSFCMA). This legislation extended U.S. control of its fishery resources from 3 miles offshore to 200 miles offshore. The high seas harvest of Alaskan salmon stocks was substantially reduced immediately after passage of the MSFCMA.

Authority for the management of the subsistence and commercial salmon fisheries of Alaska was primarily vested with ADFG, Division of Commercial Fisheries at statehood. The Alaska Board of Fish and Game and later the BOF, was formed in 1975. The BOF is a citizen based organization, with members appointed by the governor and confirmed by the legislature, responsible for considering and adopting regulations to allocate resources among user groups as well as to establish fish reserves and conservation areas, fishing seasons, quotas, and bag limits size restrictions, means and methods, habitat protection, stock enhancement; and to develop commercial, subsistence, sport and personal use fisheries (AS 16.05.251). Since the BOF is tasked with resolving fisheries disputes by making politically charged decisions on allocation, ADFG is able to concentrate its efforts on management and conservation decisions. Additionally, the BOF forms Advisory Committees (ACs) throughout the state, composed of local residents, that provide management recommendations, which the BOF is not required to adopt (AS 16.05.260) The operation and functioning of the ACs are defined by regulations (AAC 5 Chapters 96 – 97). These ACs serve as a forum to bring individuals, agencies, and interested organizations together to review important fish and game resource matters. These forums not only provide an opportunity for collaboration and communication, keystones to forging regulatory change with the boards, but serve to strengthen relationships among each of these parties in their work to improve Alaska's fish and game resources[16].

[16] www.adfg.alaska.gov/static-f/regulations/regprocess/pdfs/acmanforms/ac_process_brochure_2014.pdf

6.3.1 ADFG and Board of Fisheries (BOF) Functions

ADFG Commercial Fisheries Division Functions

ADFG is organized into a series of Divisions with specific but often interrelated management functions. The Division responsible for the management and conservation of Alaska's commercial fisheries is the Commercial Fisheries Division. Key functions include:

- Stock Assessment & Applied Research: Maintain and improve ongoing programs and develop new programs for the enumeration, assessment, and understanding of salmon stocks. The Division also operates several large vessels to support management and research functions
- Harvest Management: Control the harvest of fishery resources for subsistence, commercial, and personal uses according to plans and regulations.
- Laboratory Services: Operate three fisheries laboratories for genetic identification, fish pathology, and ageing/tagging research.
- Aquaculture Permitting: Permit and provide regulatory, technical, and planning services to aquatic farmers and private non-profit hatchery operators.
- Information Services and Public Participation: Develop and maintain dissemination of data, analyses, and published reports. Involvement of the public in management of fish and wildlife resources. Optimize public participation in fish and wildlife pursuits.

The Division of Commercial Fisheries operates 23 area offices, which are organized into four regions and staffed with area management biologists. These area management biologists are provided with fishery management authority to address the rapidly changing in season fishery management needs of the salmon fisheries in Alaska.

In 2000, the Policy for the Management of Sustainable Salmon Fisheries (MSSF) was adopted into state regulation (5 AAC 39.222). The landmark policy updates and strengthens long-standing principles of Alaska's salmon management program. Most importantly, it directs ADFG and the BOF to follow a systematic process for evaluating the health of salmon stocks throughout the state by requiring ADFG to provide the BOF, in concert with its regulatory cycle, reports on the status of salmon stocks and fisheries under consideration for regulatory changes. The policy also defined a new process for identifying stocks of concern (stocks which have not met escapement goals or yield expectations), and requires ADFG and the BOF to develop action plans to rebuild these stocks through the use of management measures, improved research, and restoring and protecting habitat.

Three levels of concern are identified: (1) a yield concern, which is the least severe and results from the inability to maintain expected harvest levels over a 4- to 5-year period; (2) a management concern, which results from the inability to maintain escapements within escapement goal ranges over a 4- to 5-year period despite the use of management measures; (3) a conservation concern, which is the most severe and results from the inability to maintain escapements above a minimum threshold, below which the stock's ability to sustain itself is jeopardized, over a 4- to 5-year period. Escapement goals are classified as either "biological escapement goals," which are scientifically-based and represent the escapement estimated to provide the greatest potential for maximum sustained yield, or "sustainable escapement goals," which represent an escapement level that is known to provide for sustained yield over a 5- to 10-year period.

The NPFMC has developed a management plan for salmon caught in waters from 3 to 200 miles offshore of Alaska, and the NMFS delegated authority to manage salmon fisheries in this area to the State of Alaska (Clark *et al.*, 2006). The NPFMC is kept informed of the state of these fisheries and can amend the FMP for salmon when necessary. The NPFMC has deferred regulation of the commercial troll and recreational salmon fisheries in the Exclusive Economic Zone (EEZ) to ADFG since almost all fishing takes place in state managed waters. The Council reserves the right to specify management measures applicable to the EEZ that differ from those of the State, if it

deems State actions to be inconsistent with this FMP or the MSA. However, ADFG remains the principal management organization for Alaska salmon fisheries.

The Board of Fisheries (BOF)

The BOF's main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, as well as setting policy and direction for management of the state's fishery resources. The BOF is charged with making allocative decisions, while ADFG is responsible for management based on those decisions.

The BOF consists of seven members serving three-year terms. Members are appointed by the Governor of Alaska, and, confirmed by the State Legislature (Figure 7). Members are appointed on the basis of interest in public affairs, good judgment, knowledge, and ability in the field of action of the BOF, with a view to providing diversity of interest and points of view in the membership.

The BOF meets four to six times per year in communities around the state, to consider proposed changes to fisheries regulations. To create regulations that are sound and enforceable, the BOF uses biological and socioeconomic information provided by ADFG, public comments received from people inside and outside of the state, and guidance from the Alaska Department of Public Safety and Alaska Department of Law.

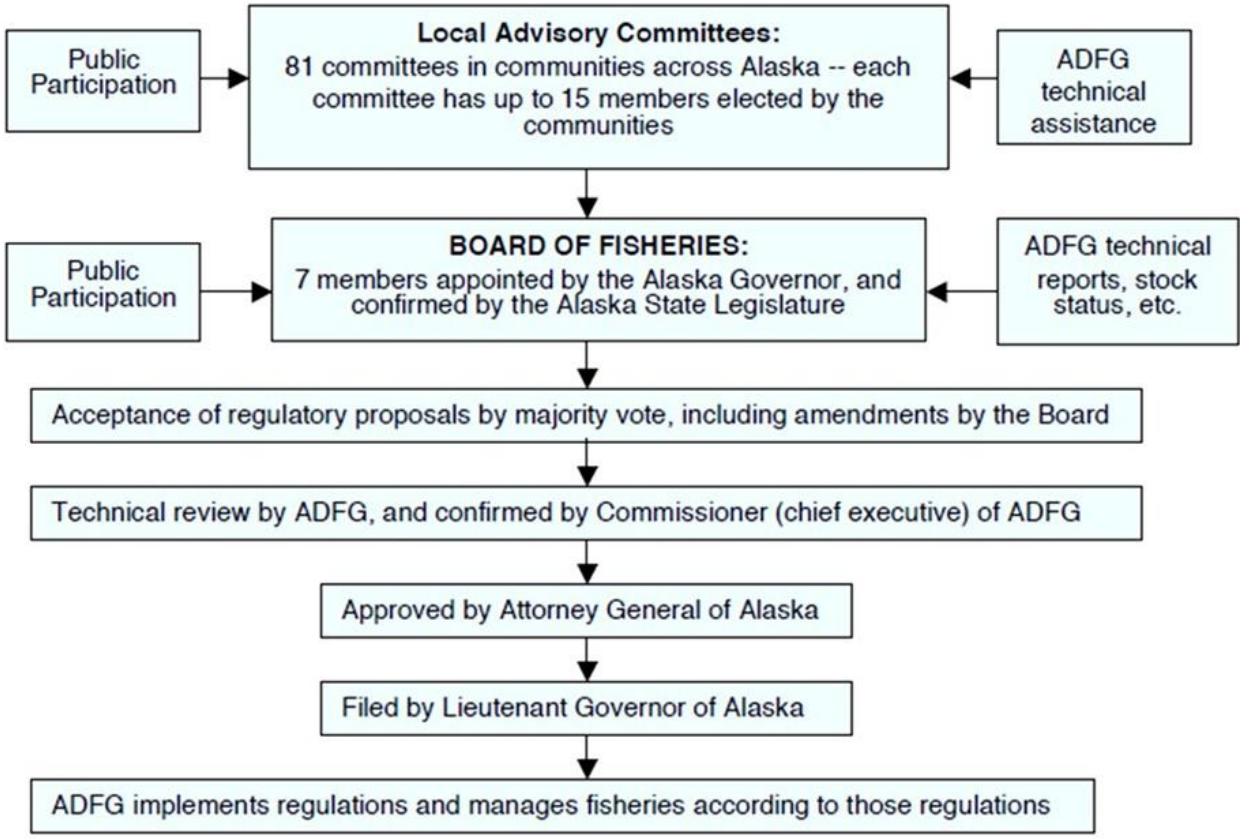

Figure 7. Functional management process of the Alaska salmon fishery**.**

The BOF's decision making process is considered to be public and transparent. For example, members of the public can attend the meetings and, if desired, state their concerns and opinions on regulatory proposals to the BOF through a defined and accessible process.

Four to six BOF meetings generally occur from October to March in communities throughout Alaska. Proposals for commercial, sport, guided sport, personal use, and subsistence fisheries within each fishery area are taken up for consideration by the BOF on a three-year cycle. There are also procedures for the BOF to consider out-of-cycle proposals under certain guidelines (AAC 39.999) and subsistence proposals (5 AAC 96.615 (a)) for topics not covered by the notice soliciting proposals. Additionally, any proposal submitted by the NMFS will be considered during a current meeting cycle (5 AAC 39.999 Policy Changing Board Agenda (3) (b)

6.3.2 Coastal Management Framework for Alaska Salmon Habitat Conservation

Management of coastal resources within the Alaskan EEZ is governed by a framework of policies, regulations, statutes and laws which aim to achieve sustainable and integrated use of living marine resources. Multiple State and federal agencies are involved in coastal zone decision-making processes and activities of relevance to the BSAI crab fishery resource and its users. The system takes into account the fragility of coastal ecosystems, the finite nature of their natural resources and the needs of coastal communities. Further, it supports sustainable and integrated use of living marine resources and avoids conflict among users.

Salmon fisheries are managed by the State (ADF&G) with Federal oversight by the NMFS and NPFMC[17]. As Federal agencies, NMFS and NPFMC participate in coastal area management-related institutional frameworks through the federal National Environmental Policy Act (NEPA) process[18]. In addition to NMFS and NPFMC, a number of other State and Federal entities participate in coastal zone processes to ensure sustainable and integrated use of living marine resources. Some of the most important entities - together with a brief description of their role in managing coastal resources within the EEZ of Alaska are presented below.

Alaskan Department of Environmental Conservation (ADEC)[19]

ADEC implements statutes and regulations affecting air, land and water quality and is the lead state agency charged with implementing the federal Clean Water Act.

Alaska Department of Fish and Game (ADFG)[20]

ADFG has jurisdiction over the mouths of designated anadromous fish streams and legislatively designated state special areas (critical habitat areas, sanctuaries, and refuges). Some marine species also receive special consideration through the State's Endangered Species program.

Alaskan Department of Natural Resources (ADNR)[21]

ADNR manages all state-owned land, water, and natural resources (except for fish and game), and uses the state Endangered Species Program to preserve the habitats of species threatened with extinction.

ADNR Office of Project Management and Permitting (OPMP)[22]

The OPMP coordinates the review of larger scale projects in the state such as transportation, oil and gas, mining, federal grants, ANILCA coordination (ANILCA = Alaska National Interest Lands Conservation Act), and land use planning.

[17] http://www.npfmc.org/
[18] https://www.epa.gov/nepa/national-environmental-policy-act-review-process
[19] https://dec.alaska.gov/
[20] http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main
[21] http://dnr.alaska.gov/commis/opmp/
[22] http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf

U.S. Fish and Wildlife Service (USFWS)[23]

The USFWS fulfills functions including enforcement of federal wildlife laws, protection of endangered species, restoration of nationally significant fisheries and conservation and restoration of wildlife habitat. Additionally, the USFWS distributes monies collected through the Sport Fish and Restoration Program to State fish and wildlife agencies for fishery projects, boating access and aquatic education.

Bureau of Ocean Energy Management (BOEM)[24]

The BOEM is responsible for managing environmentally and economically responsible development and provide safety and oversight of the offshore oil and gas leases. The activities of BOEM overlap extensively with those of ADNR, ADFG and ADEC given the potential impacts of such activities on marine resources.

Alaska has institutional and legal frameworks that determine the possible uses of coastalresources, govern access to them and take into account the rights of coastal fishing communities and their customary practices when doing so. The management framework explicitly recognizes and accounts for the rights of people dependent on marine fishing through NPFMC process, and BOF process, aswell as allowances for subsistence fisheries in Alaskan waters and consultation with tribes and Native corporations.

6.3.3 Federal Subsistence Management Program

The Federal Subsistence Management Program is a multi-agency effort to provide the opportunity for a subsistence way of life to rural Alaskans on Federal public lands and waters while maintaining healthy populations of fish and wildlife [25]. Subsistence fishing and hunting provide a large share of the food consumed in rural Alaska. Nowhere else in the United States is there such a heavy reliance upon wild foods.

This dependence on wild resources is cultural, social and economic. Alaska's indigenous inhabitants have relied upon the traditional harvest of wild foods for thousands of years and have passed this way of life, its culture, and values down through generations. Subsistence has also become important to many non-Native Alaskans, particularly in rural Alaska.

The Alaska National Interest Lands Conservation Act (ANILCA), passed by Congress in 1980, mandates that rural residents of Alaska be given a priority for subsistence uses of fish and wildlife. In 1989, the Alaska Supreme Court ruled that ANILCA's rural priority violated the Alaska Constitution. As a result, the Federal government manages subsistence uses on Federal public lands and waters in Alaska-about 230 million acres or 60 percent of the land within the state. To help carry out the responsibility for subsistence management, the Secretaries of the Interior and Agriculture established the Federal Subsistence Management Program

The program provides for public participation through the Federal Subsistence Board and 10 Regional Advisory Councils. The Board is the decision-making body that oversees the program. It is made up of the regional directors of the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, U.S. Forest Service and there are three public members appointed by the Secretaries of the Interior and Agriculture; two represent rural subsistence users and one is the Federal Subsistence Board chairman. The Regional Advisory Councils provide recommendations and information to the Board; review proposed regulations, policies and management plans; and provide a public forum for subsistence issues. Each Council consists of residents who are knowledgeable about subsistence and other uses of fish and wildlife resources in their region.

[23] http://www.fws.gov/help/about_us.html
[24] http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf
[25] https://www.doi.gov/subsistence

Another important element of the Federal Subsistence Management Program is fisheries research and monitoring. The Fisheries Resource Monitoring Program supports and funds research and monitoring projects that provide information needed for subsistence fisheries management and to ensure that regulatory decisions are based upon sound science. The Federal Subsistence Board, Regional Advisory Councils and fishery managers use this information when making regulatory decisions. Projects funded by the program are carried out by numerous organizations, including the State and Federal government agencies, universities, Alaska Native and rural organizations, and private contractors.

6.4 Overview of the Alaska Salmon Hatchery Program

6.4.1 Alaska Salmon Hatchery Program History

Alaska's modern hatchery program began in 1971, when the Alaska Legislature established the Division of Fisheries Rehabilitation, Enhancement and Development (FRED) within the Alaska Department of Fish and Game (ADF&G)[26] (Stopha,2019). Alaska's modern hatchery program was developed in response to historically low salmon abundance in the early 1970s (Figure 6). In 1972, Alaska voters amended Article 8, section 15 of Alaska's Constitution to provide tools forrestoring and maintaining the state's fishing economy. The amendment provided an exemption to the "no exclusive right of fishery" clause in the state constitution, enabling limited entry to Alaska's state fisheries and allowing broodstock and cost-recovery harvest for hatcheries. Alaska's salmon hatchery program developed under this authority and was designed to supplement—notreplace—sustainable natural production. Alaska's salmon fishery harvests were just 22 million fish in 1973 and 1974 (Figure 6).

In 1974, the Alaska Legislature expanded the hatchery program, authorizing private nonprofit (PNP) corporations to operate salmon hatcheries[27]:

> *"It is the intent of this Act to authorize the private ownership of salmon hatcheries by qualified nonprofit corporations for the purpose of contributing, by artificial means, to the rehabilitation of the state's depleted and depressed salmon fishery. The program shall be operated without adversely affecting natural stocks of fish in the state and under a policy of management which allows reasonable segregation of returning hatchery-reared salmon from naturally occurring stocks.This means that PNP hatcheries have a fishery enhancement objective and hatchery permits are issued for production-scale hatcheries".*

Salmon fishery restoration efforts came in response to statewide annual salmon harvests of just 22 million fish in 1973 and 1974, among the lowest catches since 1900 (Figure 6). The FRED Division, PNP hatcheries, and other agencies such as the US Forest Service, engaged in a variety of activities to increase salmon production. New hatcheries were built to raise salmon. Fish ladders were constructed around barriers to provide adult salmon access to new spawning and rearing areas. Lakes with waterfall outlets too high for adult salmon to ascend were stocked with salmon fry. Log jams were removed in streams to enable returning adults to reach spawning areas. Nursery lakes were fertilized to increase the available feed for juvenile salmon.

A combination of favorable environmental conditions, limited fishing effort, abundance-based harvest management, habitat improvement and protection, and hatchery production gradually boosted salmon catches, with recent commercial salmon harvests (2008–2018) annually averaging 177 million fish[28]—an increase of 800% from the 1973 and 1974 harvests. Alaska's hatchery program has produced significant contributions to the fisheries alongside sustainable, healthy, well-managed wild production. The 5 largest wild stock harvests in Alaska history occurred, in order of descending rank, in 1995, 2013, 2017, 2015 and 1993.

The State of Alaska funded the construction of 18 hatcheries between 1969 and 1983 with general obligation bonds. The hatcheries were initially operated by ADF&G FRED Division. PNP corporations began building hatcheries in the mid-1970s. In 1988, the legislature passed an act that allowed state hatcheries to be operated by PNP hatchery corporations (AS 16.10.480). Since then, all state-owned commercial production hatcheries still in operation have been contracted to PNP hatchery operators. The PNP corporations hold their own hatchery permits to operate the facilities and are responsible for funding hatchery operations. Two sport fish hatcheries continue under state operation.

[26] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[27] Alaska Leg. 1974. Act authorizing the operation of private nonprofit salmon hatcheries. Sec. 1, Chapter 111, SLA 1974, in the Temporary and Special Acts.
[28] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery

Altogether, a total of 28 production hatcheries and 1 research hatchery are currently operating in Alaska (Figure 8). Of these, PNPs operate 25 of the hatcheries: 11 facilities owned by the state and 14 owned by PNPs. ADF&G Division of Sport Fish operates 2 additional state-owned hatcheries in Anchorage and Fairbanks. The Metlakatla Indian Community on the federal Annette Islands Reserve south of Ketchikan operates Tamgas Creek Hatchery. The National Marine Fisheries Service operates a federal research hatchery at Little Port Walter in lower Chatham Strait in Southeast Alaska. An additional 5 PNP hatchery facilities are permitted but currently inactive: Gunnuk Creek Hatchery (Kake), Perry Island Hatchery (Prince William Sound), Bell Island Hatchery (Southern Southeast Alaska), Eklutna Hatchery (Eklutna) and Haines Projects Sites (Haines).

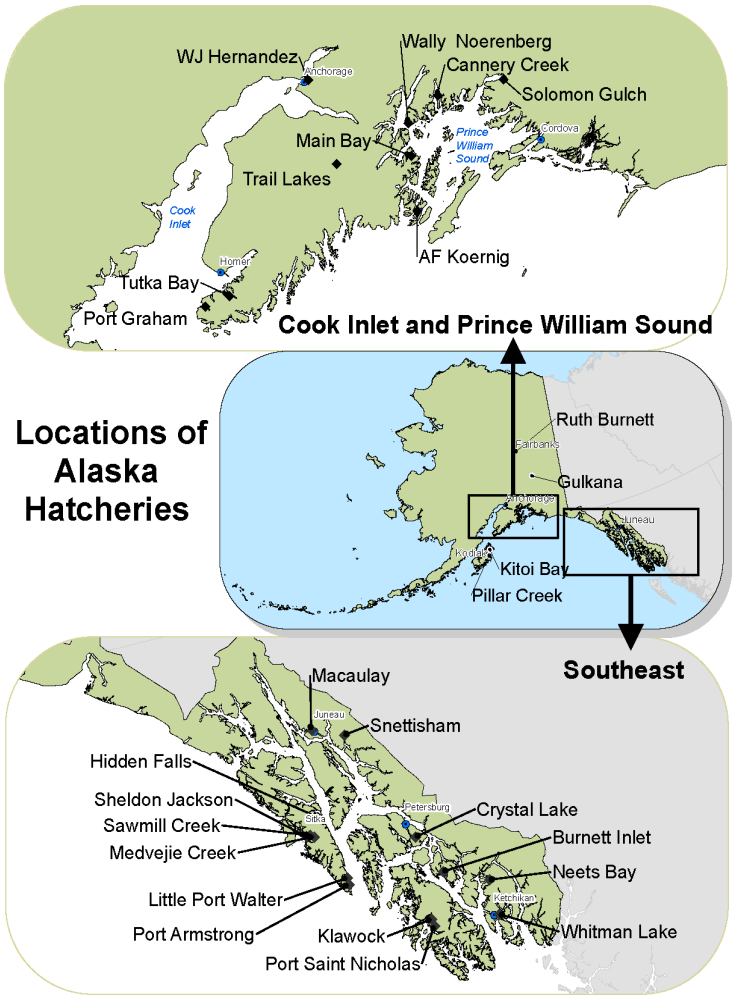

Figure 8. Salmon hatcheries currently operating in Alaska.

6.4.2 Alaska Salmon Hatchery Program Description

In Alaska, salmon may be propagated under only 2 types of permits: a PNP salmon hatchery permit and a fish resource permit (Stopha, 2019)[29] . Fish resource permits have a scientific or educational objective. Fish resource permits are issued for small-scale production, including salmon research, feasibility studies for potential PNP hatchery production, vocational programs, and the extensive salmon in the classroom program conducted in schools across the state. PNP hatchery permits have a fishery enhancement objective and are issued for production-scale hatcheries.

[29] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf

The purpose of PNP salmon hatcheries is to supplement the harvest of natural stocks for public benefit. Hatcheries are efficient at improving survival from the egg to juvenile stage compared to survival in the wild. For example, estimates for pink salmon *Oncorhynchus gorbuscha* egg-to-fry survival in 2 Southeast Alaska creeks ranged from less than 1% to 22%, with average survivals from 4% to 9% (Groot and Margolis 1991). Under hatchery conditions, egg-to-fry survival is usually 90% or higher.

Alaska hatcheries do not grow fish to adulthood, but instead incubate fertilized eggs and release resulting progeny as juveniles (i.e., fry or smolt). Juvenile salmon imprint on the release site and return to the release location as mature adults. By state policy, hatcheries generally use stocks taken from close proximity to the hatchery so that any straying of hatchery returns will have similar genetic makeup as the stocks from nearby streams. In addition, Alaska hatcheries do not selectively breed. Large numbers of broodstock are used for gamete collection to maintain genetic diversity, without selection for size or any other characteristic. The production level at a hatchery is limited by the hatchery's available freshwater capacity and freshwater rearing space. Soon after emergence from the egg, pink and chum salmon *O. keta* fry can be transferred from fresh water to salt water and released.

Most Chinook *O. tshawytscha*, sockeye *O. nerka*, and coho *O. kisutch* salmon stocks must spend a year or more in fresh water while fry develop to the smolt stage and can tolerate salt water, which makes them much more expensive to rear. They require a higher volume of fresh water, a holding area for freshwater rearing, and feeding.

There are economic tradeoffs between the costs of production versus the value of fish at harvest. Although Chinook, sockeye, and coho salmon usually garner higher prices per pound at harvest, chum and pink salmon are more economical to rear and generally provide a higher economic return on production cost

Pink salmon have the shortest life cycle of Pacific salmon (2 years), provide a quick return on investment, and provide the bulk of Alaska hatchery production. From 2009 to 2018, pink salmon accounted for an annual average 73% of Alaska hatchery salmon returns by number, followed by chum (21%), sockeye (4%), coho (2%) and Chinook salmon (<1%) (Figure 9).

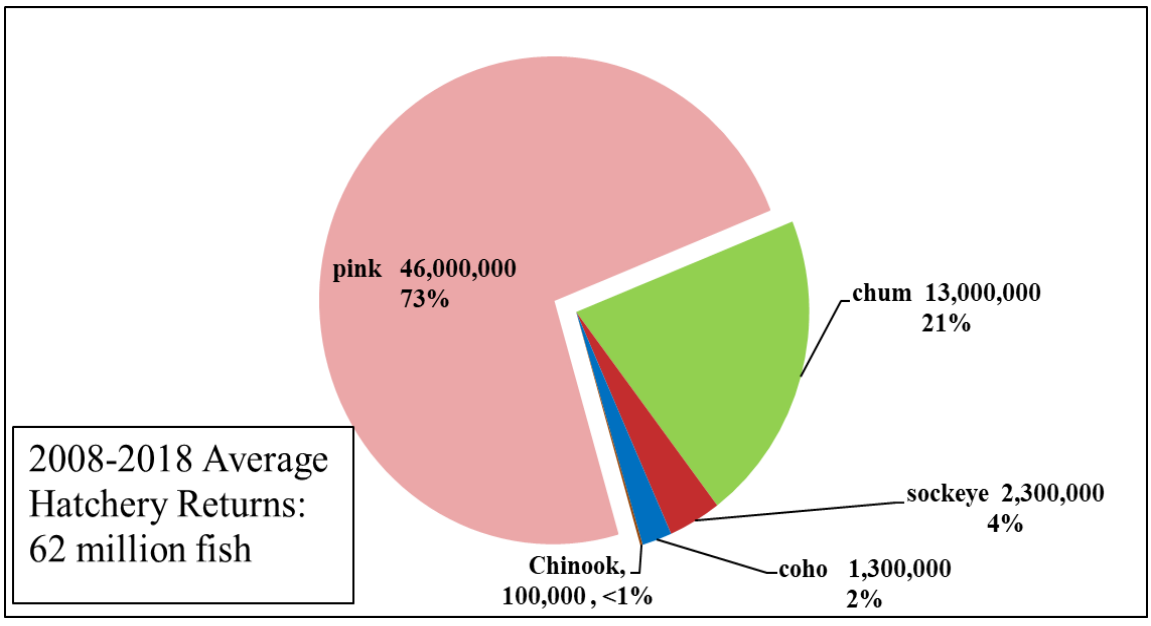

Figure 9. Annual average Alaska hatchery production by species: 2008-2018.

6.4.3 Alaska Hatchery Policies

Numerous Alaska mandates and policies for hatchery operations were specifically developed to minimize potential adverse effects to wild stocks. Through a comprehensive permitting and planning process, PNP hatchery operations are subject to continual review by ADF&G staff.

The ADF&G *Genetic Policy* (Davis *et al.* 1985) sets out restrictions and guidelines for stock transport, protection of wild stocks, and maintenance of genetic variance. Policy guidelines include banning importation of salmonids from outside the state (except US/Canada transboundary rivers); restricting transportation of stocks between the major geographic areas in the state (Southeast, Kodiak Island, Prince William Sound, Cook Inlet, Bristol Bay, Arctic-Yukon-Kuskokwim, and Interior); requiring the use of local broodstock; maintaining genetic diversity by use of large populations of broodstock collected across the entire run and without regard to any physical trait such as size; and limiting the number of hatchery stocks derived from a single donor stock.

The Alaska Fish Health and Disease Control Policy (5 AAC 41.080) is designed to protect fish health and prevent spread of infectious disease. The policy is used by ADF&G fish pathologists to review hatchery plans and permits.

The Alaska Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222), the Policy for the Management of Mixed-Stock Salmon Fisheries (5 AAC 39.220), the Salmon Escapement Goal Policy (5 AAC 39.223), and local fishery management plans (5 AAC 39.200) guide fisheries management for the protection of wild salmon stocks. These regulations require fishery managers to consider the interactions of wild and hatchery salmon stocks when reviewing hatchery management plans and permits.

6.4.4 Alaska Permitting and Planning Procedures

Regional aquaculture associations (RAAs) exist for many of Alaska's salmon planning regions. Where RAAs operate hatcheries, they also form PNP corporations, and have a board of directors whose membership is composed of commercial salmon fishing permit holders and representatives of other stakeholder groups such as sport and subsistence harvesters, processors, and city officials[30]. PNP boards establish hatchery production goals and oversee business operations.

Salmon fishery enhancement efforts are guided by comprehensive salmon plans for each region. These plans are developed by Regional Planning Teams (RPT). RPTs are composed of 6 voting members: 3 from ADF&G and 3 appointed by the RAA's board of directors. Plans are developed in a public process based on the needs of fishery user groups and communities of the region. The plans can be reviewed and updated to meet changing needs.

Commercial salmon fishing permit holders may vote to impose a salmon enhancement tax on sale of salmon in their region. These funds are collected by the state and distributed to the RAA to finance hatchery operations or other enhancement and rehabilitation activities. Independent PNP corporations, not affiliated with an RAA, also operate hatcheries in several areas of the state. The RAAs and independent PNP hatchery organizations may contract processors to harvest hatchery salmon in designated areas to pay for operations. Such harvests are called cost- recovery fisheries, in contrast to common property fisheries, which are fisheries open to all qualified commercial, subsistence, personal use, and sport harvesters.

Each hatchery is permitted separately. Acquisition of a hatchery permit is an extensive process (5 AAC 40.110–40.230). A hatchery application consists of production goals, hatchery site information, water flow, water chemistry data, land ownership, water rights, hatchery design, initial proposed broodstock for the hatchery, and a financial plan. ADF&G staff draft a fishery management feasibility analysis for the proposed hatchery. ADF&G

[30] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf

staff review the application with the applicant, who addresses any deficiencies. The application is then provided for public review.

The RPT reviews hatchery permit applications within their region to determine if the hatchery operation is compatible with the regional comprehensive salmon plan. The RPT also makes a recommendation on the permit to the ADF&G commissioner.Following review by the RPT, a public hearing for the hatchery permit is held. The hatchery applicant describes the proposed hatchery plan, and ADF&G staff present the basic management plan (described below) for the hatchery. Public testimony and questions follow the presentations. ADF&G must respond in writing to any specific objections to the proposed permit.

The application is then sent to the ADF&G commissioner for final review. By regulation (5AAC 40.220) the commissioner's decision is based on consideration of (1) the suitability of the site for making a reasonable contribution to the common property fishery, not adversely affecting management of wild stocks, and not requiring significant alterations of traditional fisheries; (2) the operation of the hatchery makes the best use of the site's potential to benefit the common property fishery; (3) the harvest area size at the hatchery is sufficient in size to provide a segregated harvest of hatchery fish of acceptable quality for sale; (4) proposed donor sources can meet broodstock needs for the hatchery for the first cycle; (5) water sources for the hatchery are secured by permit and are of appropriate quality and quantity; and (6) the hatchery has a reasonable level of operational feasibility and an acceptable degree of potential success. Hatchery permits cannot be transferred. When hatcheries change operators, a new permit must be issued by the process described above.
Alaska PNP hatcheries operate under 4 documents: PNP hatchery permit with basic management plan (BMP), annual management plan (AMP), fish transport permit (FTP), and annual report. The hatchery permit and BMP, AMP, and FTP must be approved by the ADF&G commissioner.

The hatchery permit authorizes operation of the hatchery and specifies the species permitted to be produced[31]. The BMP, an addendum to the hatchery permit, specifies the maximum number of eggs of each species that a facility can incubate, the authorized release locations, and may identify stocks for broodstock. Hatchery permits remain in effect unless relinquished by the permit holder or revoked by the ADF&G commissioner. Hatchery permits and BMPs may be amended by the permit holder through a permit alteration request. Requested changes are reviewed by the RPT and ADF&G staff and recommendations are sent to the ADF&G commissioner for consideration. The AMP outlines operations for the current year and is written cooperatively among ADF&G and PNP hatchery staff. Typically, AMPs include the current year's egg-take goals, juvenile releases and remaining inventory, expected adult returns, harvest management plans, FTPs (described below) required or in place, production strategies, and evaluation plans. The AMP must be consistent with the hatchery permit and BMP. Final consideration of the plan is made by the ADF&G commissioner.

An FTP is required for egg collections, transports, and releases. The FTP authorizes specific activities described in the hatchery permit and management plans including broodstock sources, gamete collections, and release sites, and must be consistent with the PNP Permit and BMP. FTP applications are reviewed by the ADF&G fish pathologist, fish geneticist, regional resource development biologist, and other ADF&G staff as delegated by the ADF&G commissioner. Reviewers may suggest conditions for the FTP. Final consideration of the application is made by the ADF&G commissioner. An FTP is issued for a fixed time period. When an FTP is renewed or amended, the FTP application goes through the same process as the original FTP, providing an ongoing review of all PNP hatchery projects over time. Each hatchery is required to submit an annual report documenting broodstock collection, egg take numbers, releases, returns, and projected run sizes for the following year. Information from all hatchery annual reports is compiled into this annual report to the Alaska Legislature.

[31] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf

ADF&G Sport Fish hatcheries in Anchorage and Fairbanks produce fish specifically for sport fisheries in Cook Inlet, Resurrection Bay, Prince William Sound, and the Interior. The hatcheries are primarily funded from the federal excise tax on fishing-related equipment under the Dingell - Johnson Sport Fish Restoration Act.

6.4.5 Value of Hatchery Operations

PNP hatchery operations are primarily funded by cost-recovery harvest and assessment taxes on the commercial salmon harvest and are a significant sector of the commercial fishing industry in parts of coastal Alaska. In fiscal year 2018, the operation budgets for all PNP hatcheries in the state totaled about $46 million.17 By comparison, the statewide fiscal year 2018 operating budget for ADF&G Division of Commercial Fisheries for all state fisheries was about $72 million.

6.4.6 Alaska State Management of Salmon Hatcheries

The Alaska state constitution, statutes, and regulations mandate that ADF&G manage salmon returns for wild stock conservation[32]. This means that escapement goals are established for important salmon systems, and the fisheries are managed to meet these goals. Wild and hatchery returns are managed to meet wild stock escapement goals. In some cases, 1 species of hatchery fish returns at the same time as other, more predominant wild stock species, and the hatchery fish are harvested as incidental catch. For example, in Southeast Alaska, hatchery-produced chum salmon return across the timing of both sockeye and pink salmon and are caught during fisheries that are managed for sockeye or pink salmon. Chum salmon that are not harvested in the sockeye and pink salmon fisheries return to isolated release sites in bays where they can be harvested with minimal impact to wild stocks.

For some fisheries, both hatchery and wild stocks of the same species return simultaneously. In Prince William Sound, hatchery stocks of pink salmon return at the same time as the wild pink salmon stocks they are derived from. All hatchery-produced pink salmon are otolith marked. Otoliths are read from samples of fish collected from the commercial fishery to apportion the catch between hatchery and wild stocks during the season so that managers can manage for the wild stock return.In the Kenai River, releases of hatchery sockeye salmon are limited to a small fraction of the wild populations so that they do not unduly influence management.

In Southeast Alaska, a percentage of both hatchery and wild stocks of coho and Chinook salmon are coded-wire-tagged. Tags are collected and read during the season so that managers can assess the wild and hatchery components of the return to assess wild stock abundance. Hatchery stocks of pink and chum salmon are otolith marked as well. In Kodiak, hatchery chum and sockeye salmon stocks are otolith marked. Only a portion of hatchery-produced pink salmon are marked, but return to the release site on Afognak Island where there are no substantial wild pink salmon stocks in the area. All pink salmon fishery openings in this area target hatchery-produced salmon.

6.4.7 Alaska Hatchery Contribution to Alaska Fisheries

The hatchery return is composed primarily of the harvest in the fisheries and the broodstock from which eggs are collected for hatchery production. Most (95%) of the hatchery harvest occurs in the commercial common property fisheries (78%) and the cost recovery fisheries (16%), which collectively make up the commercial harvest. Sport, personal use, and subsistence fisheries harvest about 1% of the return. The remainder (5%) is broodstock, escapement, and estimated unharvested returns (Figure 10. Alaska salmon hatchery returns in numbers **of fish by return category, 2009-2018 average.**
).

[32] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf

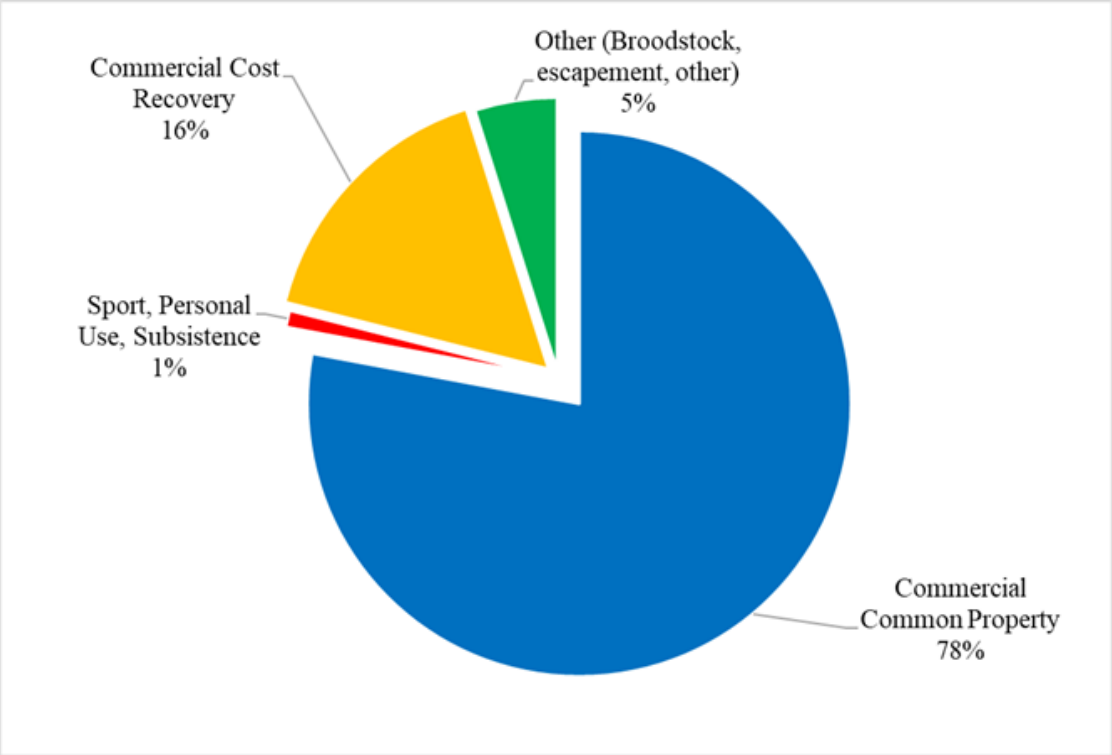

Figure 10. Alaska salmon hatchery returns in numbers of fish by return category, 2009-2018 average.

Over the past decade (2009–2018), hatcheries contributed an annual average of about one-third of the total Alaska commercial salmon harvest. Pink and chum salmon are the predominant species produced by Alaska hatcheries, followed by sockeye, coho, and Chinook salmon (Figure 11. Average Alaska hatchery contribution to commercial **fishery harvest by species, 2009-2018.**
).

As stated earlier, pink and chum salmon are the most economical to raise because fry can migrate to saltwater soon after hatching, whereas sockeye, coho and Chinook salmon typically require a year or more of freshwater rearing and feeding. By species, Alaska hatchery fish contributed an annual average 65% of the chum, 41% of the pink, 22% of the coho, 19% of the Chinook, and 5% of the sockeye salmon in the total commercial harvest over the decade (Figure 11).

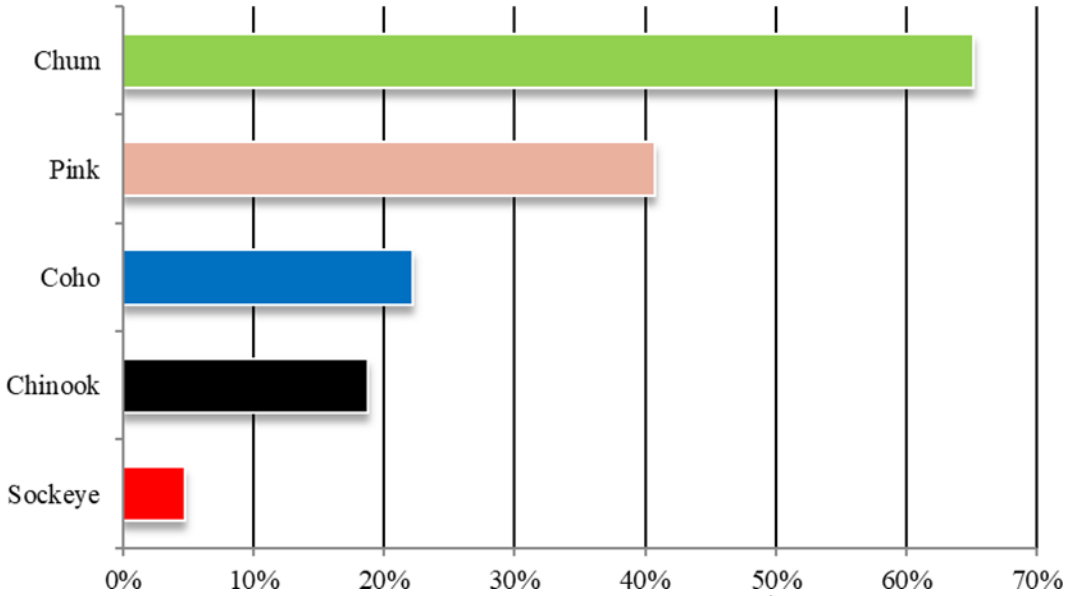

Figure 11. Average Alaska hatchery contribution to commercial fishery harvest by species, 2009-2018.

Alaska's salmon fisheries are considered among the healthiest in the world. The largest returns of wild stocks have occurred since the 1980s alongside the PNP hatchery program returns (Figure 6), with three of the highest wild stock harvests in the past five seasons.

The 2013 season was a record harvest overall, with the 283 million fish commercial harvest composed of the second highest catch for wild stocks (176 million fish) and the highest catch for hatchery stocks (107 million fish) in Alaska's history. The 2015 season was the second highest harvest overall, with a 263 million fish commercial harvest composed of the fourth highest catch for wild stocks (170 million fish) and the second highest catch for hatchery stocks (93 million fish). The 2017 season was the fourth highest harvest on record (225 million fish), with the third highest wild stock harvest (175 million fish) on record.

To put the magnitude of wild stock production in historical perspective, the hatchery harvests alone in both 2013 and 2015 were greater than the entire statewide commercial salmon harvests in every year prior to statehood except for 7 years(1918, 1926, 1934, 1936, 1937, 1938 and 1941).

In 2018, Alaska hatchery fish comprised 34% of the total commercial harvest. About 39 million hatchery-produced salmon were harvested in the commercial fisheries in 2018, with an estimated exvessel value of $176 million. Chum made up 57% of the exvessel value of the commercial hatchery harvest, followed by pink (24%), Chinook (3%), coho (5%), and sockeye salmon (11%).

6.5 Stock Assessment Activities

Salmon stocks have unique population dynamics characteristics in each river to which they return to spawn. Each "run" of salmon in a particular river must be understood, forecasted, and managed as a discrete unit, not related to other runs of salmon in that river, or in nearby rivers.

In the years since Alaska became a state (1959), ADFG has compiled comprehensive databases on salmon runs. ADFG scientists use those data, plus in-season assessments of run strength (numbers of returning salmon), to set escapement goals for stocks and manage the fisheries. "Escapement" means the annual estimated size of the spawning salmon stock, which is the number of adult salmon that escapes capture in fisheries and have the potential to spawn. The quality of the escapement may be determined not only by numbers of spawners, but also by factors such as sex ratio, age composition, temporal entry from the ocean into the river system, and spatial distribution within salmon spawning habitat. The escapement goal is a stock-specific reference point for fishery management.

ADFG utilizes fishery performance data and associated information to make in-season evaluations of salmon harvests. Fish ticket data, which document commercial harvest sales, are used by the staff to evaluate in-season run strength, attribute catches to various streams, evaluate enhancement projects, measure long-term production, establish and modify escapement goals, and generate forecasts. In-season assessments of run strength can also be obtained from:

- fishery performance data, including catch per unit effort;
- catch sampling and monitoring efforts;
- test fishing programs;
- aerial surveys of terminal areas and streams;
- tagging studies, including mark-recapture;
- radio-telemetry;
- counting towers;
- weirs; and
- riverine sonar projects.

For example, ADFG charters vessels to conduct test fishing assessments of run strength in selected index areas or across transects; monitors salmon sex ratios in the commercial harvest to evaluate run timing; and tracks age composition of commercial salmon catches to determine the strength of age classes in the run. Aerial surveys are a widely used method to evaluate initial run strength while salmon are traveling to the spawning grounds, and to document peak salmon abundance on the spawning grounds as an index of total escapement.

Alaska commercial salmon harvests are augmented in certain areas by hatchery programs. All commercial harvests of these enhanced salmon are performed by the commercial common property fishery (CPF). The natural salmon contributions to the CPF are estimated by subtracting hatchery contributions from the CPF total. Recoveries from hatchery contributions are determined by the use of a number of marks to aid identification, including; thermal marked otolith recoveries, coded wire tag (CWT) recoveries, or average fry-to-adult survival estimates multiplied by fry release numbers and estimated exploitation rates.

Almost all Alaska salmon hatcheries are non-profit corporations that perform “ocean ranching”, in which juveniles rearing in the hatchery are released into the wild to grow and return as adults. The practice of salmon “farming” or “pen-rearing”, growing salmon (or any other finfish) to market size in captivity, is illegal in Alaska.

Escapement Goals

Alaskan regulations specify the development and use of salmon escapement goals under two policies: the Policy for management of sustainable salmon fisheries (5 AAC 39.222) and the Policy of state-wide salmon escapement goals (5 AAC 39.223). There are four types of escapement goals: two determined by ADFG, based solely on the best available biological information, and two set by the BOF, that consider both biological and allocative factors.

ADFG is responsible for determining the **Biological Escapement Goal** (**BEG**) or **Sustainable Escapement Goal** (**SEG**) for a salmon stock, both of which are based on the best available biological information and are scientifically defensible**.** BEGs are set for all salmon stocks for which ADFG can reliably estimate both salmon escapement levels and total annual returns, and provides for maximum sustained yield. BEGs are always set as a range based on stock productivity and data uncertainty. SEGs are set for all salmon stocks for which ADFG can only reliably estimate or index salmon escapement, and provides for sustained yield over a 5 to 10 year period. SEGs may be set as either a range or a lower bound based on data uncertainty. Additionally, ADFG, in consultation with the BOF, may set a **Sustained Escapement Threshold** (**SET**) for a stock of management or conservation concern. A SET is usually 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 below the lower bound of a BEG or SEG, and represents a level of escapement below which the ability of the stock to sustain itself is jeopardized.

The BOF is responsible for determining an **Optimal Escapement Goal (OEG)** or an **In-River Run Goal**, which are both based on both biological and allocative factors. OEGs may differ from the SEG or BEG, but must still be sustainable. OEGs may be set as a range, with the lower bound set above any existing SET. In-River Run Goals may be set for salmon stocks that are subject to harvest upstream of the point where escapement is estimated, and are comprised of the SEG, BEG, or OEG, plus specific allocations to in river fisheries. Unless the BOF has set either a OEG or in-river goal for a fishery, the primary management objective for escapement is either the BEG or SEG, and ADFG must seek to maintain evenly distributed salmon escapements within the bounds of escapement goal ranges or above lower bound SEGs.

The management system for Alaska salmon is based upon a 'Sustained Yield' policy that is consistent with the MSFMSA (named after the late Senator Ted Stevens) and State polices for the management of natural, fishery resources. ADFG area and regional staff gather and analyze scientific and fishery data, and formulate goals and objectives for each major fishery, subject to the directives of the BOF. These goals and objectives are presented annually in Commercial Fisheries Division's Annual Management Plans, Annual Management Reports, and similar documents. The mechanism for meeting sustainable yield for each fishery is based on setting either BEGs or SEGs where less, specific data for a single in river run exists. When SEGs are used, the management approach can be described as precautionary and appropriate. Area level commercial salmon managers have transparent authority to open and close fisheries based upon the information available to them at the time and within the context of pre-determined fishery management plans and preseason forecasts of probably salmon run abundance.

This provides fishery managers with the most current information from stock assessment projects and from the fishing grounds with the objective of enabling quick decisions to be made amid the rapidly changing salmon returns allowing access to the fishery without long-term compromise of stocks. Decisions are then brought into effect through ADFG Emergency Orders, which is the legal mechanism of in-season management. The in-season management[33] process is an important aspect of the Alaska salmon management system that provides controlled fishing opportunities without long-term, irreversible impact on the 5 species of Alaska salmon. At both the regional and area level, fishery managers are supported by research staff engaged in various activities, most prominently, estimating salmon returns (Brenner *et al.,* 2018).

[33] https://www.adfg.alaska.gov/FedAidPDFs/SP18-09.pdf

6.6 Historic Biomass and Removals in the Fishery

Since 1975, the Alaska commercial salmon harvest has ranged from a low of 26 million to a high of 260 million fish. The catch is dominated by Pink and Sockeye salmon (Figure 12).

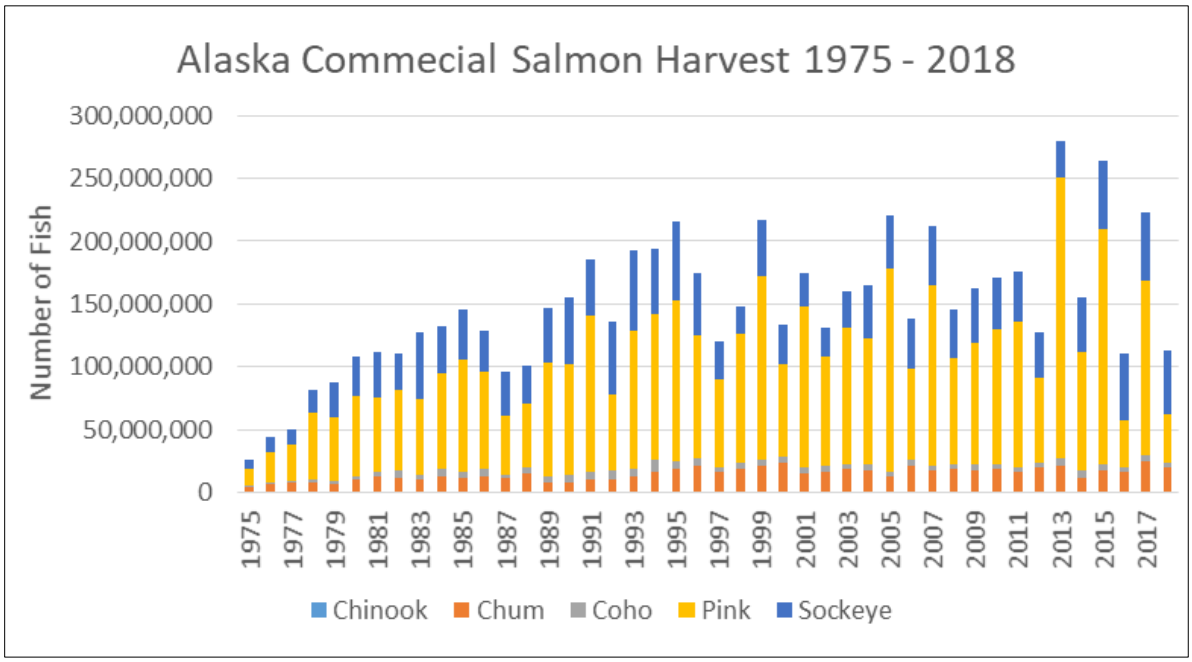

Figure 12. Alaska commercial salmon harvest by species, 1975-2018

Pink salmon are the most abundant salmon species in Alaska and in the Pacific Ocean[34]. Annual state-wide commercial harvests have been 106.7 million since large scale hatchery operation came online in the late 1980's. In Alaska, Pink Salmon are harvested primarily with purse seines.

Sockeye salmon is the second most numerous species in the Alaska commercial catch and the third most abundant salmon in the Pacific Ocean. Annual state-wide commercial harvests of sockeye salmon have averaged 38.5 million since 1975. Sockeye salmon are harvested primarily with gillnets, although seine gear is used in some areas. The Bristol Bay sockeye salmon fishery has historically been the state's most lucrative salmon fishery. The run is harvested as returning adult salmon migrate past the Alaska Peninsula in June and then by a large gillnet fleet in areas near the mouths of the rivers that drain into Bristol Bay. Subsistence users harvest sockeye salmon in many areas of Alaska. The largest subsistence harvest of sockeye salmon probably occurs in the Bristol Bay area where participants use set gillnets. In other areas of the state, sockeye salmon are taken for subsistence use in fish wheels, while beach seines as well as gillnets are used in Southeast Alaska. In some areas of Alaska, sockeye salmon are also important in sport and personal use fisheries.

Chum salmon are the third most numerous salmon species in the Alaska commercial catch and the second most abundant salmon in the Pacific Ocean (most of which is from hatchery production in Japan). The average annual commercial harvest of chum salmon has been 16.5 million since large scale hatchery production came on in the late 1908's primarily in Southeast. In Alaska, chum salmon are harvested primarily by gillnet and purse seine fleets. This species is also important in subsistence fisheries in Western Alaska.

[34] http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/salmon_harvest.php

Coho salmon are the fourth most numerous salmon species in the Alaska commercial catch and the fourth most abundant salmon in the Pacific Ocean. Since 1975, the average annual harvest has been 4.49 million. Coho salmon are generally the latest spawners in Alaska, and runs can extend well into the fall or even early winter. Because of their late run timing, many coho salmon runs in Alaska may be lightly exploited or even unexploited. Because of poor weather during the coho salmon spawning period, less information exists about run size and timing in many areas of the state. In some areas of Alaska, coho salmon are also important in sport and personal use fisheries.

Chinook Salmon are the least numerous salmon species in the Alaska commercial catch and the least abundant of the five salmon species in the Pacific Ocean. The annual average harvest since 1975 has been 0.56 million. Chinook Salmon are important in subsistence, sport and personal use fisheries, as well as commercial troll and gillnet fisheries. A Southeast Alaska troll fishery, under a treaty agreement between the governments of the US and Canada, operates on mixed stocks of migrating Chinook Salmon throughout the year, providing consumers with fresh Chinook Salmon during the winter.

ADFG Administrative Regions

Alaska's fisheries are managed at a local area level[35]. This approach was adopted at the time of statehood and was intended to remedy many of the problems that were experienced under federal management of Alaska's fisheries. Time and experience have validated the merits of this approach. Alaska's salmon fisheries have been rebuilt from the low levels that prevailed at the end of the territorial period to the highest level of sustained production recorded since commercial fishing began in 1878. Local area management puts the fishery manager, and supporting research staff, in close proximity to the resources being managed and to the people harvesting and processing those resources. It is what can best be called an information rich environment that provides for rapid decisions based on changing conditions on the fishing grounds and at stock assessment projects. The Division of Commercial Fisheries operates 23 area offices, which are organized into four regions.

- Southeast Region (R1)
- Central Region (R2)
- Arctic-Yukon-Kuskokwim (R3)
- Westward Region (R4)

The four administrative fishery regions support a varied harvest of different groundfish, shellfish and salmon species from the use of multiple gear types. Some characteristics of each region are described.

Region 1: SE/Yakutat (Appendix 5: Figures 1-4): Region 1. Southeast Alaska/Yakutat (Fig. 1: Juneau and Northern Southeast Alaska Area, Fig. 2: Ketchikan and Southern Southeast Alaska Areas, Fig. 3: Sitka & Central Southeast Alaska Areas, Fig. 4: Yakutat &NW Southeast Alaska Areas).

The Southeast Alaska/Yakutat Region (Region I) consists of Alaska waters between Cape Suckling on the north and Dixon Entrance on the South[36]. Salmon are commercially harvested in Southeast Alaska with purse seines and drift gillnets; in Yakutat with set gillnets; and in both areas with hand and power troll gear.

There are 17 districts divided by two subregions: Northern Southeast Alaska and Southern Southeast Alaska. Purse seine fishing in northern Southeast Alaska includes the fisheries that occur in Districts 9, through 14. Fishery management is driven primarily by pink salmon stock abundance but also includes fisheries in hatchery terminal harvest areas. Purse seine fishing in southern Southeast Alaska occurs in Districts 1 through 7. As in Northern Southeast Alaska, fishery management is driven primarily by pink salmon stock abundance.

[35] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main
[36] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.main

Drift gillnet fishing is allowed by regulation (5 AAC 33.310(c)) in District 1 (Sections 1-A and 1-B), District 6 (Sections 6-A, 6-B, 6-C, and 6-D), District 8 (Sections 8-A and 8-B), District 11 (Sections 11-B and 11-C), and District 15 (Sections 15-A, 15-B, and 15-C) (Appendix 5: Figures 1-4). More specifically, Drift gillnet fisheries occur at Tree Point and Portland Canal (District 1), Prince of Wales Island and Stikine River (Districts 6 and 8), Taku River/Port Snettisham (District 11), Lynn Canal (District 15), and in the following terminal hatchery areas: Neets Bay (District at Inlet (District 1), Anita Bay (District 7), Speel Arm (District 11), Deep Inlet (District 13), and Boat Harbor(District 15).

Salmon trolling occurs on almost all districts. Spring fisheries are conducted along salmon migration routes or in close proximity to the following hatcheries and release sites: Little Port Walter Hatchery (NMFS), Port Armstrong Hatchery (Armstrong/Keta), Whitman Lake Hatchery, Crystal Lake Hatchery, Neets Bay Hatchery, Neck Lake, Carroll Inlet, and Anita Bay release sites [Southern Southeast Regional Aquaculture Association (SSRAA)], Medvejie Hatchery, Hidden Falls Hatchery, Crawfish Inlet release site [Northern Southeast Regional Aquaculture Association (NSRAA)], Port Saint Nicholas Hatchery [Prince of Wales Hatchery Association (POWHA)], and Macaulay Hatchery [Douglas Island Pink and Chum (DIPAC)]. Most spring and terminal troll fisheries target Alaska hatchery-produced Chinook salmon, though non-Alaska hatchery or PST Chinook salmon are also harvested. There are also spring troll fisheries that target Alaska hatchery-produced chum salmon located in Keku Strait, North Chatham Strait, and Icy Strait (Districts 9, 10, 12, and 14). During the summer months, is when the majority of the annual troll Chinook salmon harvest is mostly taken throughout most of the Southeast Alaska/Yakutat region, including the outside waters of the EEZ. The summer fishery targets the number of PST Chinook remaining on the annual troll allocation after winter and spring troll PST harvests are subtracted. During years in which the summer Chinook salmon harvest limit is relatively large, opening lengths are estimated and a closing date is determined inseason.

The Yakutat set gillnet fisheries are divided into two fishing districts: the Yakutat District, which extends from Cape Fairweather to Icy Cape, and the Yakataga District, which extends from Icy Cape to Cape Suckling. The Yakutat District set gillnet fisheries primarily target sockeye and coho salmon, although all five species of salmon are harvested. The Yakataga District fisheries only target coho salmon. Although the bulk of the Yakutat salmon harvest is usually reported from six major fisheries (Situk-Ahrnklin Inlet; Yakutat Bay; Manby Shore; and the Alsek, East Alsek, and Tsiu/Tsivat rivers), up to 25 different areas are open to commercial fishing each year.

Southeast/Yakutat Salmon Catches:

Because of the mixed stock and mixed species nature of salmon returns, and because different gear groups often harvest the same stocks of fish, the management of commercial salmon fisheries in Southeast Alaska is complex[37]. The Southeast region contains an estimated 5,500 salmon producing streams and tributaries of various productivity levels, making stock-specific fisheries management according to run strength impractical for most individual returns. Additionally, some salmon harvested in the region originate from other states (primarily Washington and Oregon) and from Canada. Net and troll fisheries in southeast Alaska are managed for sustained yield, allocated among users according to Alaska Board of Fisheries regulations, and in accordance with harvest sharing provisions of the Pacific Salmon Treaty between the U.S. and Canada (ADF&G 2008).

Harvest of all salmon increased in the 1930s with 60 million fish. While the fisheries declined after this, more recent catches have returned to these levels. Since statehood, 76% of the salmon harvested in Southeast Alaska commercial fisheries have been caught with purse seine gear[38]. Pink salmon is the primary species targeted by the seine fleet; therefore, most management actions are based on the abundance of pink salmon stocks. Chum salmon are targeted in or near hatchery terminal areas since most of the chum salmon harvest originates from

[37] http://www.americansalmonforest.org/uploads/3/9/0/1/39018435/econreportfull.pdf
[38] https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.04.pdf

hatchery production. Chinook and Coho salmon are targeted by the troll fleet and incidentally in other fisheries. Over the recent 10- year period, the species composition of the purse seine harvest was 88% pink, 9% chum, 2% sockeye, and 1% coho salmon. Chinook salmon harvest are insignificant (1 %<) compared with other species[18].

The Region I cumulative commercial salmon harvest by all harvest categories, including hatchery cost recovery, was 22.8 million in 2018[39]. Total common property commercial harvest was 17.6 million (80% of total harvest). Overall harvest in numbers of salmon in 2018 was 44% of 2017. The 2018 harvests by species compared with 2017 were as follows: Chinook 92%, sockeye 79%, coho 56%, pink 23%, and chum salmon 100%. The Region I total commercial salmon harvest proportions by species were Chinook 1%, sockeye 3%, coho 7%, pink 37%, and chum salmon 52%. The 2018 combined-gear, large Chinook salmon harvest of 160,000 was 55% of the most recent 10-year average and 53% of the long-term average. The sockeye salmon harvest of 637,000 was 59% of the recent 10-year average and 48% of the long-term average. The coho salmon harvest of 1.6 million was 59% of the 10-year average and 74% of the long-term average. The pink salmon harvest of 8.1 million was 21% of the 10-year average and 26% of the long-term average. The chum salmon harvest of 11.5 million was 112% of the 10-year average and 189% of the long-term average. The all species total harvest was 42% of the recent 10-year average and 54% of the long-term average harvest.

Region 2: Central:

Appendix 5: Figures 5-7): Region 2. Central (Fig. 5: Prince William Sound, Fig. 6: Cook Inlet and Fig. 7: Bristol Bay Areas).Central Region Alaska commercial fisheries[40] are composed of five distinct management areas that include Bristol Bay, Prince William Sound (PWS) and Copper River, Upper Cook Inlet, and Lower Cook Inlet. Although all 5 species of salmon are harvested in each area, sockeye and pink salmon are the most abundant and most valuable. This area encompasses some of the largest and most valuable salmon fisheries in the world. From Bristol Bay, home of the largest sockeye salmon fishery in the world, to the Copper River where sockeye and Chinook salmon fetch some of the highest prices per pound paid to commercial fishermen. Cook Inlet commercial fisheries occur near the largest population center in Alaska, providing salmon to numerous niche and local markets, as well as fresh salmon to markets in other states. Prince William Sound adds productive healthy pink, chum, and sockeye salmon fisheries to the region. Southcentral commercial fisheries are of tremendous importance and an integral part of many communities and local economies in the state.

Prince William Sound:

The PWS Management Area[41] also known as Area E, encompasses all coastal waters and inland drainages entering the Gulf of Alaska between Cape Suckling and Cape Fairfield. Prince William Sound (PWS) is a mixture of glacier-hewn fjords, rainforest-blanketed islands, and rugged mountain peaks. PWS's complex coastline, protected waters, and close proximity to nutrient-rich Gulf of Alaska waters support a broad array of marine life. PWS salmon and herring fisheries, along with other natural resources, such as copper, oil, and gold, were integral in forming the modern economic landscape. Salmon fisheries in PWS have greatly expanded since the mid-1970s, largely due to the addition of hatchery produced salmon. PWS is home to five salmon hatcheries, including the largest pink salmon and second largest chum and sockeye salmon enhancement programs in the state. Salmon fisheries are a major economic driver in PWS, harvesting annually upwards of 74 million fish.

[39] https://www.adfg.alaska.gov/FedAidPDFs/SP16-07.pdf
[40] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southcentral
[41] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.main

The PWS Management Area E is divided into 11 districts[Copper River District, Bering River District, Coghill District,Unakwik District, Eshamy District, Eastern District, Northern District, Southwestern District,Montague District, Southeastern District, Eshamy District] that correspond to the local geography and distribution of the 5 species of salmon *Oncorhynchus* spp. harvested by the commercial fishery.

The management objective for all districts is to achieve spawning escapement goals while allowing for the orderly harvest of fish surplus to spawning requirements. The Alaska Department of Fish and Game (ADF&G) follows regulatory plans to manage fisheries and allow private non-profit (PNP) hatcheries to achieve cost-recovery and broodstock objectives.

Six hatcheries contribute to the area's fisheries. Gulkana, Cannery Creek, Armin F. Koernig, Wally Noerenberg, and Main Bay hatcheries are operated by Prince William Sound Aquaculture Corporation (PWSAC). Gulkana Hatchery (GH) in Paxson augments production of sockeye salmon *Oncorhynchus nerka* to the Copper River. Cannery Creek Hatchery (CCH), located on the north shore of the sound, and Armin F. Koernig Hatchery (AFK) in the southwestern sound produce pink salmon *O. gorbuscha*; Wally Noerenberg Hatchery (WNH) in the northwestern sound produces pink, chum *O. keta*, and coho *O. kisutch* salmon; and Main Bay Hatchery (MBH) in the western sound produces sockeye salmon. Valdez Fisheries Development Association (VFDA) produces pink and coho salmon at the Solomon Gulch Hatchery (SGH) in Port Valdez.

Salmon may be caught using purse seine, drift gillnet, and set gillnet; however, not all gear types are allowed in all districts. Drift gillnets are the most numerous and are allowed in the Bering River, Copper River, Coghill, Unakwik, and Eshamy Districts. Set gillnet gear is allowed only in the Eshamy District. Purse seine gear is allowed in the Eastern, Northern, Unakwik, Coghill, Northwestern, Southwestern, Montague, and Southeastern District.

The 2018 Prince William Sound (PWS) Area commercial salmon harvest was 29.37 million[42]. Harvest was composed of 8,000 Chinook, 1.30 million sockeye, 523,000 coho, 24.06 million pink, and 3.47 million chum salmon—including 456,000 for Wally Noerenberg Hatchery (WNH) broodstock and cost recovery. The 2018 harvest included 24.99 million (85%) commercial common property fishery (CCPF), and 4.38 million (15%) hatchery cost-recovery and broodstockfish.

Bristol Bay:
The Bristol Bay Management Area[43] includes all coastal and inland waters east of a line from Cape Newenham to Cape Menshikof, including 9 major river systems. Numerous freshwater nursery lakes and shallow estuaries make Bristol Bay the largest commercial sockeye salmon producing region in the world. The Bristol Bay area is divided into 5 management districts [(Naknek-Kvichak, Egegik, Ugashik, Nushagak-Igushik, and Togiak)], corresponding to the major river drainages. The management objective for each river is to achieve spawning escapement goals while harvesting fish in excess of the goals through the drift and set gillnet fisheries.

The five species of Pacific salmon found in Bristol Bay are the focus of major commercial, subsistence, and sport fisheries[4445]. The 43.5 million harvest of all species in 2018 was the second largest in the history of the fishery, after the 45.4 million fish harvest in 1995. The commercial harvest of 41.3 million sockeye salmon was 10% above the 37.6 million preseason forecast and is the second largest harvest on record. Chinook salmon were caught during directed sockeye salmon periods in all commercial districts and a preliminary total of 41,696 fish were

[42] https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.04.pdf
[43] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.main
[44] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/650190311.pdf
[45] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/989536277.pdf

harvested, 13% below the 20-year average of 48,161. The 2018 preliminary Bristol Bay chum salmon harvest was 1,868,308 fish compared to the latest 20-year average (1998–2017) of 983,118 chum salmon. Pink Salmon preliminary harvest in 2018 was 218,998 fish which is 55% percent below the 20-year average (for even years only) of 488,383 pink salmon. The preliminary coho salmon harvest in 2018 was 138,466 fish.

Cook Inlet:
The Cook Inlet Management Area[46] is located in the Central Gulf of Alaska and comprised of all waters west of the longitude of Cape Fairfield and north of the latitude of Cape Douglas. Area marine waters vary from the numerous fjord-like bays along the north Gulf of Alaska coast to the moderately protected waters of Kachemak Bay and the high-energy shoreline of Kamishak Bay. All five species of Pacific salmon, Pacific herring and smelt are commercially harvested in the Cook Inlet Area.

Upper Cook Inlet:
The Upper Cook Inlet (UCI) Management Area consists of that portion of Cook Inlet north of the latitude of the Anchor Point Light and is divided into the Central and Northern districts. Central District is approximately 75 miles long, averaging 32 miles in width. Northern District is 50 miles long, averaging 20 miles in width. All 5 species of Pacific salmon, razor clams, Pacific herring, and smelt are commercially harvested in UCI. Since the inception of a commercial salmon fishery in 1882, many salmon gear types, including fish traps, gillnets, and seines have been employed with varying degrees of success. Sockeye salmon are most important in terms of their economic value.

The overall harvest and value of the 2018 commercial salmon fishery of Upper Cook Inlet (UCI) was poor[47]. The 2018 UCI commercial harvest of approximately 1.3 million salmon was 61% less than the recent 10-year average annual harvest of 3.4 million fish. The 2018 UCI commercial harvest of 815,000 sockeye salmon was approximately 70% less than the 2008–2017 average annual harvest of 2.8 million fish. The 2018 sockeye salmon harvest was the 7 th smallest on record and the smallest harvest since 1975. The 2018 harvest estimate of approximately 220,679 coho salmon in all commercial fisheries inUCI was 32% greater than the recent 10-year (2008–2017) average annual harvest of approximately 180,000 fish. The 2018 drift gillnet harvest of 108,016 coho salmon was very close to the recent 10-year average of approximately 107,000 fish.

The Northern District 2018 (UCI) set gillnet harvest of 64,000 coho salmon in 2018 was the largest harvest since 2000 and was approximately 78% greater than the 36,000 annual average harvest from the previous 10 years. The 2018 UCI commercial pink salmon harvest was estimated to be approximately 126,605 fish, which was 84% lower than the average annual harvest of nearly 386,413 fish from the previous 10-years of even-year harvests. The 2018 harvest of 129,682 chum salmon was approximately 13% lower than the previous 10-year average annual harvest of 165,000 fish. The 2018 year-end king salmon harvest in all UCI commercial fisheries was 3,233, which was62% less than the previous 10-year (2008–2017) average annual harvest of 8,430 fish.

Lower Cook Inlet:
The Lower Cook Inlet (LCI) Management Area is comprised of all waters west of the longitude of Cape Fairfield, north of the latitude of Cape Douglas, and south of the latitude of Anchor Point. Area marine waters vary from the numerous fjord-like bays along the north Gulf of Alaska coast to the moderately protected waters of Kachemak Bay and the high-energy shoreline of Kamishak Bay. The majority of freshwater drainages are short, coastal streams dominated by pink salmon, however all five Pacific salmon species are present in LCI waters, with chum and sockeye salmon adding significant value in most years.

[46] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareacookinlet.main
[47] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/999033903.pdf

Fisheries enhancement has played a major role in LCI salmon production for over three decades, at times contributing up to 90% of the harvest, thus providing a significant portion of the average annual commercial ex-vessel value. The LCI area offers a wide variety of commercial fishing opportunities for salmon, groundfish and scallops.

The 2018 Lower Cook Inlet Area commercial salmon harvest, based on current preliminary fish ticket data, was 2.0 million fish[48]. The harvest was composed of 381 Chinook, 370,460 sockeye, 15,387 coho, 1.6 million pink, and 48,729 chum salmon of which 758,117 (37.9%) were commercial common property harvest and 1.2 million (62.1%) were hatchery cost recovery.

Region 3: Arctic-Yukon-Kuskokwim

Appendix 5: Region 3. Arctic-Yukon-Kuskokwim (Fig. 8: Kotzebue, Fig. 9: Norton Sound-Port Clarence, Fig. 10: Yukon Northern, Fig. 11: Upper Yukon, Fig. 12: Lower Yukon and Fig. 13: Kuskokwim Areas).

The Arctic-Yukon-Kuskokwim (AYK) Region[49] encompasses the coastal waters of Alaska and includes the rivers and streams that drain into the Bering, Chukchi, and Beaufort Seas. It stretches from its boundary at Cape Newenham with the Bristol Bay area to the border with Canada on the Arctic Ocean. The Yukon River, with the fifth largest drainage in North America, lies within this management region, as do many other major rivers; the Kuskokwim being second in size next to the Yukon. With the exception of Fairbanks, Bethel, and Nome, this is a region of villages. Salmon and herring are the most important fisheries resources in this region. Large numbers of salmon are taken for subsistence for which can equal or surpass the numbers of fish harvested in commercial fisheries, especially Chinook salmon.

Kuskokwim:

The Kuskokwim Management Area[50] includes the Kuskokwim River drainage, all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, and Nunivak and St Mathew Islands. Commercial and subsistence fishing in this area focuses primarily on salmon and herring. Herring are abundant along the coast of the Kuskokwim area, but there has been little market for commercial herring in some time. Salmon fishing occurs primarily within the main stem of the Kuskokwim River and in Kuskokwim and Goodnews Bays. Kuskokwim salmon fisheries are noteworthy for the role played by the Kuskokwim River Salmon Working Group, which serves as a public forum for federal and state fisheries managers to meet with local users of the salmon resource and review run assessment information and reach a consensus on how to proceed with management of Kuskokwim River salmon fisheries. Subsistence fishing is of major importance to the residents of this region and the largest subsistence harvest of Chinook salmon in the state is taken from the Kuskokwim River.

There are currently 4 commercial salmon fishing Districts in the KMA (5 AAC 07.200). Districts 1, 2, 3, and 4 were established in 1960; however, District 3, Upper Kuskokwim River, was removed from regulation in 1966 due to lack of landings. District 5, Goodnews Bay, was established in 1968. District 1, Lower Kuskokwim River, consists of the Kuskokwim River from a line between Apokak Slough and the southernmost tip of Eek Island and Popokamiut upstream to a line between the Alaska Department of Fish and Game (ADF&G) regulatory markers located at Bogus Creek, about 9 miles upstream of the Tuluksak River. District 1 was divided into Subdistricts 1-A and 1-B, in 2000. Subdistrict 1-A consists of that portion of District 1 upstream from a line between regulatory

[48] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1000401993.pdf
[49] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.interior
[50] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.main

markers located at the downstream end of Steamboat Slough. Subdistrict 1-B consists of that portion of District 1 downstream from regulatory markers at Steamboat Slough. District 2, Middle Kuskokwim River, consists of Kuskokwim River from ADF&G regulatory markers located at the upstream entrance to the second slough on the west bank downstream from Kalskag to the regulatory markers at Chuathbaluk .

The most recent commercial fishing periods in District 2 occurred in 2000. District 4, Quinhagak, consists of Kuskokwim Bay waters from the northernmost edgeof the mouth of Weelung Creek to the southernmost tip of the south mouth of the Arolik River and extending for 3 miles from the coast. District 5 consists of that portion of Goodnews Bay east of a line from ADF&G regulatory markers located approximately 2 miles south and 2 miles north on the seaward side of the entrance of Goodnews Bay, and west of a linebetween mouth of Ukfigag Creek to the mouth of the Tunulik River.

2018 was the third consecutive fishing season that there were no large-scale commercial salmon buyer/processors in the Kuskokwim Area[51]. This resulted in very little opportunity for fishermen in District 1 and no opportunity for fishermen in District 4 (Quinhagak) and District 5 (Goodnews Bay). Due to confidentiality requirements the small amount of harvest that did occur cannot be reported.

Yukon:
The Yukon Salmon Management Area[52] encompasses the largest river in Alaska. The Yukon River and its tributaries drain an area of approximately 220,000 square miles within Alaska, while the Canadian portion of the river accounts for another 110,000 square miles. The river flows 2,300 miles from its origin 30 miles from the Gulf of Alaska to its terminus in the Bering Sea.

The Yukon Area is divided into 7 districts and 10 subdistricts for management and regulatory purposes. The Coastal District, which is divided into Southern and Northern areas, is the area from Naskonat Peninsula to Point Romanof, and includes all waters extending 3 nautical miles from any grassland. The Coastal District is sometimesmanaged as part of District 1. The Set Gillnet Only Area is a fall season commercial fishing area in District 1, in which only set gillnets are allowed. For reporting purposes, the Lower Yukon Area includes the Coastal District and Districts 1, 2, and 3 to a point near Old Paradise Village at river mile 301. The Upper Yukon Area includes Districts 4, 5, and 6, and is that portion of the Yukon River drainage upstream of a point near Old Paradise Village at river mile 301 to the Canadian Border . Subdistrict 5-D is divided into 3 areas (lower, middle, upper) for management purposes. Additional fishing areas include the Fairbanks Nonsubsistence Area and the Anvik River. The districts and subdistricts are further divided into 31 statistical areas for management and reporting purposes. In addition to the U.S. fisheries, Aboriginal, commercial, sport, and domestic salmon fisheries occur in the Canadian portion of the Yukon River drainage. The Canadian Department of Fisheries and Oceans Canada (DFO) conducts the corresponding fishery management activities. Details about fisheries management in the Canadian portion of the Yukon River drainage can befound in the annual Yukon River Panel Joint Technical Committee (JTC) reports.

Chinook and chum salmon, both summer and fall, are of the most importance to the Yukon River area. Sockeye, pink, and coho salmon, while present, are of minor importance. Chinook salmon have been in a prolonged period of low productivity and this has resulted in much hardship to the residents of the Yukon River drainage. Chum salmon returns, while better than Chinook returns, have been erratic since 1993, with some very poor returns that restricted both commercial and subsistence fishing. Adding to these problems, poor prices and lack of buyers depressed the value of chum salmon harvested from the Yukon River at a time that fuel costs skyrocketed, making the economics of salmon fishing in the Yukon River even more challenging. Both the state and federal government

[51] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/995616595.pdf
[52] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareayukon.main

increased funding for management and research after the poor fishery performance of the 1990s. The result has been a major increase in information about the numbers, spawning locations, and relative importance of particular tributaries in the total production of Yukon River salmon. Because significant numbers of salmon are produced on both sides of the border[53], managing the valuable Yukon River salmon resource is a complex international effort, involving the close cooperation of all stakeholders involved in the fishery from both the United States and Canada.

All management efforts related to the Yukon River salmon fishery are focused on one important sustainability goal: To allow enough fish to escape to their spawning grounds to ensure that there will be fish in the future for both subsistence and commercial users all along the river.

To provide guidance to all parties, in 2002—after 16 years of negotiations—the United States and Canada entered into an agreement, under the PST, known as the Yukon Salmon Agreement. This Agreement outlines both parties' commitment to the restoration, conservation, and management of the salmon upon which Yukon River communities depend.

Additionally, the Agreement obligates both countries to manage their salmon fisheries in a way that allows enough spawning salmon to escape harvest, and to follow agreed-upon harvest-sharing arrangements. Further, the Agreement recognizes that the subsistence fishery in Alaska and First Nations fisheries in Canada have priority over other fisheries in each respective country.

Setting escapement goals and making other management recommendations is the responsibility of the Yukon River Panel (YRP). Established by the PST between the United States and Canada, the YRP not only sets escapement goals for Canadian-origin salmon but also makes recommendations to the management entities on both sides of the border that have oversight of the salmon stocks originating in Canada. The ADF&G serves that management function in the United States; in Canada that responsibility falls to the Department of Fisheries and Oceans (DFO). Both are responsible for any agreements between the countries regarding Canadian-origin Yukon River salmon.

In addition to Yukon Salmon Agreement and YRP recommendations, Alaska's salmon fisheries are subject to the policies and regulations set forth by the BOF. With input from the BOF ACs and the public, the BOF not only sets policy but also establishes regulations and sets the overall direction for the management of the state's fishery resources. ADF&G then manages these fisheries based on the BOF's decisions.

In Alaska, the 220,000 square miles of the Yukon River drainage includes 1,200 miles of the mainstream Yukon River, major Alaskan tributary rivers, such as the Koyukuk, Tanana and Porcupine Rivers, and various other smaller tributary streams. ADF&G manages all subsistence, commercial, sport, and personal use fisheries within the Alaskan portion of the Yukon River drainage.

In federal public waters, however, subsistence is managed jointly by ADF&G and the U.S. Fish and Wildlife Service. The Federal Subsistence Board (FSB), with input from the Federal Subsistence Regional Advisory Councils (RAC) and in consultations with the federally-recognized tribes, has regulatory responsibility for subsistence fisheries on federal public waters for federally-qualified subsistence users. In addition, the Canadian DFO regulates and manages all Yukon River salmon fisheries within the Canadian portion of the Yukon River drainage.

[53] http://www.kwikpakfisheries.com/fisheriesmanagement.html

During the 2018 summer season, the total commercial harvest in the Alaska portion of the Yukon River drainage was 576,700 summer chum salmon[54] , the largest harvest since 1989. The commercial harvest of summer chum salmon in the Lower Yukon Area (Districts 1–3) was 446,381 and in the Upper Yukon Area (Districts 4–6) was 130,319 fish. Harvest using selective gear accounted for over 64% of the total commercial summer chum salmon harvest in Yukon Area[55].

The total commercial harvest for the Yukon River Fall season in the Alaska portion of the drainage was 387,788 fall chum salmon and 110,587 coho salmon. The 2018 commercial harvest of fall chum salmon was above the 2013– 2017 5-year average of 300,044 and the 2008–2017 10-year average of 217,670. The 2018 commercial harvest of coho salmon was below the 2013–2017 5-year average of 128,198 and above the 2008–2017 10-year average of 84,083.

Arctic Norton Sound:
Norton Sound[56], Port Clarence, and Kotzebue Sound management districts include all waters from Point Romanof in southern Norton Sound to Point Hope at the northern edge of Kotzebue Sound, and St Lawrence Island. These management districts encompass over 65,000 square miles, and have a coastline exceeding that of California, Oregon, and Washington combined. Approximately 17,000 people, primarily Alaska Natives, reside in 30 small communities within these management districts. Nearly all local residents are dependent to varying degrees on fish and game resources for their livelihood. Chum and pink salmon are abundant in Norton Sound and smaller populations of sockeye, coho, and Chinook salmon are also present. Only chum salmon are found in sufficient abundance to support commercial fishing in Kotzebue Sound. Small, isolated populations of salmon are found north of Kotzebue Sound. Herring are present in all three management districts; Norton Sound has the largest abundance of herring in the entire AYK Region. The remote location of these herring stocks, and their later timing relative to other herring stocks, makes attracting buyers difficult for these fisheries. An important commercial and subsistence king crab fishery takes place in Norton Sound. This fishery was restricted to small boats in 1993 and designated a super exclusive fishery in 1994, which means that a vessel registered for the Norton Sound king crab fishery cannot participate in any other king crab fishery during that year.

As in 2017, well above average to near record runs of chum, pink, sockeye and coho salmon highlighted the 2018 fishery[57]. The coho salmon commercial harvest was a record and the chum salmon commercial harvest was the second highest on record and the best since 1983. The pink salmon run was one of the greatest runs for an evennumbered year and pink salmon escapements were records at some salmon counting projects. However, there was minimal interest from the only buyer in purchasing pink salmon. No commercial fishing targeting king salmon was allowed.

Norton Sound Salmon District consists of all waters between Cape Douglas in the north and Point Romanof in the south. The district is divided into 6 subdistricts and corresponding statistical areas: Subdistrict 1, Nome (333-10); Subdistrict 2, Golovin (333-20); Subdistrict 3, Elim (333-31, 32, 33); Subdistrict 4, Norton Bay (333-40); Subdistrict 5, Shaktoolik (333-50); and Subdistrict 6, Unalakleet (333-60). The subdistrict and statistical area boundaries were established to facilitate management of individual salmon stocks, and each subdistrict contains at least 1 major salmon-producing stream.

[54] https://www.adfg.alaska.gov/FedAidPDFs/RIR.3A.2019.01.pdf
[55] https://www.adfg.alaska.gov/FedAidPDFs/RIR.3A.2019.01.pdf
[56] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareanortonsound.main
[57] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/997457402.pdf

All commercial salmon fishing in the district is by set gillnets in marine waters; however, fishing effort is usually concentrated near river mouths. Commercial fishing typically begins in June and targets Chinook salmon if enough run strength exists. Emphasis switches to chum salmon in July, and the coho salmon fishery begins the fourth week of July and closes in September. Pink salmon are much more abundant in even-numbered year returns. A pink salmon directed fishery may coincide w th or may be scheduled to alternate periods with the historical chum salmon directed fishery.

Kotzebue:
Kotzebue District encompasses all waters from Point Hope to Cape Prince of Wales, including those waters draining into the Chukchi Sea . Kotzebue District also supports the northernmost commercial salmon fishery in Alaska. The district is divided into 3 subdistricts. Subdistrict 1 has 6 statistical areas where commercial salmon fishing may occur. The commercial fishery under state management opened in 1962. Salmon harvests consist primarily of chum salmon, although limited amounts of Dolly Varden; sheefish; whitefish; and Chinook, sockeye, pink, and coho salmon are harvested during the fishery.

In the Kotzebue fishery, gear is limited to setnets with an aggregate of no more than 150 fathoms per permit holder. Fishermen generally operate with an end on or near shore and with all 3 shackles connected. Fishermen also set in deeper channels in the mudflats farther out from shore. Most gear used in the district is 5.875-inch or 6.0-inch stretch mesh gillnet.

The 2018 commercial harvest of 695,153 chum salmon was a record high, exceeding the previous record of 677,239 chum salmon caught in 1981[58]. The 2018 harvest represented the fourth time in the last five years that the harvest exceeded 400,000 chum salmon but was only the eighth time in history for harvest that high. Also, 13 king salmon and 15 sockeye salmon were sold.

Region 4: Westward:
Appendix 5: Region 4. Westward (Fig. 14: Kodiak, Fig. 15: Aleutians, Fig. 16: Chignik Areas, Figure 17: Alaska Peninsula).

Westward Region[59] includes the Kodiak archipelago, the north and south sides of the Alaska Peninsula (including Chignik, the Shumagin Islands, and Port Moller), and the Aleutian Islands. Dutch Harbor, the number one fishing port in the nation, in pounds landed, is situated in the Aleutian Islands. This region encompasses all Pacific Ocean waters extending south from the Kodiak Archipelago and west of the longitude of the eastern side of Cook Inlet, as well as Bering Sea waters east of the maritime boundary between Russia and the United States. The islands of St. Mathew and the Pribilofs, as well as the Chukchi-Beaufort seas, also fall within the Westward Region. Westward Region supports a diverse mix of shellfish and finfish fisheries, including the largest crab and Pacific cod fisheries in the state. Important salmon and herring fisheries occur throughout the coastal waters of the region. Management is particularly complex because of interaction and coordination between respective federal and state fishery management plans and jurisdictions; for example, coordination with the federal government for state-waters Pacific cod fisheries. Joint state and federal fishery management programs have been implemented regarding management of Bering Sea-Aleutian Islands crab and regional scallop fisheries

[58] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/995022591.pdf
[59] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southwest

Alaska Peninsula:
The Alaska Peninsula and Aleutian Islands Management Area[60], commonly referred to as Area M, includes those waters on the south side of the Alaska Peninsula west of the Chignik Management Area; the waters on the north side of the Alaska Peninsula west of Bristol Bay; and waters of the Aleutian Islands west of Unimak Island and east of the Atka-Amlia Management Area.

The North Alaska Peninsula portion of the Alaska Peninsula Management Area (Area M) includes those waters of the Alaska Peninsula from Cape Sarichef to Cape Menshikof and consists of 2 districts: the Northwestern District, which includes all waters between Cape Sarichef and Moffet Point, and the Northern District, which includes all waters between Moffet Point and Cape Menshikof. The Nelson Lagoon to Outer Port Heiden region, which encompasses most of the Northern District, is the primary sockeye salmon Oncorhynchus nerka harvest area on the North Alaska Peninsula and includes the Nelson Lagoon, Bear River, Three Hills, Ilnik, and Outer Port Heiden sections. In addition to these sections, smaller directed commercial salmon fisheries occur in other areas of the North Alaska Peninsula.

Commercial salmon fisheries located in South Alaska Peninsula waters, are managed within 4 districts. The Alaska Peninsula Salmon Management Area is divided into 4 districts: (1) Southeastern District, consisting of waters between Kupreanof Point and McGinty Point; (2) South Central District, consisting of waters between McGinty Point and Arch Point Light; (3) Southwestern District, consisting of waters between Arch Point Light, False Pass, and Cape Pankof Light; and (4) Unimak District, consisting of waters between Cape Pankof Light and Scotch Cap, including Sanak Island. The Southeastern District is further subdivided into 2 areas with different management plans: (1) the Shumagin Islands Section, consisting of the Shumagin Islands archipelago, and (2) the Southeastern District Mainland (SEDM), consisting of Stepovak, Balboa, and Beaver bays.

Important salmon fisheries occur on both sides of the Alaska Peninsula. June fisheries targeting Bristol Bay sockeye occur along the South Peninsula, particularly in the Shumagin Islands and at Unimak Island. Afterwards, a salmon fishery on the north side of the Alaska Peninsula targets sockeye returning to the Bear, Nelson, Sandy, and other North Peninsula rivers. Pacific cod, other groundfish, crab, herring, and halibut also contribute to the commercial fisheries of Area M. Major fish processing operations are located at Sand Point, King Cove, Dutch Harbor, and Akutan.

The 2018 commercial salmon harvest in the Alaska Peninsula, Aleutian Islands, and Atka-Amlia Islands Management areas totaled approximately 20,000 Chinook, 3,696,000 sockeye, 368,000 coho, 794,000 pink, and 1,154,000 chum salmon[61]. In 2018, the harvest of sockeye and Chinook salmon on the North Alaska Peninsula were both below projected harvest levels, whereas the harvest of coho, pink, and chum salmon were above projected harvest levels. The North Alaska Peninsula harvests of sockeye and coho salmon were above the previous 10-year (2008–2017) averages for each species, whereas the harvest of Chinook, pink, and chum salmon were below the 10-year averages.

Chignik:
The Chignik Management Area[62] (CMA) is located on the south side of the Alaska Peninsula, approximately 250 miles southwest of Kodiak. The CMA encompasses all coastal waters and inland drainages of the northwest Gulf of Alaska between Kilokak Rocks and Kupreanof Point . For management purposes, these waters are divided into 5 fishing districts: Eastern, Central, Chignik Bay, Western, and Perryville districts. There are over 100 salmon

[60] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.main
[61] https://www.adfg.alaska.gov/FedAidPDFs/SP19-07.pdf
[62] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareachignik.main

producing streams in the CMA. The Chignik River system, located in the Chignik Bay District, is the major sockeye salmon producer and supports two genetically distinct runs.

Site of one of the earliest commercial salmon fisheries in Alaska--in 1878 two canneries operated here. Commercial salmon fishing continues to be the basis of economic and community life in Chignik and a seasonal salmon processing plant still operates here. Sockeye salmon is by far the most important species harvested in the CMA, although pink salmon can also be important. Newly established state waters groundfish fisheries are also providing additional fishing opportunity for Chignik residents, although groundfish are not processed locally. Crab and herring fisheries have declined in importance because of low abundance for crab stocks and lack of markets for herring. The harvest of salmon for subsistence use is very important to Chignik residents.

The 2018 overall sockeye salmon run of 539,825 fish (escapement and harvest) was the poorest return on record since statehood[63]. As a result, the early- and late-run Chignik River sockeye salmon combined total run was well below all recent averages. Consequently, there was no commercial fishing targeting sockeye salmon in 2018.
No Chinook salmon were commercially harvested in the CMA during 2018. A total of 128 sockeye salmon were incidentally harvested during the commercial fishing period targeting pink and chum salmon in the CMA during 2018. Sockeye salmon harvest was the lowest on record since statehood and below all recent averages. One coho salmon was commercially harvested in 2018. The most recent 10-year average for coho salmon harvest in the CMA is approximately 111,000 fish. A total of 6 pink salmon were commercially harvested in the CMA in 2018. The most recent 10-year average harvest (even years only) for pink salmon in the CMA is approximately 702,000 fish. A total of 924 chum salmon were commercially harvested in 2018. The recent 10-year average harvest for chum salmon in the CMA is approximately 253,000 fish.

Kodiak:
The Kodiak Management Area[64] (KMA) is located in the western Gulf of Alaska south of the latitude of Cape Douglas (58°52' North latitude) and east of Imuya Bay (156°20'13" West longitude) near Wide Bay on the Alaska Peninsula. The marine waters around Kodiak are among the most productive in the North Pacific. Offshore upwelling combines with abundant freshwater runoff to make near shore waters rich in nutrients. There are over one hundred species of marine fish native to the KMA, including Pacific herring, *Clupea pallasii* and five species of salmon, including chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, pink *O. gorbuscha*, chum *O. keta*, and coho *O. kisutch*. Commercial herring and salmon fisheries in those waters surrounding the Kodiak Archipelago and the northern Alaska Peninsula are managed by the Alaska Department of Fish and Game in Kodiak. Commercial fishing and processing account for 55% of the private sector work force. During the commercial salmon fishing season (approximately June through September) up to 5,000 people may be involved in the KMA commercial salmon fishery.

There are 10 salmon management plans that direct the Alaska Department of Fish and Game (ADF&G) management activities for specific portions and time periods of the KMA Within the KMA there are 7 districts, which are further broken down into sections and statistical areas (Afognak,Northwest Kodiak Southwest Kodiak Alitak Eastside Kodiak,Northeast Kodiak) The majority of the Chinook salmon is harvested in the Eastside and Northwest Kodiak districts. Sockeye is harvested more around the areas Southwest district Afognak Section while Coho Pink and Chum salmon is commonly harvested on the West Kodiak districts.All salmon fishing districts within the KMA are managed by regulatory plans for the entire season.

[63] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/993821032.pdf
[64] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByAreaKodiak.main

The 2018 commercial harvest (not including personal use or ADF&G Test Fishery) in the KMA was 3,893 Chinook salmon, 1,820,319 sockeye salmon, 438,046 coho salmon, 5,946,840 pink salmon, and 463,814 chum salmon[65]. The total KMA harvest (including KRAA cost recovery) of 8,668,580 salmon was well below the 2018 forecast as well as the previous 10-year average of approximately 21,563,216 salmon.

Aleutian Islands:
The Aleutian Islands Management Area is part of the Alaska Peninsula Salmon Management Area (Area M) and includes the State waters west of Cape Sarichef Light and Scotch Cap (both located on Unimak Island), and the Pribilof Islands, but excludes the Atka-Amlia Islands Management Area (5 AAC 12.100). The Atka-Amlia Islands Management Area (Area F) encompasses all State waters of the Aleutian Islands between Seguam Pass (long 172°50.00'W) and Atka Pass (long 175°23.00' W; 5 AAC 11.101). The Alaska Department of Fish and Game (ADF&G) has been responsible for managing the salmon resources of the Aleutian Islands and Atka-Amlia Islands Management areas since 1960. Purse seines, hand purse seines, and beach seines are the only legal salmon gear types in the Aleutian Islands Area (5 AAC 12.330).There are 4 districts in The Aleutian Islands Management Area[Akutan District,Unalaska District,Umnak District, Adak District].

The Alaska Board of Fisheries (BOF) created the Atka-Amlia Islands Management Area (Area F) in 1992 to provide a harvest opportunity for fishermen on local area pink salmon *Oncorhynchus gorbuscha* runs. Legal salmon gear types for the Atka-Amlia Islands Management Area include both set gillnets and purse seines (5 AAC 11.333). To date, only set gillnet fishermen have reported commercial salmon harvests from the Atka-Amlia Islands Area (Poetter and Keyse 2011). Area M Commercial Fisheries Entry Commission (CFEC) permits are also valid in Area F. Runs of sockeye *O. nerka*, coho *O. kisutch*, pink, and chum *O. keta* salmon occur in Aleutian Islands streams; however, poor salmon markets have generally limited commercial salmon harvests in both the Unalaska Island and Atka-Amlia Island fisheries. Pink salmon are the dominant species in the Aleutian Islands, and runs tended to be stronger during even-numbered years through the year 2000 (Poetter and Keyse 2011).

The 2018 commercial salmon harvest in the Alaska Peninsula, Aleutian Islands, and Atka-Amlia Islands Management areas totaled approximately 20,000 Chinook, 3,696,000 sockeye, 368,000 coho, 794,000 pink, and 1,154,000 chum salmon[66]. In 2018, the harvest of sockeye and Chinook salmon on the North Alaska Peninsula were both below projected harvest levels, whereas the harvest of coho, pink, and chum salmon were above projected harvest levels. The North Alaska Peninsula harvests of sockeye and coho salmon were above the previous 10-year (2008–2017) averages for each species, whereas the harvest of Chinook, pink, and chum salmon were below the 10-year averages.

[65] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1001207336.pdf
[66] https://www.adfg.alaska.gov/FedAidPDFs/SP19-07.pdf

Table 6. 2018 actual and forecasted harvests for the Alaska salmon commercial fishery [Region/Area,Species] (in 000's of fish).

Region/Area	Chinook	Sockeye	Coho	Pink	Chum	TOTAL
Southeast/Yakutat - Region 1						
Actual Harvest	158	602	1,555	7,762	11,165	21,242
Forecasted Harvest		1,296	3,010	23,000	9,984	37,290
Central - Region 2						
Prince William Sound						
Actual Harvest	8	1,302	509	23,937	3,438	29,113
Forecasted Harvest	14	1825	408	32752	4001	38999
Cook Inlet						
Actual Harvest	4	1,185	235	1,691	178	3,293
Forecasted Harvest	8	2354	207	2057	278	4904
Bristol Bay						
Actual Harvest	42	41,253	138	219	1,868	43,521
Forecasted Harvest	32	37598	158	917	993	39,698
Central Region Grand Total						
Actual Harvest	654	227,523	6,979	97,535	40,458	373,148
Forecasted Harvest	54	41,777	773	35,726	5,271	83,601
Arctic-Yukon-Kuskokwim (AYK) - Region 3						
Actual Harvest	3	19	2,546	223	13,648	16,439
Forecasted Harvest	4	4	320	50	3,475	3,853
Westward Region – 4						
Actual Harvest	199	28,326	6,084	25,472	11,863	71,944
Forecasted Harvest	42	8,512	846	10,907	2,247	22,554
Statewide Grand Total						
Actual Harvest	235	49,885	3,615	40,662	20,094	114,490
Forecasted Harvest	99	51,589	4,949	69,682	20,977	147,297

6.7 Economic Value of the Fishery

The 2018 Alaska commercial salmon fishery all species harvest was approximately 114.5 million fish with an estimated preliminary ex-vessel value of $595.2 million, a 13% decrease from the 2017 value of $685.0 million[67] (Table 7).

Sockeye salmon account for 59 percent of total value at $349.2 million and 44 percent of total harvest at 49.9 million fish. Chum salmon were the second most valuable species comprising 21 percent of total ex-vessel value at $125.0 million and 18 percent of total harvest at 20.1 million fish. Pink salmon represent approximately 12 percent of total value at $69.2 million, and 36 percent of total harvest at 40.7 million fish. Coho salmon account for approximately 6 percent of total value at $35.5 million and 3 percent of total harvest at 3.6 million fish. The Chinook salmon harvest was estimated at 234,614 fish with an estimated preliminary value of $16.3 million. Estimates of value are based on preliminary ex-vessel prices and do not include any post-season adjustments paid to fishermen.

In terms of pounds of fish, the all species salmon harvest of 605.1 million pounds ranks 34th in the 1975-2018 time series, with chum salmon harvest ranking 8th, sockeye salmon harvest ranking 13th, coho salmon harvest ranking 31st, and pink salmon harvest ranking 39th in the 1975-2018 time series. Total harvest value for Chinook salmon in 2018 was the lowest since limited entry began in 1975.

Detailed economic analysis of Alaska's salmon fisheries is undertaken routinely by ADFG and through contracted economic fishery specialists (e.g. McDowell & Assoc.). These economically studies are made publically available for future management discussions and decisions on allocation and conservation.

Table 7. Alaska commercial salmon harvests (numbers and pounds) and ex-vessel values, 2018.

Species	Av. weight (lbs)	Av. Price per lb	Number (thousands)	Pounds (thousands)	Ex-vessel Value US$ (thousands)
Southeast					
Chinook	12.16	$7.46	158	1,920	14,322
Sockeye	5.36	$1.96	602	3,225	6,320
Coho	7.40	$1.78	1,555	11,507	20,483
Pink	3.86	$0.38	7,762	29,961	11,385
Chum	8.35	$0.87	11,165	93,230	81,110
Totals			21,242	139,844	133,621
Prince William Sound					
Chinook	15.61	$10.00	8	126	1,265
Sockeye	4.58	$2.71	1,302	5,957	16,144
Coho	8.58	$1.44	509	4,370	6,313
Pink	3.73	$0.51	23,937	89,225	45,397
Chum	8.34	$0.89	3,438	28,662	25,631
Totals			29,113	128,341	94,749
Cook Inlet					
Chinook	12.81	$3.34	4	46	155
Sockeye	4.84	$2.27	1,185	5,733	13,004
Coho	6.29	$0.97	235	1,478	1,427
Pink	3.69	$0.40	1,691	6,246	2,485
Chum	8.34	$0.71	178	1,488	1,053
Totals			3,293	14,992	18,123

[67] https://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr&release=2018_11_02

Table 7. Alaska commercial salmon harvests (numbers and pounds) and ex-vessel values, 2018.

Species	Av. weight (lbs)	Av. Price per lb	Number (thousands)	Pounds (thousands)	Ex-vessel Value US$ (thousands)
Bristol Bay					
Chinook	10.4	$0.80	42	434	347
Sockeye	5.3	$1.26	41,253	218,642	275,489
Coho	6.6	$0.80	138	914	731
Pink	3.6	$0.20	219	788	158
Chum	6.4	$0.36	1,868	11,957	4,305
Totals			43,521	232,735	281,029
Kodiak					
Chinook	6.82	$0.72	4	27	20
Sockeye	5.07	$1.56	1,825	9,258	14,377
Coho	8.16	$0.75	441	3,597	2,679
Pink	3.85	$0.39	6,169	23,666	8,888
Chum	8.04	$0.51	464	3,731	1,897
Totals			8,903	40,278	27,860
Chignik					
Chinook					
Sockeye	4.63	$1.43	0	1	1
Coho	4.00	$0.35	0	0	0
Pink	2.50	$0.20	0	0	0
Chum	7.71	$0.43	1	7	3
Totals			1	8	4
AK North Peninsula					
Chinook	14.50	$1.55	2	25	40
Sockeye	5.35	$1.25	2,372	12,698	15,873
Coho	7.05	$0.30	95	673	202
Pink	3.37	$0.34	30	100	34
Chum	6.57	$0.35	59	388	136
Totals			2,558	13,885	16,284
AK South Peninsula / Aleutian Is					
Chinook	7.96	$0.69	17	138	95
Sockeye	4.99	$1.19	1,343	6,706	7,983
Coho	6.46	$0.44	274	1,773	781
Pink	3.27	$0.33	776	2,536	829
Chum	7.06	$0.42	1,095	7,732	3,241
Totals			3,506	18,885	12,929
Kuskokwim					
Chinook					
Sockeye					
Coho					
Pink					
Chum					
Totals					
Yukon					
Chinook					
Sockeye					
Coho	6.38	$1.00	106	678	678

Table 7. Alaska commercial salmon harvests (numbers and pounds) and ex-vessel values, 2018.

Species	Av. weight (lbs)	Av. Price per lb	Number (thousands)	Pounds (thousands)	Ex-vessel Value US$ (thousands)
Pink	2.72	$0.15	39	107	16
Chum	6.52	$0.64	951	6,196	3,980
Totals			1,096	6,980	4,674
Norton Sound					
Chinook	10.29	$2.99	0	3	8
Sockeye	5.73	$1.40	3	19	27
Coho	7.08	$1.40	260	1,843	2,580
Pink	2.97	$0.25	39	116	29
Chum	7.13	$0.80	238	1,696	1,356
Totals			541	3,677	4,001
Kotzebue					
Chinook					
Sockeye					
Coho					
Pink					
Chum	8.1	$0.40	695	5,643	2,279
Totals			695	5,643	2,279
ALASKA TOTALS					
Chinook	11.59	$5.98	235	2,719	16,251
Sockeye	5.26	$1.33	49,885	262,239	349,216
Coho	7.42	$1.34	3,615	26,833	35,874
Pink	3.76	$0.45	40,662	152,745	69,221
Chum	8.00	$0.78	20,094	160,730	124,992
Totals			114,490	605,267	595,554

7 Assessment Process

This Assessment constitutes an evaluation of the applicant fisheries' management systems against the conformance criteria outlined in the Alaska Responsible Fisheries Management Certification Program Fisheries Standard Version 2.0.

7.1 Scoring

Each clause of the Alaska RFM Fishery Standard is scored based on defined process which Certification Bodies are required to follow. The process is described in brief below and is also outlined in detail in the relevant scheme documents (See Details of Applicable Alaska RFM Documents for further details).

7.1.1 Evaluation Parameters

Evaluation Parameters (described below), which effectively break down each clause using defined performance related parameters, form the basis of scoring.

Process Evaluation Parameter

Requires that evidence is provided outlining the process or system used by a fishery management organization to implement or maintain key aspects of fishery management practices, such as systems for data collection, laws and regulations, stock assessments, and enforcement. If evidence on the current process/system of a given process-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Current Status/Appropriateness/Effectiveness Evaluation Parameter

Requires that the current status, appropriateness, or effectiveness of an element of fisheries management practices (depending on which one of these attributes is most relevant to a given clause) is demonstrated, such as data collected, results of stock assessment including stock status, and enforcement data. If evidence on the current status, appropriateness, or effectiveness of a given output-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Evidence Basis EP

Requires that the availability, quality, or adequacy of the evidence that is the base for scoring a given clause is assessed. If evidence availability (such as studies, reports, other data, and regulations) is scarce, low quality or non-existent, then this Evaluation Parameter is not satisfied.

7.1.2 Numerical Scoring based on Evaluation Parameters

Confidence Ratings and Conformance Levels for each Clause are determined based on the following process:

1. Numerical scoring is effectively a reverse process with each applicable Clause starting out the maximum possible overall score of 10.
2. The Assessment Team is then required to subtract 3 from that total for each Evaluation Parameter not met to reach an overall numerical score for that Clause
3. The Clause is then assigned both a Confidence Rating and an overall Conformance Level based on its overall numerical score as follows:

Overall Score	Confidence Rating	Conformance Level
10	High	Full Conformance
7	Medium	Minor Non-conformance
4	Medium	Major Non-conformance
1	Low	Critical Non-conformance

7.1.3 Confidence Ratings and Non-conformances

Based on the numerical scoring process described above, clauses of the fisheries standards are assigned Confidence Ratings and Conformance Levels—these are intended to reflect the below descriptions.

- **Critical Non-Conformance – Low Confidence Rating**
  Information/evidence is completely absent or contradictive to demonstrate conformance to a clause. Absence of information/evidence results in a low confidence rating. In these cases, a critical non-conformance is assigned.

- **Major Non-Conformance – Medium Confidence Rating**
  Information/evidence to demonstrate conformance to a clause is limited. In these cases, a major improvement is needed to achieve full conformance. A medium confidence rating with a major non-conformance is assigned.

- **Minor Non-Conformance – Medium Confidence Rating**
  Information/evidence is broadly available to demonstrate conformance to a clause although there are limited gaps in information that, if available, could clarify aspects of conformance and allow the assessment team to assign a high confidence rating. In these cases, a minor improvement is needed to achieve full conformance. A medium confidence rating with a minor non-conformance is assigned.

- **Full Conformance – High Confidence Rating**
  Sufficient information/evidence is available to demonstrate full conformance to a clause. In these cases, a high confidence rating is assigned. Sufficient evidence is that which allows objective determination by the assessment team that a fishery fully complies with a given clause in the Alaska RFM Fishery Standard.

Where a non-conformance (regardless of type) is assigned, the assessment team requests further information/clarification from the Client to confirm the non-conformance. The non-conformance is then re-considered in light of any further evidence provided; this may result in a non-conformance being upgraded, downgraded or closed.

7.1.4 Overall Assessment Scoring

Alaska RFM Fishery Standard clauses are categorized into four sections:

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

Any more than one (1) major non-conformance or three (3) minor non-conformances assigned to any Section will result in the assignment of a critical non-conformance at section level.

A critical non-conformance for any clause or section stops the assessment, unless/until the Client is able to provide additional information/evidence that demonstrates a higher level of conformity.

7.2 Consultation Meetings

A joint MSC/AKRFM audit was done during the 2nd reassessment of the AKRFM AK Commercial Salmon fishery on December 2019.

Table 8. Summary of Validation Assessment meetings, December 9-19 2019.

Meeting Date and Location	Personnel	Areas of discussion
Date: 12/9/2019 Time:8:30 AM Location: APICDA 717 K Street, Anchorage, Alaska	ADFG Anchorage: Bill Templin, Kyle Shedd, Sam Rambung, Chris Habicht AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Results of HWI and Response to Pedigree Fitness Studies
Date: 12/9/2019 Time:11:45 AM Location: APICDA 717 K Street, Anchorage, Alaska	ADFG Anchorage: Sam Rambung AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Budget and changes in ADF&G
Date: 12/9/2019 Time:1:30 PM Location: APICDA 717 K Street, Anchorage, Alaska	NMFS AFSC Staff: Elizabeth Siddon (Conference call) AFDF (Client):Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Ocean Productivity
Date: 12/9/2019 Time:3:00 PM Location: APICDA 717 K Street Anchorage, Alaska	PNP Operators: KRAA : Tina Fairbanks PWSA: Tommy Sheridan DIPAC: Eric Priestegaard, Katie Harms VFDA: Mike Wells CIAA: Dean Day AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor	Status of Operations

Meeting Date and Location	Personnel	Areas of discussion
	Scott Marshall, Assessor Marc Johnson , Assessor	
Date: 12/10/2019 Time:8:30 AM Location: APICDA 717 K Street Anchorage, Alaska	ADFG Anchorage: Andrew Munro AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Escapements and Stocks of Concern
Date: 12/10/2019 Time:10:30 AM Location: APICDA 717 K Street, Anchorage, Alaska	ADFG Southeast Region Personnel AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Southeast Region status of fisheries, assessment programs and biological data
Date: 12/10/2019 Time:1:30 PM Location: APICDA 717 K Street, Anchorage, Alaska	ADFG Southeast: Phil Richards AFDF (Client): Dave Gaudet MRAG: Amanda Stern, Ray Beamesderfer MSC: Kate Dewar Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Chinook Research
Wednesday December 11 8:30 AM Anchorage Hilton Hotel	Seabird Workshop Sponsored by AFDF	Seabirds.
Date: 12/12/2019 Location: APICDA Anchorage Time:8:30 AM	ADFG Westward Region Personnel (Conference call) AFDF (Client): Dave Gaudet Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Westward Region status of fisheries, assessment programs and biological data
Date: 12/12/2019 Location:	ADFG AYK Region Personnel: John Lindeman AFDF (Client): Dave Gaudet Assessment Team Members: Ivan Mateo, Lead Assessor	AYK Region status of fisheries, assessment programs and biological data

Meeting Date and Location	Personnel	Areas of discussion
ADF&G Anchorage Time:2:00 PM	Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	
Date: 12/12/2019 Location: Captain Cooke Hotel Time:4:30 PM	AFDF (Client): Dave Gaudet, Julie Decker ASMI: Jeff Regnart Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	2nd Reassessment audit findings
Date: 12/19/2019 Location: CONFERENCE CALL	ADFG Central Region Staff AFDF (Client): Dave Gaudet Assessment Team Members: Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Central Region status of fisheries, assessment programs and biological data

8 Summary of Assessment Outcomes

8.1 Assessment Outcomes by Clause

Table 9 below presents Confidence Ratings and Conformance Levels for each applicable Clause resulting from this Assessment. Note supporting evidence specific to each Clause is outlined in section 9 AKRFM 2.0 Standard A-D key points.

Table 9. Confidence ratings and conformance levels for each clause of the Alaska RFM Standard

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
Topics that will trigger immediate assessment failure				Yes	n/a	High	Full	
A	The Fisheries Management System	1	1.1	Yes	10	High	Full	
			1.2	Yes	10	High	Full	
			1.2.1	Yes	10	High	Full	
			1.3	Yes	10	High	Full	
			1.3.1	Yes	10	High	Full	
			1.4	No				
			1.4.1	Yes	10	High	Full	
			1.5	Yes	10	High	Full	
			1.6	Yes	10	High	Full	
			1.6.1	No				
			1.7	Yes	10	High	Full	
			1.8	Yes	10	High	Full	
			1.9	No				
		2	2.1	Yes	10	High	Full	
			2.1.1	Yes	10	High	Full	
			2.1.2	Yes	10	High	Full	
			2.2	Yes	10	High	Full	
			2.3	Yes	10	High	Full	
			2.4	Yes	10	High	Full	
			2.5	Yes	10	High	Full	
			2.6	Yes	10	High	Full	
			2.7	Yes	10	High	Full	
		3	3.1	Yes	10	High	Full	
			3.1.1	Yes	10	High	Full	
			3.1.2	Yes	10	High	Full	
			3.1.3	Yes	10	High	Full	
			3.2	Yes	10	High	Full	
			3.2.1	Yes	10	High	Full	
			3.2.2	Yes	10	High	Full	
			3.2.3	Yes	10	High	Full	
			3.2.4	Yes	10	High	Full	
B	Science, Stock Assessment Activities and the Precautionary Approach	4	4.1	Yes	10	High	Full	
			4.1.1	Yes	10	High	Full	
			4.1.2	Yes	10	High	Full	
			4.2	Yes	10	High	Full	
			4.2.1	Yes	10	High	Full	
			4.3	Yes	10	High	Full	
			4.4	Yes	10	High	Full	
			4.5	Yes	10	High	Full	

Table 9. Confidence ratings and conformance levels for each clause of the Alaska RFM Standard

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
			4.6	Yes	10	High	Full	
			4.7	Yes	10	High	Full	
			4.8	Yes	10	High	Full	
			4.9	No				
			4.10	No				
			4.11	No				
		5	5.1	Yes	10	High	Full	
			5.1.1	Yes	10	High	Full	
			5.1.2	Yes	10	High	Full	
			5.2	Yes	10	High	Full	
			5.3	Yes	10	High	Full	
			5.4	Yes	10	High	Full	
			5.5	Yes	10	High	Full	
		6	6.1	Yes	10	High	Full	
			6.2	Yes	10	High	Full	
			6.3	Yes	10	High	Full	
			6.4	Yes	10	High	Full	
			6.5	Yes	10	High	Full	
		7	7.1	Yes	10	High	Full	
			7.1.1	Yes	10	High	Full	
			7.1.2	Yes	10	High	Full	
			7.2	No				
C	Management measures, implementation, monitoring, and control	8	8.1	Yes	10	High	Full	
			8.1.1	Yes	10	High	Full	
			8.1.2	Yes	10	High	Full	
			8.2	Yes	10	High	Full	
			8.3	Yes	10	High	Full	
			8.4	Yes	10	High	Full	
			8.4.1	Yes	10	High	Full	
			8.5	Yes	10	High	Full	
			8.5.1	Yes	10	High	Full	
			8.6	Yes	10	High	Full	
			8.7	Yes	10	High	Full	
			8.8	Yes	10	High	Full	
			8.9	Yes	10	High	Full	
			8.10	Yes	10	High	Full	
			8.11	Yes	10	High	Full	
			8.12	Yes	10	High	Full	
			8.13	No				
		9	9.1	Yes	10	High	Full	
			9.2	Yes	10	High	Full	
			9.3	Yes	10	High	Full	
		10	10.1	Yes	10	High	Full	
			10.2	Yes	10	High	Full	
			10.3	No				
			10.3.1	No				
			10.4	No				

Table 9. Confidence ratings and conformance levels for each clause of the Alaska RFM Standard

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
			10.4.1	No				
		11	11.1	Yes	10	High	Full	
			11.2	Yes	10	High	Full	
			11.3	Yes	10	High	Full	
			11.4	Yes	10	High	Full	
D	Serious Impacts of the Fishery on the Ecosystem	12	12.1	Yes	10	High	Full	
			12.2	Yes	10	High	Full	
			12.2.1	Yes	10	High	Full	
			12.2.2	Yes	10	High	Full	
			12.2.3	Yes	10	High	Full	
			12.2.4	Yes	10	High	Full	
			12.2.5	Yes	10	High	Full	
			12.2.6	Yes	10	High	Full	
			12.2.7	Yes	10	High	Full	
			12.2.8	Yes	10	High	Full	
			12.2.9	Yes	10	High	Full	
			12.2.10	Yes	10	High	Full	
			12.2.11	Yes	10	High	Full	
			12.3	Yes	10	High	Full	
			12.4	Yes	10	High	Full	
			12.5	Yes	10	High	Full	
			12.6	Yes	10	High	Full	
			12.7	Yes	10	High	Full	
		13	13.1	Yes	10	High	Full	
			13.1.1	Yes	10	High	Full	
			13.2	Yes	10	High	Full	
			13.2.1	Yes	10	High	Full	
			13.3	Yes	10	High	Full	
			13.4	Yes	7	Medium	Minor Non Conformance	
			13.5	Yes	10	High	Full	
			13.6	Yes	10	High	Full	
			13.7	Yes	10	High	Full	
			13.7.1	Yes	10	High	Full	
			13.7.2	Yes	10	High	Full	
			13.7.3	Yes	10	High	Full	
			13.8	Yes	10	High	Full	
			13.9	Yes	10	High	Full	
			13.10	Yes	10	High	Full	
			13.11	Yes	10	High	Full	
			13.12	Yes	10	High	Full	
			13.13	Yes	10	High	Full	

8.2 Certification Recommendation

Following this Assessment, the Assessment Team recommends that the applicant fishery;

- **US Alaska Pacific Salmon Commercial Fishery**

be awarded continuing certification against the Alaska RFM Certification Program Fisheries Standard v2.0.

8.3 Certification Determination

SAI Global/Global Trust's internal Fishery Certification Committee, which is comprised of both internal and external fishery experts as well as certification experts, makes the ultimate determination as to whether or not an applicant fishery is granted certification.

Following a meeting on May 27 2020, the Certification Committee has determined that the applicant fishery in this instance;

- **US Alaska Pacific Salmon Commercial Fishery**

be awarded continuing certification against the Alaska RFM Certification Program Fisheries Standard v2.0.

9 Assessment Outcomes

Topics that will trigger immediate assessment failure

According to the Alaska RFM Standard Version 2.0, the following fisheries management issues will cause a fishery to immediately fail assessment:

- Dynamiting, poisoning, and other comparable destructive fishing practices.
- Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.
- Shark finning (i.e., removal and retention of shark fins while the remainder of the shark is discarded in the ocean).
- 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 Assessment, carried out a review of the available evidence with respect to these issues. The results of this review are presented below.

Topics that will trigger immediate assessment failure.						
Dynamiting, poisoning, and other comparable destructive fishing practices.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
EVIDENCE:	There is no evidence of such methods being employed in the fishery under assessment.					
Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
EVIDENCE:	There is no evidence of significant (or otherwise) illegal, unreported, and unregulated (IUU) fishing activities within State and Federal jurisdictions of Alaska.					
Shark finning.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
EVIDENCE:	There is no evidence of shark finning in the fishery under assessment and such a practice is highly unlikely given the lack of shark bycatch.					
Slavery and slave labor on board fishing vessels.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
EVIDENCE:	There is no evidence of incidences of successful prosecutions of entities involved in the fishery under assessment for slavery and/or slave labor offences.					
Significant lack of compliance with the requirements of an international fisheries agreement.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
EVIDENCE:	The fishery under assessment is entirely State managed and as such is not subject to international fisheries agreements.					

Section A: The Fisheries Management System

Fundamental Clause 1. Structured and legally mandated management system

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.

Supporting Clause 1.1.

1.1.	**There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *Management agencies are physically and legally established at international, State and local levels.*	☑

EVIDENCE:

Alaska's salmon fisheries are managed under a clear structure of laws, regulations, treaties, and other legal mandates and instruments, at the international, national, state (State-wide), and local (Within state) levels. This management process is well-established and transparent. 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 renewable resources belonging to the state shall be utilized, developed and maintained on the sustained yield principle, subject to preferences among beneficial uses. ADFG Commercial Fisheries Division is responsible for conservation of Alaska's salmon stocks and for management of the commercial fisheries. ADFG's fishery managers in each area produce annual management reports and similar documents, taking into account all previously-agreed management measures. Representatives of ADFG and NMFS routinely and actively participate in several international forums and organizations (i.e. North Pacific Anadromous Fish Commission, and Pacific Salmon Commission). These organizations strive for compatibility in their management and actively foster cooperation among States with regard to salmon fisheries research, development and management. ADFG conducts routine annual and in-season reviews and revisions of conservation and management measures within the Commercial Fisheries division, and with the BOF. The management arrangements and decision-making processes for Alaska salmon fisheries are organized in a very transparent manner, and are readily accessible on the ADFG website.

Current status: *The output of the management organization(s) is in line with fishery resource management needs. Examples may include rule making, scientific research, stock and ecosystem assessments, implementation of rules and regulations, and enforcement activities.*	☑

EVIDENCE:

Almost all of Alaska's salmon fisheries take place in the internal waters (0-3 nm, and other enclosed waters) of the State of Alaska. Alaska manages those fisheries under the authority of its Constitution, statutes (laws), and regulations (administrative code):

* Article VIII of Alaska's Constitution states: Section 4. Sustained Yield: Fish, forests, wildlife, grasslands, and all other renewable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses[68].

* "Alaska's Constitution: A Citizen's Guide (Fourth Edition)" explains: "This section bolsters the commitment to conservation found in Section 2. The principle of sustained yield management is a basic tenet of conservation: the annual harvest of a biological resource should not exceed the annual regeneration of that resource. Maximum sustained yield is the largest harvest that can be maintained year after year. State law defines maximum sustained yield as 'the achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the state land consistent with multiple uses' (AS 38.04.910). At the time of the constitutional convention, stocks of Alaska's salmon had been reduced to a sad remnant of their past bounty by neglect of the sustained yield maxim. The qualifying phrase 'subject to preferences among beneficial uses' signals recognition by the

[68] http://w3.legis.state.ak.us/docs/pdf/citizens_guide.pdf

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

delegates that not all the demands made upon resources can be satisfied, and that prudent resource management based on modern conservation principles necessarily involves prioritizing competing uses."

* Statutes (also termed "laws") are enacted by the state Legislature. Title 16 of Alaska Statutes, entitled "Fish And Game", sets forth the laws which govern the management of Alaska's salmon fisheries, as well as myriad other living resources. Like all other statutes, Title 16 is consistent with the Constitution[69].

* Regulations (also termed "administrative code") are developed and implemented by departments of the Executive branch of government, which is headed by the Governor. Title 5 of the Alaska Administrative Code, entitled "Fish And Game", is the body of state regulations by which Alaska's salmon fisheries are managed. All regulations must be consistent with the governing statutes; that is, 5AAC is consistent with AS16. Regulations of particular relevance to this assessment are: Commercial and Subsistence Fishing and Private Non-profit Salmon Hatcheries. (5 AAC 1 - 5 AAC 41) and Fish and Game Advisory Committees. (5 AAC 96 - 5 AAC 98.ADFG Commercial Fisheries Division is responsible for conservation of Alaska's salmon stocks and for management of the commercial fisheries[70]. In addition, the Sport Fish, Subsistence and Habitat divisions, as well as the BOF, all have responsibility for salmon conservation. The BOF is responsible for fishery policy and allocation among users[71].

The MSFSCMA is the primary federal legislation governing the management of American fisheries. Under this, law the fisheries of the American EEZ off Alaska are managed by the NPFMC. However, the NPFMC gave management authority to ADFG when it developed the Fishery Management Plan for Alaska salmon fisheries[72].

Appropriateness/Effectiveness: *The management framework is appropriate for managing the resource. For example, the larger the exploitation, vulnerability, or risks of a fish stock, the more work and precision (assessment of the resource ensuring the risks related to overfishing and equivalent negative effects) shall be focused in managing the resource. This shall be done in compliance with legislative and regulatory requirements at the local, national, and international level, including the requirements of any regional fisheries management agreement. The management system shall not be subject to continual unresolved or repeated disputes or political instability.*	☑
EVIDENCE: See Supporting Clause 6.2.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an effective legal and administrative framework established at the local and national level is appropriate for fishery resource conservation and management. In addition, the management system and the fishery operate in compliance with the requirements of local, national, and international laws and regulations, including the requirements of any regional fisheries management agreement. Examples may include fishery management plans or other relevant information.*	☑
EVIDENCE: The availability and quality of evidence is sufficient to substantiate an effective legal and administrative framework is appropriate for fishery resource conservation and management.	

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)** =	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance

[69] http://www.energy.gov/sites/prod/files/2015/06/f22/16.20.195.pdf
[70] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.sustainingakfisheries
[71] http://www.adfg.alaska.gov/index.cfm?adfg=process.main
[72] http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP114.pdf

1.1.	**There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.**
Non-conformance Number (if applicable):	

Supporting Clause 1.2.

1.2.	**Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Current status/Appropriateness: *If a stock is subject to two or more jurisdictions (nations, states, etc.) (either by distribution or migration), then exploitation by all jurisdictions shall be considered when defining exploitation levels and determining stock status to avoid overfishing/depletion of the resource. The scoring of this parameter shall consider that significant migration may take a species outside the jurisdiction of the managing agency (e.g., for significant feeding or ontogenetic migration).*	☑

EVIDENCE:

Management measures take into account the whole Alaska salmon stock unit over its entire area of distribution including some stocks in the extreme south being managed concurrently with Canada. ADFG's main priority for salmon fisheries is achieving escapement, which ensures that enough salmon escape the fisheries and spawn in their natal rivers. Escapement goals necessarily take into account each stock unit over its entire area of distribution, because escapement is the net result of all factors that have influenced each stock during its life history stages in freshwater and the ocean and along its migration path, including the fisheries to which it is subjected. The biological unity of each stock (e.g. Kenai River Chinook salmon, Naknek River sockeye salmon) is explicitly taken into account in ADFG's setting of escapement goals, and in the management of the fisheries, which ensures escapement as its first priority.

Unlike most other commercially harvested fishes, Alaska salmon are anadromous and semelparous. Alaska fisheries for these species do not usually occur out on the open sea; they generally take place relatively near each stock natal stream (with exceptions such as the Southeast Alaska troll and the southern southeast Alaska gillnet fisheries), as adult salmon conduct their spawning migration. Salmon are faithful to their stream, and their stock can be referred to their natal river. This means that common fisheries management methods, such as setting of Total Allowable Catches (TAC), are usually not appropriate for Alaska salmon. ADFG's main priority in managing salmon fisheries is to obtain escapements that ensure enough salmon escape the fisheries, and spawn in their natal rivers to sustain future runs. The total number of salmon returning to a given river (the "run" or "return") is usually much greater than the required escapement level[73]. The amount, over and above escapement is available for harvest by commercial, recreational, personal use, or subsistence fisheries. If the run is less than the escapement goal, ADFG attempts to stop or minimize harvests. Therefore, escapement goals take into account each stock unit over its entire area of distribution, because escapement is the net result of all factors which have influenced each stock during its life history, including the fisheries to which it is subjected.

All five species of Alaska salmon are anadromous and home to their natal streams. Their migration begins in Alaska's freshwater habitats, which the fish depart on their way to marine habitats. These habitats are monitored, studied, and protected by ADFG. In some cases, monitoring and studies are performed by scientists of other agencies, such as the USFS, NPS, and NMFS. Results from monitoring and studies are made available to the public through the ADFG's websites.
The protection of salmon habitat is the responsibility of ADFG's Habitat Division, pursuant to Title 16 of Alaska Statutes. The Habitat Division routinely coordinates its work with other agencies, such as NMFS[74].

Because Alaska salmon are anadromous, they cannot properly be considered to be one stock, as would be the case for many other species. Every salmon species and each run have particular characteristics such as size, freshwater habitat requirements, food preferences, ocean migration patterns, spawning run timing, etc. All of these characteristics are considered by ADFG in setting escapement goals and managing the fisheries to achieve these escapement goals as a first priority.

Effectiveness: *Managers shall have an understanding of stock structure and composition as these relate to stock resilience over its entire distribution area. The underlying objective is to preserve genetic diversity between and within species and avoid localized depletions (overall affecting the stock contributing to its resilience and stability). This assessment shall consider, when*	☑

[73] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section223.htm
[74] http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main

1.2.	**Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.**	
appropriate, demographic independence of populations or stocks (i.e., if a component stock of a species is demographically independent from another because it is genetically different, has significant difference in age structure, or if there is insignificant exchange among groups due to distance, environmental barriers, or other reasons).		
EVIDENCE: See previous discussion under current status.		
Effectiveness: *The stock may spend a portion of its life (migration for feeding, growth, or reproduction) in both fresh and saltwater, in international waters, or in another jurisdiction, and may suffer mortality or other pressures. These must be accounted for when assessing stock status.*		☑
EVIDENCE: See previous discussion under current status.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management measures consider (1) the stock status over its entire area of distribution, (2) the area through which the stock migrates during its life cycle, and (3) other biological characteristics of the stock. Examples may include the presence of genetic studies, age structure data, stock assessments or other relevant information.*		☑
EVIDENCE: The availability and adequacy of evidence is sufficient to substantiate that management measures consider stock status, salmon migration during its life cycle and other biological characteristics of the stock.		
References:		

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(0 x 3)**			**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 1.2.1.

1.2.1.	**Previously agreed management measures established and applied in the same region is region shall be taken into account by management.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process or system that allows the continuity and updating of previously agreed and implemented management measures. Examples may include a specific review process or management plan where these measures can be clearly identified and continued implementation and updating can be carried out.*	☑

EVIDENCE:
ADFG's fishery managers in each area produce annual management reports that explain how the fisheries were prosecuted and managed in a given year. In addition, regulations concerning allocation criteria and subsistence determinations take into consideration past use and management. In this way, the management system deliberately takes into account all previously-agreed management measures.

Current status/Appropriateness/Effectiveness: *Previously agreed management measures established and applied in the same region are included and part of current management decisions. Examples may include international or other agreements not honored by the management system or a management agency. The management system is effectively continuing implementation of agreed management measures.*	☑

EVIDENCE:
ADFG's fishery managers in each area produce annual management reports and other fisheries related documents. These reports explain how the fisheries were prosecuted and managed in a given year, how that differed from the previous year(s), and results of any changes implemented by ADFG or imposed by the BOF. In addition, regulations concerning allocation criteria and subsistence determinations also take into consideration past use and management. In this way, the management system deliberately takes into account all previously-agreed management measures.

Annual management reports and other fisheries related documents are readily available at the ADFG Commercial Fisheries websites for each major fishing area:
* Southeast Alaska[75]
* Prince William Sound[76]
* Cook Inlet[77][62]
* Kodiak & Westward[78][79][80]
* Bristol Bay[81][66]
* Arctic-Yukon-Kuskokwim[82][83]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that previously agreed management measures established and applied in the same region are taken into account by management.*	☑

The availability and adequacy of the evidence is sufficient to substantiate that previously management measures are taken into account by management.

References:	
Numerical score:	**Starting score – (Number of EPs NOT met x 3) = Overall score**

[75] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon#fishery
[76] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.salmon
[77] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareacookinlet.salmon
[78] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByAreaKodiak.salmon
[79] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareachignik.salmon
[80] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.main
[81] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.salmon
[82] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareanortonsound.salmon
[83] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.salmon

1.2.1.	Previously agreed management measures established and applied in the same region is region shall be taken into account by management.		
10	0	10	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Full Conformance
Non-conformance Number (if applicable):			

Supporting Clause 1.3.

1.3.	**Where transboundary, shared, straddling, highly migratory, or high seas stocks are exploited by two or more States (neighboring or not), the applicant and appropriate management organizations concerned shall cooperate and take part in the formal fishery commission or arrangements appointed to ensure effective conservation and management of the stock(s) in question and their environment.**
Relevance:	Relevant.
	Note: This clause pertains only if the stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2. Where sub-stocks are referred to as part of an overall stock, there shall be sufficient information on biology, distribution, and life cycle that demonstrates the degree of association or disassociation, and the basis for the management approach taken, to prevent recruitment failure of the stock or other negative impacts that are likely to be irreversible or very slowly reversible.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the applicant organization(s) cooperates for the management of the transboundary, shared, straddling, highly migratory or high seas stock. This mechanism has the sustainable total exploitation of the stock as its main objective.*	☑
EVIDENCE: Representatives of ADFG and NMFS routinely and actively participate in several relevant Salmon management forums and organizations that deal with transboundary issues.	
Current Status/Appropriateness/Effectiveness: *There is evidence that the mechanism described in the process parameter is effective at ensuring the stock is sustainably exploited. This can take the form of evidence that the stock is not overfished or subject to overfishing across the entirety of the range of the stock.*	☑
EVIDENCE: Representatives of ADFG and NMFS routinely and actively participate in several relevant forums and organizations that deal with transboundary issues, including, but not limited to: * North Pacific Anadromous Fish Commission (NPAFC))[84] * Pacific Salmon Commission (PSC)[85] * Pacific States Marine Fisheries Commission (PSMFC)[86] *Pacific Fisheries Management Council (PFMC)[87]	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where transboundary, shared, straddling, highly migratory, or high seas fish stocks are exploited by two or more States, the applicant and appropriate management organizations concerned cooperate and take part in formal fishery discussions or arrangements that have been appointed to ensure effective conservation and management of the stock(s) and fisheries in question. Examples may include evidence of formal agreements, records of meetings, and decisions.*	☑
EVIDENCE: The availability and adequacy of evidence is sufficient to substantiate that supporting clause 1.3 is met by management agencies where transboundary, shared, straddling fish stocks are exploited by two or more states.	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance

[84] http://www.npafc.org/new/index.html
[85] http://www.psc.org/
[86] [1]http://www.psmfc.org/
[87] http://www.pfmc.org

1.3.	**Where transboundary, shared, straddling, highly migratory, or high seas stocks are exploited by two or more States (neighboring or not), the applicant and appropriate management organizations concerned shall cooperate and take part in the formal fishery commission or arrangements appointed to ensure effective conservation and management of the stock(s) in question and their environment.**
Non-conformance Number (if applicable):	

Supporting Clause 1.3.1.

1.3.1.	**Conservation and management measures established for the stock under consideration within the jurisdiction of the relevant States for transboundary, shared, straddling, highly migratory, or high seas stocks, shall be compatible in a manner consistent with the rights, competence, and interests of the States concerned.**
Relevance:	Relevant.
	Note. This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2. Compatibility of management measures does not mean identical management measures, but the approach shall be consistent with respect to the overall management and conservation goals of the stock.

Evaluation Parameters	**Met?**
Process: *Identification of common objectives for maintenance of stock biomass.*	☑

EVIDENCE:

As with all migratory and straddling fishery species, there is debate and often dispute concerning management of these stocks in national and international waters. Fundamental agreements on management and arrangements for furthering research exist for Pacific salmon throughout the range of the five species. These include: a prohibition of high seas fishing for salmon by all nations involved (Japan, Canada, Republic of Korea, Russian Federation and the United States (NPAFC) and supporting this, research policies that further understanding on marine range and distribution of each major strain of Pacific salmon.

Current status/Appropriateness/Effectiveness: *Implementation of measures to achieve the common objectives mentioned above (i.e., similar harvest rates based on stock status, common rebuilding objectives for depleted stocks).*	☑

EVIDENCE:

Each of the above-cited organizations in which ADFG and NMFS salmon scientists and managers participate strives for compatibility in their management measures. These organizations have sustained yield and conservation as their highest priority, even in cases where different states are competing for the same resource (i.e. US and Canada)[88].

As with all migratory and straddling fishery species there is debate and often dispute concerning management of these stocks in national and international waters. Fundamental agreements on management, and arrangements for furthering research, exist for Pacific salmon throughout the range of the five species. These include: a prohibition of high seas fishing for salmon by all nations involved (Japan, Canada, Republic of Korea, Russian Federation and the United States (NPAFC) and, supporting this, research policies that further understanding on marine range and distribution of each major strain of Pacific salmon[89]. Within the international arena of salmon management in the North Pacific, incompatibilities in approach can exist. However, the internationally mandated organizations have made commitments to common objectives and develop resolutions for improving compatibility within the management arrangements of the contracting parties. Within the US and Alaska, there is a strong track record of implementing agreements and resolutions made at these organizations as Federal or State laws[90]. U.S- Canada Pacific Salmon Commission[91]. It's the one body that Alaska shares straddling stocks with, and really does have almost daily coordination on management resources.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures established for the stock within the jurisdiction of the relevant States for shared, straddling, high seas, or highly migratory stocks, are compatible in a manner consistent with the rights, competences, and interests of the States concerned. Examples may include evidence of formal agreements, records of meetings and decisions, stock assessment, and other reports.*	☑

EVIDENCE:

The availability and adequacy of evidence is sufficient to substantiate that supporting clause 1.4 is met by management agencies where transboundary, shared, straddling fish stocks are compatible in a manner consistent with the interests of the states concerned.

References:

[88] http://www.npafc.org/new/index.html
[89] http://www.npafc.org/
[90] http://www.psmfc.org/
[91] http://www.psc.org/

1.3.1.	Conservation and management measures established for the stock under consideration within the jurisdiction of the relevant States for transboundary, shared, straddling, highly migratory, or high seas stocks, shall be compatible in a manner consistent with the rights, competence, and interests of the States concerned.						
Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**	
	10	**– (**	**0**	**x**	**3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 1.4.

1.4.	**A State's fishery management organization not member or participant of a sub-regional or regional fisheries management organization shall cooperate, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement.**
Relevance:	Not relevant.
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.

Evaluation Parameters	**Met?**
Process: *There is ongoing cooperation in stock assessment, data sharing, and other activities.*	☐
EVIDENCE: Supporting Clause 1.4 is not relevant because the nations that fish North Pacific Salmon AK fishery, namely the U.S. and Canada, are members of the NPAFC, and PSC.	
Current status/Appropriateness/Effectiveness: *Relevant measures are implemented by non-member States.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State non-member or participant of a sub-regional or regional fisheries management organization cooperates, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement. Examples may include reports detailing results of common surveys or acceptable harvest rates.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3)**	**=**		**NA**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

Supporting Clause 1.4.1

1.4.1.	**A fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.**
Relevance:	Relevant.
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.

Evaluation Parameters	**Met?**
Process: *There is a history of prior consultation.*	☑

EVIDENCE:
ADFG and NOAA are mandated to protect estuarine and marine habitats from non-fishery actions primarily through cooperative efforts involving other state and federal agencies and local governments. In all circumstances, full account is taken of any proposed non fishery actions and activities that may have an impact of the conservation and management of Alaska salmon fishery resources.

Current status/Appropriateness/Effectiveness: *The views of the managing fishery organization are taken into account.*	☑

EVIDENCE:
ADFG protects estuarine and marine habitats primarily through cooperative efforts involving other state and federal agencies and local governments. Both ADFG and NOAA participate in a network of coastal area management related institutional frameworks that serve to review any proposed development or activity that could impact the conservation and habitat of Alaska salmon. The main processes are the National Environmental Policy Act (NEPA) and Essential Fish Habitat (EFH) which allow ADFG and NOAA to implement their statutory obligations for the protection and conservation of Alaska's fish and game resources within their respective jurisdictions. For example, any activity or project that is conducted below the ordinary high water mark of an anadromous stream requires a Fish Habitat Permit[92].

NOAA Fisheries' Habitat Conservation Division works in coordination with other government agencies and industries, stakeholder groups, private citizens to avoid, minimize, or offset the adverse effects of activities on EFH and living marine resources in Alaska. This work includes conducting and/or reviewing environmental analyses for a large variety of activities outside of fishing ranging from coastal development to large transportation and energy projects. The division identifies technically and economically feasible alternatives and offers recommendations for the conservation of valuable living marine resources. The division focuses on activities in habitats used by federally managed fish species located offshore, nearshore, in estuaries, and in freshwater areas important to anadromous salmon[93]. Hence, in all circumstances, full account is taken of proposed actions and activities that may have an impact of the conservation and management of Alaska salmon fishery resources.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement consults with the latter, in advance to the extent practicable, and take its views into account. Examples may include reports detailing action taken by the State(s) in question.*	☑

EVIDENCE:
The availability and quality of evidence are sufficient to substantiate ADFG and NOAA are seeking to affect conservation and management through cooperative and collaborative actions with non-fishery organizations.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)** =	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High

[92] http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main
[93] https://alaskafisheries.noaa.gov/habitat

1.4.1.	**A fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.**	
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		Full Conformance
Non-conformance Number (if applicable):		

Supporting Clause 1.5.

1.5.	**The applicant's fishery management system, when appropriate for the stock under consideration, shall actively foster cooperation between States with regard to (1) information gathering and exchange, (2) fisheries research, (3) fisheries management, and (4) fisheries development.**
Relevance:	Relevant
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.

Evaluation Parameters	**Met?**
Process: *The extent to which a formal process or system is available.*	☑

EVIDENCE:
Representatives of ADFG and NMFS routinely and actively participate in several relevant forums and organizations, including, but not limited to NPAFC, PSC, and PSMFC. These organizations actively foster cooperation among States with regard to salmon fisheries information gathering and exchange, research and management. ADFG and various federal agencies participate in numerous organizations that seek to obtain information about the ecosystem and status and management of salmon fisheries. All salmon fisheries are fully developed and utilized.

Current Status/Appropriateness/Effectiveness: *Level of activity, application, and level of engagement.*	☑

EVIDENCE:
Representatives of ADFG and NMFS routinely and actively participate in several relevant forums and organizations, including, but not limited to:

* North Pacific Anadromous Fish Commission[94] Article VII of the Convention mandates extensive cooperation among member nations in conducting scientific research for the purpose of conservation of anadromous populations. With respect to the Convention area, cooperation includes "collecting, reporting and exchanging statistics and biological information, fisheries data, including catch and fishing effort statistics, biological samples and other relevant data." Pertaining to areas adjacent to the Convention area, the member-nations can be requested to provide "catch information, enhancement information, materials such as biological samples, for example, scales and DNA material, and other technical data or information related to anadromous populations and ecologically related species." The Convention calls for the development of "appropriate cooperation programs, including scientific observer programs, to collect fishing information in the Convention Area for the purpose of scientific research on anadromous populations." Member-nations are also to cooperate in scientific exchanges such as seminars, workshops, and exchanges of scientific personnel.

* Pacific Salmon Commission[95]
This organization supports fisheries conservation, development, management, and legislation. To accomplish this, it maintains several programs that focus on scientific, inventory and economic research and data collections, consolidation and distribution. These programs primarily provide information for those with scientific or economic interests in the field, but also aim to provide educational materials for the general public related to their areas of focus.

* Pacific States Marine Fisheries Commission[96]
The Pacific States Marine Fisheries Commission (PSMFC) also coordinates research activities, monitors fishing activities, and collects and maintains databases on salmon, steelhead and other marine fish occurring off the coast of California, Oregon, Washington, Idaho, and Alaska.
The above organizations actively foster cooperation among States with regard to salmon fisheries research and management. ADFG and various federal agencies participate in numerous organizations that seek to obtain information about the ecosystem and status and management of salmon fisheries. Examples include: the North Pacific Research Board (NPRB) which funds "... 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 a priority on cooperative research efforts designed to address pressing fishery management or marine

[94] http://www.npafc.org/new/science.html
[95] http://www.psc.org/Meetings/2016_PSC_Annual_Meeting_Summary.pdf
[96] http://www.psmfc.org/

1.5.	**The applicant's fishery management system, when appropriate for the stock under consideration, shall actively foster cooperation between States with regard to (1) information gathering and exchange, (2) fisheries research, (3) fisheries management, and (4) fisheries development.**

ecosystem information needs[97]; The Wild Salmon Centre[98], which works to protect the best remaining wild salmon ecosystems across the Pacific Rim; The Pacific Coastal Salmon Recovery Fund, which was established by Congress in 2000 to provide project funding to states and tribes of the Pacific Coast Region to protect, restore, and conserve Pacific salmon and steelhead populations and their habitats[99]; and the Saltonstall-Kennedy grant program[100],which is a fund administered by the NMFS to provide grants or cooperative agreements for fisheries research and development.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the applicant's fishery management system, when appropriate for the stock under consideration, fosters active international cooperation on fishery matters with regard to information gathering and exchange, fisheries research, fisheries management, and fisheries development. Example of evidence sources may include outputs from activity (e.g., reports, minutes, common or collective themes).*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that ADFG fishery management system fosters cooperation on fishery matters regarding information gathering and exchange on fisheries management and development.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[97] http://www.nprb.org/nprb/about-us/mission-research-principles/research-approaches/multidisciplinary-integratedecosystem-based-research/
[98] http://wildsalmoncenter.org/
[99] http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/pacific_coastal_salmon_recovery_fund.html
[100] http://www.nmfs.noaa.gov/mb/financial_services/docs/noaa-fisheries-sk-grants-fy1516-alaska.pdf

Supporting Clause 1.6.

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

Evaluation Parameters	**Met?**
Process: *There is an agreed-upon system to finance the fishery management organizations and arrangements.*	☑

EVIDENCE:
Management bodies such as North Pacific Anadromous Fishery Commission (NPAFC), PFMC, PSC, and PSMFC and their activities involved in the salmon fisheries are largely financed through contributions and dues from members.

Current status/Appropriateness/Effectiveness: *The fishery management organizations and arrangements are currently financed using a cost recovery or other system.*	☑

EVIDENCE:
NPAFC was established under the Convention for the Conservation of Anadromous Populations in the North Pacific Ocean (signed in 1992; entered into force in 1993). The member nations of the NPAFC are Canada, Japan, Republic of Korea, Russian Federation, and United States of America. The primary objective of the Commission is to promote the conservation of anadromous populations in the Convention Area. NPAFC operations are supported through contributions made by the Parties[101] The PSC is the body formed by the governments of Canada and the United States to implement the Pacific Salmon Treaty staff and other operational costs are financed with annual dues paid by each national government (currently $1.44 million per country). The Secretariat is not able to act without consensus between countries[102]. PSMFC's activities are funded through federal grants, special contracts, and dues from its member states. Since 1978, PSMFC has maintained a low overhead rate. PSMFC regularly serves as a primary contractor on grants, projects, and contracts for states and other organizations in large part due to its low overhead and proven management ability. The PSMFC provides administrative support in the form of payroll, procurement, accounting, travel arrangements, and contract monitoring[103].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is agreement on the means by which the activities of such organizations and arrangements are financed. Where appropriate, and when possible, such organizations and arrangements aim to recover the costs of fisheries conservation, management, and research. Examples may include data showing the expenditure and cost recovery derived from fisheries management.*	☑

EVIDENCE:
The availability and adequacy of evidence is sufficient to substantiate that there is agreement on means to finance costs of fisheries management.

References:							
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3) =	**Overall score**
	10						**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[101] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[102] http://www.psc.org/pubs/About/OrientationGeneralJune2015.pdf
[103] http://www.psmfc.org/psmfc-info

Supporting Clause 1.6.1.

1.6.1.	**Without prejudice to relevant international agreements, States or fishery management organizations shall encourage banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures.**
Relevance:	Not relevant.
	Note: The fishery for the *stock under consideration* occurs outside the exclusive economic zone (EEZ), there is evidence of flags of convenience, and evidence of illegal, unreported, and unregulated (IUU) fishing. Not applicable otherwise.

Evaluation Parameters	**Met?**
Process: *There is a system that encourages banks to require vessels to be flagged within the jurisdiction of interest.*	☐
EVIDENCE: Supporting clause 1.61 is not relevant as there are no flagged vessels fishing in the US Alaska salmon fishery.	
Current Status/Appropriateness/Effectiveness: *There is regulation that directs for vessels to be flagged outside the State's jurisdiction. The fishery for the stock under consideration occurs outside EEZ, and there are flags of convenience operations present, or evidence of IUU fishing.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State or fishery management organizations encourages banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures. Examples may include data showing fishery operation by vessels flying a flag different from that of the State where fishing geographically occurs.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x**	**3**	**)**	**=**	**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

Supporting Clause 1.7.

1.7.	**Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a procedure to review management measures. The procedure includes the use of outcome indicators against which the success of management measures in achieving specific management objectives is measured. The procedure covers all management measures, including those relating to the sustainable exploitation of the target stock; the mitigation of negative impacts on non-target species through bycatch, discarding, and indirect effects; and the protection of Endangered, Threatened, Protected (ETP) species and the physical environment. Please note that both the management processes of the North Pacific Fishery Management Council (NPFMC) for federal waters, and the Alaska Board of Fisheries (BOF) for state waters, allow for the continuous review of conservation and management measures. Such processes shall be clearly documented as relevant to key management measures for the fishery under assessment.*	☑

EVIDENCE:

Alaska's salmon fisheries are managed by ADFG. The Division of Commercial fisheries manages commercial harvests, and, in conjunction with the Division of Subsistence, harvests by subsistence fishermen. The Division of Sport Fisheries manages sport and personal use resource harvests. Every three years (based on the BOF schedule) each Alaska Region updates its escapement information and submits a salmon stock status report to the BOF. This report, which is mandated in the Policy For The Management of Sustainable Salmon Fisheries (5AAC 39.222), reviews stock status within a management area, may recommend new and modified escapement goals based on the new data, identifies any stocks of concern, and provides management or action plans to deal with management issues.

Current status/Appropriateness/Effectiveness: *If, as a result of the review process, it is determined that management measures are not achieving the specific management objectives they are designed to achieve, they are revised and updated as appropriate.*	☑

EVIDENCE:

Alaska's salmon fisheries are managed by ADFG. The Division of Commercial fisheries[104] manages commercial harvests, and, in conjunction with the Division of Subsistence[105], harvests by subsistence fishermen. The Division of Sport Fisheries manages sport and personal use resource harvests[106]. Every three years (based on the BOF schedule) each Alaska Region updates its escapement information and submits a salmon stock status report to the BOF. This report, which is mandated in the Policy For The Management Of Sustainable Salmon Fisheries (5AAC 39.222)[107], reviews the status of all stocks within a management area, recommends new and modified escapement goals based on the new data that have been collected and analyzed in the past three years, defines stocks of concern, and provides management or action plans to deal with fishery management issues. There is also frequent, routine annual and in-season review and revision of conservation and management measures within Commercial Fisheries Division, and between the Commercial Fisheries Division and the BOF[108].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fishery management system, procedures are in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information. Examples may include data showing recent regulation or management plan revisions.*	☑

EVIDENCE:

The availability and adequacy of the evidence is sufficient to substantiate that within the fishery management system procedures are in place to achieve the efficacy of current conservation and management measures and under continuous review in light of new information.

[104] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main
[105] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main
[106] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main
[107] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf
[108] http://www.adfg.alaska.gov/index.cfm?adfg=gameboard.main

1.7.	Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.							
References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Supporting Clause 1.8.

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

Evaluation Parameters	Met?
Current status: *There is transparency in management arrangements. Please note that both the management processes of the NPFMC for federal waters, and the BOF for state waters, shall be clearly documented to provide evidence for the transparency of these arrangements and decision-making processes.*	☑

EVIDENCE:
The management arrangements and decision-making processes for Alaska salmon fisheries are organized in a very transparent manner, and are readily accessible to any person. Preseason management plans are published and sometimes presented in public forums by ADFG, and in-season management changes are issued as Emergency Orders that explain the rationale for the changes. Decision-making generally takes two forms Decisions made by the BOF, which occur during meetings open to the public, and decisions made by Commercial Fisheries Division managers to achieve BOF goals, which may be contained in written management plans, emergency orders, and management reports, all of which are available to the public.

Effectiveness: *There is transparency in decision-making processes.*	☑

EVIDENCE:
The management arrangements and decision-making processes for Alaska salmon fisheries are organized in a very transparent manner, and are readily accessible to any person. Management arrangements generally take one of two forms: annual pre-season and in-season. Both types of arrangements are explained at the websites of each ADFG Commercial Fisheries Division fishing area[109]. Decision-making also generally takes two forms: those made by the BOF and those made by ADFG to achieve BOF goals. Decisions made by Commercial Fisheries Division managers may be in the form of management plans, in-season Emergency Orders, and annual reports. This information, as stated above, is clearly presented on relevant webpages. The decision-making process of the BOF is transparent and readily accessible via the BOF's website, by attendance at the BOF meetings, and by active stakeholder participation in the BOF's decision-making process[110]. In fact, the BOF actively and routinely encourages stakeholder involvement in the process. The BOF meets four to six times per year in communities around the state to consider proposed changes to fisheries regulations. The BOF uses biological and socioeconomic information provided by ADFG and public comments received from individuals and organizations inside and outside of the state, and guidance from the Alaska Department of Public Safety and Alaska Department of Law to create sound and enforceable regulations.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the management arrangements and decision-making processes for the fishery are organized in a transparent manner. Examples may include records of the management arrangements and decision-making processes.*	☑

EVIDENCE:
The availability and adequacy of evidence is sufficient to substantiate that management and decision making processes are organized in a transparent manner.

References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10						**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[109] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main
[110] http://www.adfg.alaska.gov/index.cfm?adfg=process.main

Supporting Clause 1.9.

1.9.	**Management organizations not party to the Agreement to Promote Compliance with International Conservation and Management Measures by Vessels Fishing in the High Seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement.**
Relevance:	Not relevant.
	Note: Not applicable if the fishery does not occur in high seas.

Evaluation Parameters	**Met?**
Process: *Regulation to implement the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas has been adopted. Assessors shall consult the following document http://www.fao.org/docrep/meeting/003/x3130m/X3130E00.htm for reference to the Agreement.*	☐
EVIDENCE: Supporting clause 1.9 is not relevant because staff from USA agencies participate on different international groups responsible for high seas fisheries management.	
Current status/Appropriateness/Effectiveness: *There are laws regulating high seas fishing activity. Describe how they accomplish this.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization is party to the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, or has adopted laws and regulations consistent with the provisions of the Agreement. Examples may include reports on the management of high seas fishing activities.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x**	**3**	**)**	**=**	**NA**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

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.

Supporting Clause 2.1.

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing 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, States shall take due account of the risks and uncertainties involved.**
Relevance:	Relevant
	If not relevant provide evidence for why this is the case (e.g. This Clause is not relevant because…).

Evaluation Parameters	**Met?**
Process: *A mechanism exists by which the integrated management of multiple coastal area uses is conducted, the possible uses of coastal resources are assessed, and access to them is governed. Accordingly, policies for the management of the coastal area are set. Assessment teams shall document how existing authorities and/or processes cooperate and interact together to manage coastal resources (living and non-living) in a transparent, organized, and sustainable way that minimizes environmental issues while taking into account the socio-economic aspects, needs, and interests of the various stakeholders of the coastal zone.*	☑

EVIDENCE:

The salmon fishery management organizations in Alaska (principally ADFG and NMFS) participate in coastal area management-related institutional frameworks processes, including the National Environmental Policy Act (NEPA) and Essential Fish Habitat (EFH). These processes include decision-making 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. 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 between 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. The Department of Environmental Conservation (DEC) implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for implementing the federal Clean Water Act, which provides considerable opportunity to maintain high quality fish and wildlife habitat through pollution prevention. The MSFCMA includes provisions concerning identification and conservation of EFH. The NMFS and regional Fishery Management Councils must describe and identify EFH in fishery management plans), minimize adverse effects of fishing on EFH, and encourage the conservation and enhancement of EFH. 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 EFH and living marine resources in Alaska.

Current status/Appropriateness/Effectiveness: *The coastal management framework includes explicit consideration of the fragility of coastal ecosystems, the finite nature of coastal resources, and the needs of coastal communities, and accounts for the rights and customary practices of coastal communities. These policies take due account of risks and uncertainties.*	☑

EVIDENCE:

The salmon fishery management organizations in Alaska (principally ADFG and NOAA) participate in coastal area management-related institutional frameworks processes such as NEPA, EFH. These processes include decision-making 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.

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 between 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

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing 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, States shall take due account of the risks and uncertainties involved.**

anadromous fish habitat and providing free passage for anadromous and resident fish in fresh water bodies (AS 16.05.841871). Any activity or project that is conducted below the ordinary high water mark of an anadromous stream requires a Fish Habitat Permit[111].

In 1976, Governor Hammond introduced the Alaska Coastal Management Program in response to increasing demands on state coastal resources. The program provided for the establishment of local coastal districts and a strong role for local governments in coastal development decisions. In 1984, Governor Sheffield adopted a coordinated review process for coastal projects. In 2003, Governor Murkowski amended the coastal program to reduce local communities' voice in coastal development decisions; removed consideration of air and water quality matters from the coordinated review process; and eliminated the regionally represented Coastal Policy Council, transferring its powers to a single agency, the DNR. In 2011, the Alaska legislature and the governor failed to agree on conditions for extending the coastal program and the program expired on July 1, 2011.[112]

DEC implements statutes and regulations affecting air, land and water quality. DEC is the lead state agency for implementing the federal Clean Water Act, which provides considerable opportunity to maintain high quality fish and wildlife habitat through pollution prevention. ADFG protects estuarine and marine habitats primarily through cooperative efforts involving other state and federal agencies and local governments. ADFG has jurisdiction over the mouths of designated anadromous fish streams and legislatively designated state special areas (critical habitat areas, sanctuaries and refuges). Some marine species also receive special consideration through the state Endangered Species program. DNR manages all state-owned land, water and natural resources except for fish and game. This includes most of the state's tidelands out to the three mile limit and approximately 34,000 miles of coastline. DNR authorizes the use of log-transfer sites, access across state land and water, set-net sites for commercial gill net fishing, mariculture sites for shellfish farming, lodge sites and access for the tourism industry, and water rights and water use authorizations. DNR can use the state Endangered Species Act to preserve natural habitat of species or subspecies of fish and wildlife that are threatened with extinction.

NEPA processes provide public information and opportunity for public involvement that are robust and inclusive at both the state and federal levels. Decisions are made through public processes and involvement of fishery managers, fishermen, fishing organizations and fishing communities that are actively invited through publicly advertised and scheduled meetings. Assessing the social and cultural value of coastal resources is an explicit part of the decision making process for allocation and use of resources. All construction activities in the coastal zone (e.g., work on docks, breakwaters, harbors and other infrastructure) are subject to the NEPA process. These processes take into account all resources and users of those resources. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures.

ADFG fisheries management staff at the regional and area levels meet routinely with federal fisheries staff at both formal and informal meetings to discuss salmon fishery-related activities including research projects, in-season management issues and coastal developments. Area Biologists and other ADFG employees also routinely meet with fishery groups, environmental groups, developers, and other agencies with management authority (e.g., USFS, NMFS, and USFWS) to ensure the needs of Alaska's fisheries are considered when making decisions about development or policies.

The MSFCMA includes provisions concerning identification and conservation of EFH, which is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The NMFS and regional Fishery Management Councils must describe and identify EFH in fishery management plans, minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS, and NMFS must provide conservation recommendations to federal and state agencies regarding actions that would adversely affect EFH[113]. All fishery management plans include a

[111] http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main
[112] http://www.skagway.org/vertical/sites/%7B7820C4E3-63B94E6795BA7C70FBA51E8F%7D/uploads/Information_on_the_Alaska_Coastal_Management_Program_Initiative.pdf
[113] http://www.npfmc.org/habitat-protections/essential-fish-habitat-efh/

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing 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, States shall take due account of the risks and uncertainties involved.**

description and identification of EFH, adverse impacts, and actions to conserve and enhance EFH. Maps of EFH areas are useful for understanding potential effects of proposed development and other activities. NOAA Fisheries' Habitat Conservation Division 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. This work includes conducting and/or reviewing environmental analyses for a large variety of activities ranging from commercial fishing to coastal development to large transportation and energy projects. The division identifies technically and economically feasible alternatives and offers recommendations for the conservation of valuable living marine resources. The division focuses on activities in habitats used by federally managed fish species located offshore, nearshore, in estuaries, and in freshwater areas important to anadromous salmon[114].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fisheries management organization's jurisdiction, an appropriate policy within the legal and institutional framework has been adopted in order to achieve sustainable and integrated use of living marine resources. Examples may include coastal management plans or other policy documents, and frameworks for resource/coastal management.*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that within the fisheries management organization's jurisdiction an appropriate policy has been adopted to achieve sustainable and integrated use of living marine resources.

References:	AS 16.05.841871

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[114] https://alaskafisheries.noaa.gov/habitat

Supporting Clause 2.1.1.

2.1.1.	States shall establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a mechanism to allow cooperation between neighboring States to improve coastal resource management.*	☑

EVIDENCE:

Salmon management over such a vast area requires a complex mixture of domestic and international bodies, treaties, regulations, and other agreements. Federal and state agencies cooperate in managing salmon fisheries. There are mechanisms for cooperation and coordination among national authorities involved in planning, development, conservation and management of coastal areas such as NPFAC, PSC, and PFMSC. Salmon management has been the responsibility of many agencies, including ADFG, and NOAA. The networking of these groups is essentially designed to preserve this valuable resource. ADF&G'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 ADF&G'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.

NMFS 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.

Current status/Appropriateness/Effectiveness: *There are records of cooperation. Examples may include fishery, fishery enhancement, or other agreements or records from international forums.*	☑

EVIDENCE:

Salmon management over such a vast area requires a complex mixture of domestic and international bodies, treaties, regulations, and other agreements. Federal and state agencies cooperate in managing salmon fisheries.

Salmon management has been the responsibility of many agencies, including ADFG, NMFS. The networking of these groups is essentially designed to preserve this valuable resource ADFGs Habitat Division[115] is delegated by the Commissioner to implement the state's Title 16 authority for Fish Habitat and Special Area permitting. Unlike many of Fish and Game's regulations, which are developed through the BOF 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.

For example, Alaska Statute 16.05.871(a) requires the ADFG to specify the various rivers, lakes, and streams, or parts of them, that are important for spawning, rearing, or migration of anadromous fishes[116]. Adopted by reference under 5 AAC 95.011 of the Alaska Administrative Code, the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes (referred to as the "Catalog") and the Atlas to the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes (referred to as the "Atlas") are used to make this specification. 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 16.05.841-871). Any activity or project that is conducted below the ordinary high water mark of an anadromous stream requires a Fish Habitat Permit.

NMFS Fisheries' Habitat Conservation Division[117] (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. This work includes conducting and/or reviewing environmental analyses for a large variety of

[115] http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.main
[116] https://www.adfg.alaska.gov/sf/SARR/AWC/
[117] https://alaskafisheries.noaa.gov/habitat

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

activities ranging from commercial fishing to coastal development to large transportation and energy projects. HCD identifies technically and economically feasible alternatives and offers realistic recommendations for the conservation of valuable living marine resources. 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. The Pacific States Marine Fisheries Commission's[118] (PSMFC) Habitat Program is involved in programs on the West Coast that further habitat protection for anadromous, estuarine, and marine fish species. Program efforts are focused on watershed and estuarine conservation and restoration, work with regional science and policy bodies and marine debris and pollution abatement. The program also works to assist fishermen and communities with recycling fishing nets, gear, and other marine debris and tracking and promoting efforts to remove derelict fishing gear.

PSMFC participates in various groups and forums that promote habitat conservation planning and restoration activities, including the regional Pacific Marine and Estuarine Fish Habitat Partnership and the West Coast Governor's Marine Debris Alliance.

There are seven fish habitat partnerships established along the U.S. West Coast. PSMFC is engaged at the national level as a representative on the board of the National Fish Habitat Partnership. In addition, PSMFC is actively involved in two of the regional fish habitat partnerships; the Pacific Marine and Estuarine Fish Habitat Partnership and the California Fish Passage Forum.

Finally, several entities have significant influence on the quality of freshwater spawning and rearing habitats for salmon throughout Alaska. Among these are the UFS, the Bureau of Land Management, NPS, USFWS, Alaska state parks and forests, Alaska Native regional and village corporations, municipalities, boroughs, and private landowners that control watersheds used by salmon.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the States establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas. Examples may include reports or data on the international cooperation/information exchange in these events.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that the states establish mechanisms for cooperation and coordination in planning, development, conservation and management of coastal areas.

References:	16.05.871(a), 5 AAC 95.011, AS 16.05.841-871

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[118] http://habitat.psmfc.org/

Supporting Clause 2.1.2.

2.1.2.	**The fisheries management organization shall ensure that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources.**
Relevance:	Relevant.
	If not relevant provide evidence for why this is the case (e.g. This Clause is not relevant because…).

Evaluation Parameters	**Met?**
Process: *There are appropriate technical capacities and financial resources.*	☑

EVIDENCE:

NPAFC, PSC and PSMFC have the appropriate technical capacities and financial resources to effectively represent the fisheries sector in the coastal management process. Agency operations are supported through contributions, annual dues federal grants, and special contracts. ADFG has an operating budget of approximately $200 million, which come through a variety of funding sources, including federal receipts, general fund receipts, and fish and game fund receipts, Its success in performing coastal management functions for the fisheries sector is probably best measured by the achievement of salmon escapement goals to sustain these stocks and the fisheries that depend upon them.

Current status/Appropriateness/Effectiveness: *It can be determined with confidence that there are appropriate technical capacities and financial resources.*	☑

EVIDENCE:

Management agencies such as NPAFC, PSC and PSMFC and their activities involved in the salmon fishery are financed by national and international agreements. NPAFC operations are supported through contributions made by the member parties. PSC operation costs are funded costs are financed with annual dues paid by each national government. PSMFC's activities are funded through federal grants, special contracts, and dues from its member states[119, 120].

ADFG has an operating budget of approximately $200 million which consists of a variety of funding sources, including federal receipts, general fund receipts, fish and game fund receipts, and several other sources. All of the state budgets are submitted through the State Office of Management and Budget and funded by the state legislature[121]. ADFG also has an annual capital budget that varies greatly from year to year. It consists of a mixture of federal receipts, general fund receipts, fish and game fund receipts, and other funding sources.

Managing commercial, subsistence, and personal use harvests in ways that protect the reproductive potential of salmon stocks is the most basic responsibility of ADFG's Division of Commercial Fisheries[122]. Its success in performing this function is the most direct indicator of program success, as well as the best indicator of continued healthy fish stocks. Success in achieving escapement goals is also the most common measure of success that salmon managers and research staff apply to their own performance.

The division annually deploys and operates numerous weirs, counting towers, and sonar sites to conduct escapement counts. Aerial and foot surveys are also used extensively in the absence of other means of counting escapement. The proportion of escapement goals achieved state-wide has been fairly consistent during the last five years. While fisheries have been restricted in the face of lower abundance of some species, in some cases the goals were still not achieved. Failure to achieve goals over several years' results in increasing restrictions to affected fisheries.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources. Examples may include reports or data, overall operating staff, and financial resources/budgets available.*	☑

EVIDENCE:

[119] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[120] http://www.psmfc.org/psmfc-info/overview
[121] http://www.adfg.alaska.gov/index.cfm?adfg=about.budgets
[122] https://www.omb.alaska.gov//html/performance/program-indicators.html?p=55&r=1

2.1.2.	**The fisheries management organization shall ensure that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources.**

The availability and quality of the evidence is sufficient to substantiate that the fisheries management organization ensures that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the technical capacities and financial resources.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 2.2.

2.2.	**Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *Describe how fishery-related information is disseminated and how a process is in place to consult with the fishery sector and fishing communities.*	☑

EVIDENCE:

Representatives from fishery management organizations and fishing communities participate in coastal area management planning through the federal 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 DEC, ADFG, and DNR; the affected local coastal district office; and other interested members of the public, including fishermen's organizations and private individuals.

Current status/Appropriateness/Effectiveness: *There are records of consultations with the fisheries sector and fishing communities. Attempts have been made to create public awareness on the need for protection and management of coastal resources, and those affected by the management process have been made aware of its provision.*	☑

EVIDENCE:

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. All construction activities in the coastal zone (e.g., work on docks, breakwaters, harbors and other infrastructure) are subject in many cases to the NEPA process. These processes deliberately take into account all resources and users of those resources. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures. The review process requires participation by: the project applicant[123]; 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 public, including fishermen's organizations and private individuals. Other state and federal programs affecting fishery resources in Alaska include the National Fish Habitat Action Plan administered by the U.S. Fish and Wildlife Service (USFWS). The mission of this program is to protect, restore and enhance fish and aquatic communities through partnerships with state and local groups and agencies.

ADFG sport fish area managers work closely with the BOF[124], recreational anglers and federal and international regulatory bodies to develop fishing regulations and solutions to issues that are, according to divisional policy described in the Strategic Plan, effective, minimally intrusive, and enforceable. In all regions of the state, these managers actively monitor fish stocks and sport fisheries and make adjustments in season as required, work closely with enforcement staff in policing fisheries, maintain a dialogue with local user groups and recreational anglers, assist in habitat conservation and restoration, and provide local expertise to the angling public. In addition, the BOF process provides a regularly scheduled public forum for all interested individuals, fishermen, fishing organizations, environmental organizations, Alaskan Native organizations and other governmental and non-governmental entities to participate in the development of legal regulations for all salmon fisheries in the state. The BOF ensures that the process for the state's regulatory system relating to fish and wildlife resources operates publicly, efficiently and effectively. ADFG staff provides support for this public process, and ensures that the system is legal, timely, and accessible to all citizens of the state.

Evidence Basis:	☑

[123] http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main
[124] http://www.adfg.alaska.gov/index.cfm?adfg=process.main

2.2.	**Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.**

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and involved in other activities related to coastal area management planning and development. The public, and others affected, are also kept aware of the need for the protection and management of coastal resources and are participants in the management process. Examples may include public records of consultation activities and other available documentation published on the internet or distributed at public meetings.

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that members of the fisheries sector are consulted in decision making processes related to coastal area management planning and development.

References:							
Numerical score:	**Starting score**			**Number of EPs NOT met**			**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 2.3.

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

Evaluation Parameters	**Met?**
Process: *These practices have been adopted, and there is a process to regulate fishing gear, methods, and vessels so as to avoid risk of conflict. If conflicts arise, there is a process in place to settle conflicts between fishery users and other users.*	☑

EVIDENCE:

The BOF process serves to provide a forum for fishery conflict resolution. Further, the NEPA review process deliberately takes into account all resources and users of those resources in order to resolve potential conflicts among users before project approvals are given. The NPFMC also encourages testimony from fishers, the environmental community, and the public at-large at meetings and hearings. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures. However, in most cases management plan and project approvals are withheld until substantive conflicts are resolved.

Current Status/Appropriateness/Effectiveness: *Describe these practices and their effectiveness within the fishery sector, and between fishers and other coastal users.*	☑

EVIDENCE:

The BOF process serves to provide a forum for fishery conflict resolution[125]. The BOF is a seven member board appointed by the governor and confirmed by the legislature which sets fishing seasons, bag limits, methods and means for the state's commercial, subsistence, sport, guided sport, and personal use fisheries. It also sets policy and direction for management of the state's fishery resources and makes all decisions on allocation of those resources among users. ADFG then manages the fisheries based on BOF regulations. As a part of making decisions on allocation of the fishery resources, the BOF sets fishery openings by gear-type by time and area. When there are concerns that conflict may arise between gear-types, the BOF generally requires the different gear types to operate in separate areas or at different times.

The NEPA process, deliberately takes into account all resources and users of those resources in order to resolve potential conflicts among users before project approvals are given[126]. Conflict resolution mechanisms include both administrative (through governmental agencies) and legal (through courts of law) procedures. However, in most cases project approvals are withheld until substantive conflicts are resolved.

All regular NPFMC meetings, committee meetings and advisory panel meetings are open to the public. Council meetings include a section for public testimony on each issue on the agenda[127]. NPFMC and other public meetings are held throughout Alaska and occasionally in Portland and Seattle. Written public comments and summaries are provided to NPFMC members in their briefing books.

Members of the commercial and recreational fishery, the environmental community, and the public at-large are encouraged to testify at NPFMC meetings and hearings. This involves speaking in a formal public forum Public testimony to the Advisory Panel may lead to a proposal to the NPFMC, which may then lead to a discussion paper and NPFMC development of alternatives to address the problem or situation identified.

Evidence Basis:	☑

[125] http://www.adfg.alaska.gov/index.cfm?adfg=process.main
[126] https://alaskafisheries.noaa.gov/fisheries/nepa-guidance
[127] http://www.npfmc.org/wp-content/PDFdocuments/help/Navigating_NPFMC.pdf

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

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) are adopted and fishing is regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms are established at the appropriate administrative level to settle conflicts that arise within the fisheries sector, and between fisheries resource users and other coastal users. Examples may include laws and regulations or other documents.

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that fisheries practices that avoid conflict among fishers and other users in the coastal areas are adopted and fishing is regulated to avoid risk of conflict.

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 2.4.

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

Evaluation Parameters	**Met?**
Process: *There is a process that allows for fishery-related information to be disseminated.*	☑

EVIDENCE:

Agencies such as ADFG, NOAA, and NPMFC have developed websites with information on management and conservation measures for interested parties. This information includes news releases, species profiles, and newsletters. ADFG operates public education programs that illustrate the importance of salmon to Alaska's culture, economy and ecosystem. ADFG also provides educational materials to educators and the public, both online and in paper copy, and participates regularly in publicly attended sportsman shows, commercial fisheries trade shows and gear group meetings to interact with and educate thousands of members of the public.

In 2007, ADFG Sport Fish Division developed an Aquatic Resources Implementation Plan for Alaska's Comprehensive Wildlife Conservation Strategy. The intent of the plan is to initiate or expand partnerships with other agencies and non-governmental organizations to conserve, improve, and manage Alaska's habitats for aquatic species; develop education and outreach programs and materials related to aquatic species and their habitats; and to develop curricula and supporting material that describes the relationship between aquatic species, sport-fished species, and the importance of aquatic habitats by providing targeted audiences with educational programs that focus on aquatic resource-based stewardship principles and encourage active stewardship practices.

Current status/Appropriateness/Effectiveness: *There is a record of the disseminated information, and is it disseminated effectively, and the basis and purposes of such regulation explained to users.*	☑

EVIDENCE:

Agencies such as ADFG, NOAA, and NPMFC have developed websites with information on management and conservation measures for interested parties. Some of this information is news releases, species profiles, and newsletters. ADFG operates public education programs[128] including the modules "salmon in the classroom," and "Alaska's Wild Salmon" that illustrate the importance of salmon to Alaska's culture, economy and ecosystem. ADFG also provides educational materials to educators and the public, both on-line and in hard copy, and participates regularly in public attended Sportsman Shows, Commercial Fisheries Trade shows and Gear Group meetings to interact with and educate thousands of members of the public.

In 2007, ADFG Sport Fish Division developed an Aquatic Resources Implementation Plan for Alaska's Comprehensive Wildlife Conservation Strategy (CWCS[129]). The intent of the plan is to initiate or expand partnerships with other agencies and non-governmental organizations (NGO's) to conserve, improve, and manage Alaska's habitats for aquatic species, develop education and outreach programs and materials related to aquatic species and their habitats, and to develop curricula and supporting material that describes the relationship between aquatic species, sport-fished species, and the importance of aquatic habitats by providing targeted audiences with educational programs that focus on aquatic resource-based stewardship principles and encourage active stewardship practices. The division plans to develop a CWCS aquatic species notebook series and publish articles regarding the implementation of CWCS for aquatic species in the Otolith and Alaska Wildlife News. Activities such as these serve to keep the public aware of the need to participate in the protection and management of coastal resources.

Evidence Basis:	☑

[128] http://www.adfg.alaska.gov/index.cfm?adfg=anglereducation.main
[129] https://www.adfg.alaska.gov/static/species/wildlife_action_plan/cwcs_main_text_combined.pdf

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

The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures are explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures. Examples may include records of such management measures published in the internet or distributed at public meetings.

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that the State's fisheries management organizations and sub-regional or regional fisheries management organizations give due publicity to conservation and management measures are effectively disseminated.

References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10						**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 2.5.

2.5.	The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.
Relevance:	Relevant/Not relevant.

Evaluation Parameters	Met?
Process: *There is a system that allows for socio-economic value assessments and cultural value assessments to be carried out.*	☑

EVIDENCE:

The value of coastal salmon resources from economic, cultural and social perspectives are regularly assessed in order to assist decision makers with allocation and use decisions. Alaska's CFEC helps conserve and maintain the economic health of commercial fisheries by limiting the number of participating fishers. NEPA processes provide the public with information and opportunity for public involvement at both the state and federal levels. Decisions are made through public processes and involvement at publicly advertised and scheduled meetings. Assessing the social and cultural value of coastal resources is stated as an explicit part of the decision making process for allocation and use of resources.

Subsistence fishing in Alaska is critical to the cultural and economic wellbeing of more than 100,000 Alaska Natives and non-Natives living in rural Alaska. The average annual rural subsistence harvest of fish and wildlife in Alaska is about 375 pounds of food per person. Nowhere else in the United States is there such a heavy reliance upon wild food. The Federal Subsistence Management Program is a multi-agency federal effort to provide subsistence opportunities to rural Alaskans on federally managed public lands and waters while maintaining healthy populations of fish and wildlife. Alaska's indigenous inhabitants have relied upon the traditional harvest of wild foods for thousands of years, but subsistence is also important for non-Native Alaskans in rural Alaska.

ADFG's Subsistence Division scientifically gathers, quantifies, evaluates and reports on customary and traditional uses of the state's fish and wildlife resources. This information is used by the BOF in determining reasonable opportunities for customary and traditional use. ADFG maintains an online library of detailed reports on customary and traditional use of fish and game resources in Alaska.

Current status/Appropriateness/Effectiveness: *There are socio-economic value assessments and cultural value assessments, both of which are effectively assisting decision making on resource allocation and use.*	☑

EVIDENCE:

The value of coastal salmon resources from economic, cultural and social perspectives are regularly assessed in order to assist decision makers with 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. Through continuing research on economic conditions for each limited-entry fishery, CFEC maintains publicly accessible data bases showing current and historic information on numbers of permits issued/renewed, number of permits actually fished, total weight of fish harvested, average gross earnings per permit for Alaska residents and non-residents, and average selling price of permits in each fishery[130]. Economic impacts of the private non-profit salmon hatchery program in Southeast Alaska have been assessed regularly[131, 132].

The NEPA processes provide the public with information and opportunity for public involvement that is robust and inclusive at both the state and federal levels. Decisions are made through public processes and involvement of fishery managers, fishermen, fishing organizations and fishing communities is actively invited through publicly advertised and scheduled meetings. Assessing the social and cultural value of coastal resources is stated as an explicit part of the decision making process for allocation and use of resources.

Subsistence fishing in Alaska is critical to the cultural and economic wellbeing of more than 100,000 Alaska Natives and non-Natives living in rural Alaska[133]. The average rural subsistence harvest of fish and wildlife in Alaska is about 375 pounds of food per person meat, fish, and poultry per year. Nowhere else in the United States is there such a heavy reliance upon wild food. However, only about 4% of the fish harvested in Alaska is used for subsistence purposes. The Federal Subsistence Management Program is a multi-

[130] https://www.cfec.state.ak.us/
[131] https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/se_hatcheries_10.pdf
[132] http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=775
[133] https://seagrant.uaf.edu/map/fisheries/

2.5.	The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.

agency federal effort to provide the opportunity for a subsistence way of life for rural Alaskans on federally managed public lands and waters while maintaining healthy populations of fish and wildlife[134]. This dependence on wild resources is cultural, social and economic. Alaska's indigenous inhabitants have relied upon the traditional harvest of wild foods for thousands of years and have passed this way of life, its culture, and values down through generations. Subsistence has also become important to many non-Native Alaskans, particularly in rural Alaska. The mission of the ADFG Subsistence Division is to scientifically gather, quantify, evaluate and report on customary and traditional uses of the state's fish and wildlife resources, and to then provide this information to fisheries and wildlife programs and to the BOF for their use in determining reasonable opportunities for customary and traditional use[135]. ADFG maintains an online library of detailed reports on customary and traditional use of fish and game resources in Alaska.

The Limited Entry Act was passed in 1973 in order to provide resource conservation and prevent economic distress among Alaskan fishers[136]. Some of the key features included issuance of permits to natural persons only, prohibition on permit leasing, prohibition on use of permits as collateral for loans and allowance for free transferability of permits between persons. Thus, permit holders are free to transfer their permits through gift, inheritance or sale. According to Commercial Fishery Entry Commission (CFEC) reports[137], many people are concerned that free transferability of fishing permits might have undesirable impacts on Alaskan communities and result in erosion of their economic base. CFEC examines these issues through research and preparation of reports on the status of permits and changes in their distribution. CFEC suggests limited entry protected Alaskan fisheries from an influx of new fishermen from other West Coast fisheries where fishing opportunities have been severely reduced by court decisions and stock status concerns. The program was designed based on salmon fisheries that are characterized by owner/operator participants and fishery management based on escapement.

Participants in a fishery who believe the number of gear operators should be limited in order to preserve the resource and economic health of the fishery can initiate the limited entry process. If research by CFEC indicates limiting entry to the fishery would help solve the problem, the commission establishes a maximum number of permits for the fishery based upon historic participation levels. Next, CFEC develops a point system to rank eligible applicants according to the relative degree of hardship they would suffer if not awarded an entry permit. The basic criteria used to evaluate hardship are: 1) establishing that economic dependence upon the fishery exists (which could include determining the percentage of income derived from the fishery and amount of investment in a vessel and gear); and 2) past history of participation in the fishery, including the consistency and number of years that applicant participated. A person must have legally participated in the fishery, held the required licenses, and made at least one landing of fish during an eligible period prior to the established qualification date in order to qualify for that period. A specific application period, usually a few months in length, is established for each limited fishery. All persons who are eligible must submit their applications during that time period. CFEC is continuing to study alternative types of limited entry for fisheries managed by a harvest quota.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the economic, social, and cultural value of coastal resources is assessed in order to assist decision decision-making on their allocation and use. Examples may include reports on social, cultural, and economic value of the resource.*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that the economic, social and cultural value of coastal resources are assessed in order to assist decision making on their allocation and use.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)** =	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[134] https://www.doi.gov/subsistence
[135] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.subsmission
[136] https://www.cfec.state.ak.us/pregs/Homan30YrsLimitedEntrySummary.pdf
[137] https://www.cfec.state.ak.us/Publications/permit_holdings.htm

Supporting Clause 2.6.

2.6.	**States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system that allows research and monitoring of the coastal environment, and multidisciplinary research in support of coastal area management is promoted.*	☑

EVIDENCE:

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. 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 and other ecologically-related species. 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.

Current status/Appropriateness/Effectiveness: *Systems of monitoring and research have taken into account physical, chemical, biological, economic, social, legal, and institutional capabilities to support coastal area management.*	☑

EVIDENCE:

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. 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 and other ecologically-related species. 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[138]. New genetic and otolith marking techniques developed by the member states of Canada, Japan, Korea, Russia, and the United States (including Alaska) are being used to identify the origins of salmon and intermixing of the stocks in the Pacific Ocean. In addition, new high tech tags are being used to track the migratory behavior of salmon on the high seas.

The Commercial Fisheries, Sport Fish, Habitat and Subsistence Divisions of ADFG have substantial research components that monitor biological, chemical, physical, and in some cases economic and social, parameters of the coastal environment. The results of this research are published in several series of departmental scientific and technical publications that document data and results of divisional research activities and are generally available online[139, 140, 141] . These research reports also present results from research continually being done in many areas of Alaska on genetic stock identification, salmon coded-wire-tag and thermal marking, and fish pathology. Funding for ADFG research efforts is derived from state and national sources including the Alaska Sustainable Salmon Fund[142]. The Sport Fish Division devotes 32% of its funding to research activities and includes the Kachemak Bay Research Reserve, which is protected for long-term research, water-quality monitoring, education and coastal stewardship[143].

ADFG participates in research programs on an international basis with other entities on issues such as fishing gear selectivity and improvements to fishing methods and strategies. Results of such research and technology transfer are disseminated through entities such as the NPAFC. New genetic and otolith marking techniques developed by the member states are being used to identify the origins of salmon and intermixing of the stocks in the Pacific Ocean. In addition, new high tech tags are being used to track the migratory behavior of salmon on the high seas[144].

[138] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[139] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#fisheries
[140] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#subsistence
[141] http://www.adfg.alaska.gov/index.cfm?adfg=habitat_publications.main
[142] http://www.akssf.org/
[143] http://www.adfg.alaska.gov/static/fishing/PDFs/sport/StrategicPlan2015Final.pdf
[144] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf

2.6.	**States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.**

The Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (AYKSSI) was established to collaboratively develop and implement a comprehensive research plan to understand causes of the decline in and recovery of AYK salmon stocks. AYKSSI has funded 55 research projects with over $20 million in funding. Included in this effort are research projects on salmon genetics, selectivity in fisheries, and escapement goals[145].

Monitoring of the coastal environment in Alaska is also being done by federal agencies including the USFS, USFWS, and NMFS as well as many institutions of higher learning including the University of Alaska Institute of Marine Science (IMS) and the Alaska Ocean Observation System. IMS faculty and research staff provides expertise in marine biology, biological oceanography, physical, chemical and geological oceanography. With an annual research budget of approximately $5.5 million, current IMS projects include Northeast Pacific near-surface monitoring of temperature, salinity and fluorescence, polycyclic aromatic hydrocarbon research, and Arctic ocean biodiversity[146].

Non-governmental organizations, including the Northern and Southern Southeast, Cook Inlet, Prince William Sound and Kodiak Regional Aquaculture Associations, the Nature Conservancy and others, also participate in monitoring the coastal environment in Alaska.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is cooperation to support and improve coastal area management, and in accordance with capacities, measures are taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities. Examples may include reports on the status of the coastal area using the various aspects listed above.*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that there is cooperation to support and improve coastal area management and measures are taken to establish or promote systems for research and monitoring and multidisciplinary research of the coastal areas.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3)**	**=**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[145] http://www.aykssi.org/wp-content/uploads/WEB-AYKbsfa-0210_REPORT_cmprssd.pdf
[146] http://www.ims.uaf.edu/components

Supporting Clause 2.7.

2.7.	**In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.**
Relevance:	Relevant.
	If not relevant provide evidence for why this is the case (e.g. This Clause is not relevant because…).

Evaluation Parameters	**Met?**
Process: *There is a system to allow early information sharing (i.e., within appropriate timeframes to avoid negative consequences) between States in case of adverse environmental effects from one State.*	☑

EVIDENCE:

Since some important watersheds for salmon in Southeast Alaska are transboundary, Alaska, U.S. federal government, Canadian federal government, British Columbia provincial ministries, and Native/First Nation organizations and governments all have an interest in planning and decision-making that affects these salmon resources. Officials from Alaska resource management agencies, including ADFG, DNR, and DEC, USCG, other public officials, and non-public agency experts have participated in British Columbia and Canadian permitting processes, most of which have focused on British Columbia development projects, Transboundary watershed management issues are also addressed by The Boundary Waters Treaty and the International Joint Commission, In 2015, USA and Canada governments signed a Memorandum of Understanding, which is a firm, but not legally binding, commitment to continue working together in the broad areas of continued or new activity by Alaska and British Columbia. These areas of mutual interest include establishing a bilateral working group on the protection of transboundary waters and exploring cooperative actions for natural resource development, fisheries, ocean acidification, and climate change adaptation.

Current status/Appropriateness/Effectiveness: *There are current agreements for or past records of such occurrences. Examples may include oil spills, and aquaculture farm escapes among others.*	☑

EVIDENCE:

The Taku, Alsek, Stikine, Iskut, and Unuk River watersheds of southeast Alaska and northwest British Columbia and the Yukon river system are spectacularly diverse and largely intact. These transboundary watersheds support robust populations of Pacific salmon which feed families and sustain fisheries on both sides of the border. From headwaters to estuaries, the watersheds provide critical habitat for the fish, wildlife, and marine life that make this region famous.

For example since some of the important watersheds for Salmon in the Southeast 130are transboundary, Alaska State agencies, U.S. federal agencies, Canadian federal departments, British Columbia provincial ministries, U.S. federal agencies, Alaska State agencies, and Native/First Nation governments on each side of the border have an interest in planning and decision-making that affect it.

Officials from ADFG, DNR, DEC, USCG, other public officials, and non-public agency experts have participated in British Columbia and Canadian permitting processes. In the past most of these review processes have focused on individual British Columbia development projects in isolation. However AK agencies have been recently focusing cumulative effects of numerous projects across the transboundary region from the Taku in the north to the Iskut-Stikine and the Unuk in the south. There have been some venues where issues of transboundary watershed are managed : The Boundary Waters Treaty Signed in 1909, it provides the principles and mechanisms to help resolve disputes and to prevent future ones, primarily those concerning water quantity and water quality, along the boundary between Canada and the United States. The treaty provides principles for Canada and the United States to follow in using the waters they share. For example, both countries must agree to any project that would change the natural levels or flows of boundary waters. Far ahead of its time, the treaty states that waters shall not be polluted on either side of the boundary to the injury of health or property on the other side**.** The treaty established the International Joint Commission (IJC), with three members from each country. The ongoing work of the IJC helps to fulfil the treaty's purpose of preventing disputes as well as resolving them.

THE INTERNATIONAL JOINT COMMISION

The International Joint Commission (IJC) is the body that oversees the implementation of the Boundary Waters Treaty. Historically, they are the body to which transboundary disputes between Canada and the United States regarding water quantity and quality are referred for recommendations.

2.7.	**In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.**

The IJC has identified transboundary watershed management as an important tool for avoiding, managing, and resolving disputes. Under its current authority, the governments of the United States and Canada could direct the IJC to establish a watershed board transboundary watershed, with the initial task of facilitating the adoption of a watershed plan by the affected jurisdictions. The IJC could provide a neutral venue for cooperation of all stakeholders on both sides of the border under the aegis of a trusted, independent third party.

STATE OF ALASKA TRANSBOUNDARY WORKING GROUP [131]
The State of Alaska is increasing its efforts to facilitate and promote the protection of water quality, quantity, and watershed integrity in Alaska, with special emphasis on salmon and other Alaska fish stocks. The State's efforts will address the risk of pollution from mines and other development projects in British Columbia by establishing: standard practices with the government of the Province of British Columbia for the exchange of relevant information and meaningful dialog with Alaska state agencies on projects that could discharge wastes or other potentially deleterious materials to Transboundary waters; convenient means for the Alaska public to obtain reliable information on these Transboundary projects, their discharges, water quality, habitat and fish health, and opportunities to provide input to the governments of British Columbia and Alaska on decisions relating to these projects.

In 2015, Governor Bill Walker and British Columbia Premier Christy Clark signed a Memorandum of Understanding. 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.

In response to increased mining activity in Northwestern British Columbia, Canada and increasing concerns from Alaskan stakeholders, Then Lieutenant Governor Byron Malott established the Transboundary Working Group to improve the State's involvement in activities proposed in B.C. that could impact Alaskan waters and fish. The Transboundary Working Group is composed of representatives from ADFG, DEC, DNR, Commerce and Economic Development, Labor, and the Lt. Governor's office. [130] **http://riverswithoutborders.org/home/wp-content/uploads/2007/04/takubackgrounder.pdf.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, the State provides timely information and if possible, prior notification to potentially affected States. Examples may include reports or data on the international cooperation in these events.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that if ADFG activities may have had an adverse environmental effect on other states that this data is readily available to the potentially affected states.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Fundamental Clause 3. Management objectives and plan

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

Supporting Clause 3.1.

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

Evaluation Parameters	Met?
Process: *Management objectives based on the best scientific evidence available (which can include traditional/local knowledge, if verifiable) have been translated into a fishery management plan, are in regulation, or are in another document.*	☑

EVIDENCE:

The BOF's main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state's fishery resources. The BOF is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. General precepts are established by the BOF and incorporated into regulation. The long-term objectives are primarily in 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
39.222 Policy for the Management of Sustainable Salmon Fisheries
39.223 Policy for State-wide Salmon Escapement Goals

Current status/Appropriateness/Effectiveness: *The objectives described by the management plan are consistent with the sustainable use of the resource, and are subscribed to by all relevant fishery stakeholders.*	☑

EVIDENCE:

The BOF[147] main role is to conserve and develop the fishery resources of the state. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport, and personal use fisheries, and it also involves setting policy and direction for the management of the state's fishery resources. The BOF is charged with making allocative decisions, and ADFG is responsible for management based on those decisions. General precepts are established by the BOF and incorporated into regulation. The long-term objectives are primarily in 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[148]
39.222 Policy for the Management of Sustainable Salmon Fisheries[149]
39.223 Policy for State-wide Salmon Escapement Goals[150]

The basic elements of commercial fishery Management Plans are established by the BOF for each Region and incorporated into regulation in Title 5 Alaska Administrative Code[151] (Listing Regions North to South with embedded links to the pertinent plan):
Ch. 3 Kotzebue
Ch. 4 Norton Sound/Port Clarence
Ch. 5 Yukon Northern
Ch. 6 Bristol Bay
Ch. 7 Kuskokwim

[147] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main
[148] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/findings/ff93145x.pdf
[149] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf
[150] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section223.htm
[151] http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgibin/folioisa.dll/aac/query=%5bjump!3A!27title5chap29!27%5d/doc/%7b@0%7d?firsthit

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

Ch. 9 Alaska Peninsula
Ch. 11 Atka Amlia Islands
Ch. 12 Aleutian Islands
Ch. 15 Chignik
Ch. 18 Kodiak
Ch. 21 Cook Inlet
Ch. 24 Prince William Sound
Ch. 30 Yakutat Area
Ch. 33 Southeastern
Ch. 29 Troll Fishery.

Commercial Fishery Management Plans are implemented each season in each Region for each particular salmon fishery by the responsible ADFG management area biologist located in the region under the direction of the BOF. Plans are implemented at the regional, area, local level by the responsible biologist. Management Plans are also in force under state regulation for other fisheries (Subsistence Fishery, 5 AAC 01; Personal Use Fishery 5 AAC 77; Sport Fishery 5 AAC 47 – 75).

While these plans primarily affect management of non-commercial fisheries, some directly involve the management of commercial fisheries, for example, the Redoubt Bay and Lake Sockeye Salmon Fisheries Management Plan (5AAC 01.760 of the subsistence finfish section) contains the allocation for all the fisheries (including the commercial fishery) as well as the trigger points for managing the commercial fishery.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that scientifically based long-term management objectives consistent with the sustainable use of the resource are translated into a plan or other management document which is subscribed to by all interested parties. Examples may include fishery management plan/framework or legal rules.*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that scientifically based long-term management objectives consistent with the sustainable use of the resource are translated into a plan or other management document which is subscribed to by all interested parties.

References:	**5 AAC 39.220, 5 AAC 39.222, 5 AAC 39.223, 5 AAC 01, 5 AAC 47-75, 5 AAC 01.760**							
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Supporting Clause 3.1.1.

3.1.1.	**There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that allows for setting specific management objectives in fishery management plans or other relevant regulation (or other appropriate frameworks) for the protection of ETP species.*	☑

EVIDENCE:
In general within the Alaskan fishery management system, there are processes for setting specific management objectives for the protection of ETP species. ADFG is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the Commissioner of ADFG determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened. By law, the Commissioners of the Alaska Departments of Fish and Game and Natural Resources must take measures to preserve the natural habitat of fish and wildlife species that are recognized as threatened with extinction. The State Endangered Species List currently includes two birds (Short-tailed Albatross and Eskimo Curlew) and three marine mammals (blue whale, humpback whale, and right whale). Interaction of these ETP species on the salmon fisheries is very low based on logbook reports of ETP species take, and several years of sampling in test fish. There are no salmon stocks designated as endangered in the state of Alaska. However, the southeast troll fishery is estimated to take a small number of Chinook salmon belonging to threatened or endangered stocks from Washington and Oregon states. For example, the upper Willamette River Chinook are threatened. Those takes are regulated under the PST Under the treaty an annual quota of Chinook salmon is set for the Alaska fishery, a quota designed to conserve all wild stocks of Chinook salmon. The management of the troll fishery (through in season opening and closure of the fishery) is governed by that annual quota. The harvest of different stocks each year is estimated from the recovery rates of coded wire tags implanted in representative index stocks in the region of the threatened or endangered stocks.

Current status/Appropriateness/Effectiveness: *There are clear objectives in management plans or other relevant regulations (or other appropriate frameworks) seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and fishery enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Such objectives may be outlined in overarching fisheries legislation, regulations, or management plans.*	☑

EVIDENCE:
As outlined above, and again in detail in clause 3.2.4, some marine species receive special consideration through the state Endangered Species program and authorities can also use the Act to preserve natural habitat of species or subspecies of fish and wildlife that are threatened with extinction.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to ensure that endangered species are protected from adverse impacts resulting from interactions with the unit of certification and any associated culture or enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans/framework or legal rules.*	☑

EVIDENCE:
The State Endangered Species List provides evidence fof the availability, quality, and/or adequacy of evidence.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Supporting Clause 3.1.2.

3.1.2.	**There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the essential habitat of the stock under consideration and the potential impacts of the fishery (i.e., employing bottom contact gear) upon them are identified. This or a similar mechanism shall also be in place to identify habitats, which are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives seeking to avoid significant negative impacts on habitats. When identifying highly vulnerable habitats, their value to ETP species shall be also considered, with habitats essential to ETP species being categorized accordingly. Note that this clause shall consider Alaska-specific designation of important and essential fish habitats categorized as such at the state and federal level. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans.*	☑

EVIDENCE:
Conservation of the biodiversity of aquatic habitats and ecosystems is the responsibility of Habitat Division of ADFG. Activities by individuals, companies, or agencies within streams used by anadromous fish require permission of this division, which oversees activities in refuges, critical habitat, and sanctuaries. The Division also coordinates with other agencies in reviewing plans for forestry, mining, oil and gas development and coastal management. A catalogue of anadromous fish streams is maintained by ADFG.

Current status/Appropriateness/Effectiveness: *There is evidence that the objectives described above are in place, and that effective management measures relative to those have been implemented.*	☑

EVIDENCE:
Conservation of the biodiversity of aquatic habitats and ecosystems is the responsibility of Habitat Division within ADFG (AS 16.05.871, AS 16.05.841.)[152]. Activities by individuals, private companies, or agencies within streams used by anadromous fish require permission of the ADFG. The Division oversees activities in refuges, critical habitat, and sanctuaries. It coordinates with other agencies in reviewing plans for forestry, mining, oil and gas development and coastal management. Sport Fish Division maintains and updates the anadromous stream catalogue which lists all waters used by salmon for spawning, rearing, and travel. Anadromous streams receive increased protection from development.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear. Examples may include various regulations, fishery management plans, data, and reports.*	☑

EVIDENCE:
The availability and adequacy of evidence is sufficient to substantiate that there are management objectives seeking to avoid, minimize or mitigate impacts of the unit of certification on the stock under consideration's essential habitats and on habitats vulnerable to damage by the unit of certification's fishing gear.

References:	**AS 16.05.871, AS 16.05.841**						
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[152] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.haboverview

Supporting Clause 3.1.3.

3.1.3.	**There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process in place by which adverse impacts of the fishery (including any fishery enhancement) on the structure, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible are identified. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. This process results in setting relative management objectives. Management priority shall be focused primarily towards minimizing and avoiding identified impacts.*	☑

EVIDENCE:

There are existing regulatory policies, such as the Policy for the Management of Mixed Stock Salmon Fisheries (5 AAC 39.220) and the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) describing a number of key requirements with respect to wild fisheries, including salmon habitat conservation and management of enhancement activities. Salmon enhancement and hatchery activities in Alaska are also governed by statutes (AS 16.10.420, 430, 440, 445, and 455) and regulations (5 AAC 40.005, 41.005, 030, 050, 060, and 080), designed to protect wild salmon stocks.

Current status/Appropriateness/Effectiveness: *There are management measures in place to achieve the objectives described in the process parameter. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans.*	☑

EVIDENCE:

Article 2, 5AAC 39.220, Policy for the management of mixed stock salmon fisheries[153], requires that "a) ... conservation of wild salmon stocks consistent with sustained yield shall be accorded the highest priority. 5AAC 39.222, Policy for the management of sustainable salmon fisheries[154], also describes a number of key requirements with respect to wild fisheries, these include: In formulating fishery management plans designed to achieve maximal or optimum salmon production, the board and department must consider factors including environmental change, habitat loss or degradation, data uncertainty, limited funding for research and management programs, existing harvest patterns, and the fisheries or expanding fisheries.

Wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yields as follows: 1) Salmon spawning, rearing, and migratory habitats should be protected as follows: i) Salmon habitats should not be perturbed beyond natural boundaries of variation; ii) Scientific assessments of possible adverse ecological effects of proposed habitat alterations and impacts of the alterations on salmon populations should be conducted before approval of a proposal; iii) All essential salmon habitat in marine, estuarine, and fresh water ecosystems and access of salmon to these habitats should be protected iv) Salmon stocks should be protected within spawning, incubating, rearing and migratory habitats. With respect to enhanced fisheries, these include: Effects and interactions of introduced or enhanced salmon stocks on wild salmon stocks should be assessed; Wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts. Depleted salmon stocks should be allowed to recover or, where appropriate, should be actively restored; diversity should be maintained to the maximum extent possible, at the genetic, population, species, and ecosystem levels. The policy specifically identifies implementation of a precautionary approach for maintaining wild salmon populations.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to minimize adverse impacts of the fishery (including any enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, other regulatory documents, or laws.*	☑

[153] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section220.htm
[154] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf

3.1.3.	**There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.**

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that there are management objectives seeking to minimize adverse impacts of the fishery on the structure, processes and function of aquatic ecosystems that likely to be irreversible or very slowly reversible.

References:	**5 AAC 39.220, 5 ACC 39.222. , AS 16.10.420, 430, 440, 445, 455, 5AAC 40.005, 030, 050, 060, 080**						
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 3.2.

Management measures shall provide, inter alia, that:

Supporting Clause 3.2.1.

3.2.1	Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.*		☑
EVIDENCE: Alaska adopted a limited entry salmon fishery in 1973 to avoid excess fishing capacity and improve its ability to sustainably manage its salmon fisheries. The Alaska CFEC is the agency charged with conserving and maintaining the economic health of Alaska's commercial fisheries by limiting the number of participating fishers. Entry into each regional salmon fishery is limited to permitted harvesters, and the number of permits is regulated taking into account economic viability of each fishery. Implementation of the Limited Entry Act protected Alaska's fisheries from an influx of new fishermen from West Coast fisheries where fishing opportunities have been severely reduced by court decisions and stock conditions. Net economic benefits have accrued that may not have existed under open access.		
Current status/Appropriateness/Effectiveness: *The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).*		☑
EVIDENCE: Alaska has succeeded in sustainable yield management of its salmon fisheries since the enclosure of the salmon fishery in 1973 under a limited entry permit system[155]. The Alaskan legislature adopted the Limited Entry Act, establishing the current limited entry system for the salmon fisheries. To that end, no commercial fisherman may operate in the salmon fishery without first obtaining an entry permit. Entry permits entitle the permit holder to fish in a specified fishery using a specific type of gear. Permit holders may transfer their entry permits, provided they adhere to statutory and regulatory guidelines. The Commercial Fisheries Entry Commission (CFEC)[156] administers the commercial fishery entry permit system. The objective of the CFEC is to limit entry into commercial fisheries and provide annual licensing and permitting of fisheries to facilitate the management and development of fishery resources for maximum benefit of those dependent upon them and the economy of the state. Some key features of the program are to prohibit permit leasing, prevent the use of permits as collateral for loans, and allow for free transferability. The Limited Entry law also defined entry permits as a use-privilege that can be modified by the legislature without compensation. Free transferability has resulted in maintaining high percentages of residents within Alaska's fisheries and has been upheld by Alaska's Supreme Court. They are a property right of the holder and may be sold, bought and are heritable. The CFEC initially issues the permits on the basis of a detailed point system designed to gauge the hardship an applicant would suffer if denied a permit. This point system ranks applicants by weighing such factors as past participation in the fishery, degree of economic dependence on the fishery, access to alternative employment, and investment in vessels and gear. Once issued, limited entry fishing permits must be renewed annually, and failure to renew a permit for a period of two years results in forfeiture. Moreover, the Alaska Legislature has specifically reserved the right to modify or revoke a limited entry permit without providing compensation. The limited entry permit system has been beneficial to Alaska's fisheries in several ways. Implementation of the Limited Entry Act protected Alaska's fisheries from an influx of new fishermen from West Coast fisheries where fishing opportunities have been severely reduced by court decisions and stock conditions. Net economic benefits have accrued that may not have existed under open access.		

[155] http://www.cfec.state.ak.us/pregs/Homan30YrsLimitedEntrySummary.pdf
[156] http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1288&context=alr

3.2.1	Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.*		☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remain economically viable.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3) =**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 3.2.2.

3.2.2.	The economic conditions under which fishing industries operate shall promote responsible fisheries.	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.*		☑
EVIDENCE: The limited entry permitting process of the CFEC and the separation of allocative and conservation responsibilities between the BOF and ADFG promote responsible fisheries. Limited entry permit holders tend to support sustainable fishery management, since the continued value of their permits depend upon healthy fisheries as well as market forces. The BOF considers economic efficiency and resource conservation when it makes decisions on regulatory proposals.		
Current status/Appropriateness/Effectiveness: *The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).*		☑
EVIDENCE: The limited entry permitting process of the CFEC and the separation of allocative and conservation responsibilities of the BOF and ADFG promote responsible fisheries. The BOF process does support reviews of proposals to alter fisheries management plans so as to improve the economic efficiency and is designed in a manner that conserves the biological resource.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.*		☑
EVIDENCE: The availability and quality of the evidence is sufficient to substantiate the excess fishing capacity is avoided and exploitation of the stocks remain economically viable.		
References:		

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 3.2.3.

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

Evaluation Parameters	**Met?**
Process: *There is a system or process in place that identifies the interests of small-scale fishers, either through stakeholder engagement or social research, in a way, which permits the utilization of the information during the management measure development process.*	☑

EVIDENCE:
The interests of all harvesters are protected through the BOF process as well as various laws and regulation. The BOF receives recommendations from local Advisory Committees in communities around Alaska. The BOF considers recommendations provided by these committees, but is not legally obligated to accept them. BOF meetings are well publicized and open to the public. A significant amount of time during each meeting is set aside for public comment, which largely comes from individuals and groups engaged in fishing. Both the state (AS 16.05.258) and federal (Title VIII of Alaska National Interest Lands Conservation Act) governments recognize a priority for subsistence uses, which are given preference over other uses in the management of fisheries.

Current status/Appropriateness/Effectiveness: *There is evidence that the interests of small-scale fishers are effectively taken into account during the development of management measures, and there is no evidence that small-scale fisheries are adversely impacted by any management measures currently in place.*	☑

EVIDENCE:
The interests of all harvesters are protected through the BOF process[157]. The BOF receives recommendations from 82 local Advisory Committees in communities around Alaska. They develop regulation proposals, evaluate proposals, debate conservation, advise regional councils and consult with interested parties.

Subsistence uses are given preference in law over other uses in fishery management (AS 16.05.258)[158]. On all Federal public lands and waters management of subsistence fisheries is the responsibility of the Federal Government, which ensures that preference is given to subsistence users[159]. In 'non subsistence areas' of Alaska 'personal use' fisheries provide harvest opportunities other than by sport fishing methods (rod & reel). The Subsistence Division of ADFG supports the interests of subsistence harvesters.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries are taken into account. Examples may include dedicated quotas, public meeting records, laws, and regulations.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that the interests of commercial, sport, subsistence and personal use fishers are taken into account.

References:	**AS 16.05.258**

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[157] http://www.adfg.alaska.gov/index.cfm?adfg=process.acoverview
[158] http://www.touchngo.com/lglcntr/akstats/statutes/title16/chapter05/section258.htm
[159] https://www.doi.gov/sites/doi.gov/files/uploads/Subsistence%20Management%20Program%20Brochure%202016.pdf

Supporting Clause 3.2.4.

3.2.4.	**Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There are management measures in place specifically designed to ensure that the biodiversity of aquatic ecosystems are conserved and ETP species are protected. This shall reflect the existence of specific management objectives and measures, which are based on the best scientific evidence available.*	☑

EVIDENCE:

Conservation of the biodiversity of aquatic habitats and ecosystems is the responsibility of ADFG's Habitat Division (AS 16.05.871, AS 16.05.841.). It issues permits for activities within streams used by anadromous fish; oversees activities in refuges, critical habitat, and sanctuaries; and coordinates with other agencies in reviewing plans for forestry, mining, oil and gas development and coastal management. ADFG is responsible for determining and maintaining a list of endangered species in Alaska (AS 16.20.190). A species or subspecies of fish or wildlife is considered endangered when the ADFG Commissioner determines its numbers have decreased to such an extent that its continued existence is threatened. By law, the Commissioners of the Alaska Departments of Fish and Game and Natural Resources must take measures to preserve the natural habitat of fish and wildlife species that are recognized as threatened with extinction. Currently there are no salmon stocks designated as endangered in the state of Alaska. The Policy for the Management of Sustainable Salmon Fisheries (SSFP; 5 AAC 39.222, effective 2000, amended 2001) directs ADFG to provide the BOF with reports on salmon stock status and identify any stock that is of yield, management, or conservation concern. In consultation with ADFG, the BOF may designate, amend, or discontinue a "stock of concern".

Current status/Appropriateness/Effectiveness: *The management measures currently in place have been successful in meeting the management objectives. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans. There is no evidence that the fishery is currently having a significant adverse impact on aquatic ecosystems, and it is not putting any ETP species at risk of extinction.*	☑

EVIDENCE:

Conservation of the biodiversity of aquatic habitats and ecosystems is the responsibility of Habitat Division within ADFG (AS 16.05.871, AS 16.05.841.)[160]. Activities by individuals, private companies, or agencies within streams used by anadromous fish require permission of the ADFG. The Division oversees activities in refuges, critical habitat, and sanctuaries. It coordinates with other agencies in reviewing plans for forestry, mining, oil and gas development and coastal management. Sport Fish Division maintains and updates the anadromous stream catalogue, which lists all waters used by salmon for spawning, rearing, and travel. Anadromous streams receive increased protection from development. The Commercial Fisheries Division maintains a Gene Conservation Laboratory[161], which advises the Division Director in enforcing the Finfish Genetics Policy, which has as its purpose protection of the genetic diversity of salmon and other fish. The Laboratory reviews and recommends actions on applications for Hatchery Operating Permits, Fish Resource Permits which are required for any collection of fish, shellfish, or plants (e.g. for scientific research), and for Fish Transport Permits which are required for transportation, possession, or release of live fish (e.g. by a hatchery/for research).

The Commercial Fisheries Division maintains a Fish Pathology Laboratory that has an important role in ecosystem conservation[162]. It "monitors and controls finfish and shellfish diseases...conducting diagnostic surveys, developing...policies...on fish disease issues. It also reviews and recommends actions on applications for Fish Resource Permits or Fish Transport Permits. The Laboratory has responsibility for policies designed to protect habitats and ecosystems from the introduction or amplification of fish pathogens. The Commercial Fisheries Division maintains a Mark Tag and Age Laboratory[163]to provide fisheries managers and researchers with timely, current, and historical biological data to help them manage, preserve, protect, and perpetuate Alaska's fishery resources The Laboratory's role in ecosystem conservation is important in that it enables harvest managers to know the portion of wild salmon in

[160] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.haboverview
[161] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main
[162]http://www.adfg.alaska.gov/index.cfm?adfg=fishingpathologylab.main
[163] http://mtalab.adfg.alaska.gov

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

mixed harvests with hatchery-produced salmon and thus enables accomplishment of policies for mixed stock fisheries, sustainable fisheries, and escapement goal setting.

The Policy for the Management of Sustainable Salmon Fisheries[164] (SSFP; 5 AAC 39.222, effective 2000, amended 2001) directs ADFG to provide the BOF with reports on the status of salmon stocks and identify any stock that present a concern. In consultation with ADFG, the BOF may designate, amend, or discontinue Stocks of Concern based on stock status reports and recommendations from ADFG. The SSFP defines three levels of concern (Yield, Management, and Conservation) with yield being the lowest level of concern and conservation the highest level of concern. For example, Stocks of Concern (SOCs) are designated if: 1) A stock is not consistently meeting harvest levels even though escapement levels are met (Yield concern), or 2) When escapement levels have not been met within the past 3 of 5 years (Management Concern). 3) When there is a chronic inability, despite the use of specific management measures, to maintain escapements for a stock above a sustained escapement threshold (SET) (ie limit reference point) (Conservation Concern); The SOC designation triggers a written action plan to identify factors of decline and develop a plan to increase abundance and harvests. The BOF requires recovery plans for stocks of concern. As for 3/30/2016 there are no stocks of conservation concern.

ADFG[165] is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the Commissioner of ADFG determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened. By law, the Commissioners of the Alaska Departments of Fish and Game and Natural Resources must take measures to preserve the natural habitat of fish and wildlife species that are recognized as threatened with extinction. The State Endangered Species List currently includes two birds (Short-tailed Albatross and Eskimo Curlew) and three marine mammals (blue whale, humpback whale, and right whale). Interaction of these ETP species on the salmon fisheries is very low based on logbook reports of ETP species take, and several years of sampling in test fish.

There are no salmon stocks designated as endangered in the state of Alaska. However, the southeast troll fishery is estimated to take a small number of Chinook salmon belonging to threatened or endangered stocks from Washington and Oregon states. For example, the upper Willamette River Chinook are threatened. Those takes are regulated under the PST[166] Under the treaty an annual quota of Chinook salmon is set for the Alaska fishery, a quota designed to conserve all wild stocks of Chinook salmon. The management of the troll fishery (through in season opening and closure of the fishery) is governed by that annual quota. The harvest of different stocks each year is estimated from the recovery rates of coded wire tags implanted in representative index stocks in the region of the threatened or endangered stocks[167, 168].

Evidence Basis: *Evidence Basis: The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that biodiversity of aquatic ecosystems is conserved and ETP species are protected. Where relevant, there are management objectives, and as necessary, management measures. Examples may include laws and regulations, fisheries management plans, and speciesstatus reports.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that biodiversity of aquatic ecosystems is conserved and ETP species are protected.

References:	**5 ACC 39.222, AS 16.05.871, AS 16.05.841**							
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	**3**	)	=	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

[164] http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks
[165] http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akendangered
[166] http://www.psc.org
[167] http://www.psc.org/info_codedwiretagreview.htm
[168] http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

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

Fundamental Clause 4. Fishery data

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

Supporting Clause 4.1.

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

Evaluation Parameters	**Met?**
Process: *There is a process or system that allows for effective data collection (including data on retained catch, bycatch, discards and waste) on the status of fisheries and ecosystems for management purposes. In the case of stocks fished by more than one State, this includes a system or agreement with other States to ensure mortality and removals data are available for the entirety of the biological stock. Some fisheries and/or fish stock are hard to monitor for various reasons, including remoteness of operation/distribution and complexity of fishing operations—posing particular challenges with the collection and maintenance of adequate, reliable, and current data and/or other information. Assessors shall acknowledge and explain these challenges, data collection, and maintenance to cover all stages of fishery development in accordance with applicable international standards and practices. For salmon, the assessors shall describe and present the enumeration methods (i.e., peak aerial survey, feet survey, weir count, tower, mark–recapture, sonar, etc.) utilized for all the major stocks managed by formal escapement goal in Alaska. Such summary data can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally reviews the latest 9–10 years of salmon escapements, enumeration, goal development methods, and the relative escapement goal performance.*	☑

EVIDENCE:

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 Gray *et al.* 2014 or the on-line map resources http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonmaps. A record of sale for each commercial landing (fish ticket) provides the location, time, species, number, weight and value of fish caught. In-season, area office staff compile summaries of the catch and effort from these fish tickets. The Division of Commercial Fisheries Computer Services section maintains a database and archives the fish ticket data. Historically, the area office staff edited and entered the data from these paper fish tickets. Currently, the state is the process of developing and deploying an electronic fish ticket system. The first buyer of raw fish, persons who catch and process fish, and persons who catch and have fish processed by another business are required to file an annual report of their purchasing and processing activities. This report is called the Commercial Operator's Annual Report (COAR) and is due by April 1 of the following year. There are process in place to share catch data (and accompany 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).

As deemed necessary, specialized services devoted to identifying the stock composition of catches by coded microwire tags, genetic analysis, otoliths or scale patterns is conducted in-season or post season and provided to managers.

Current status:	☑

EVIDENCE:

Distribution of stock assessment information takes many forms, beginning with real-time summaries being hand delivered to managers as necessary, being entered into regionally maintained databases for rapid access, in-season memoranda's being

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

distributed to area, regional and headquarters staff to final reports being accessible on-line[169] . The fine scale geographic definitions of Regions/Districts/Subdistricts/steams are highly appropriate for stock specific management because it allows definition of biological stocks and appropriate places where these stocks can be fished (and records of catch maintained) in as fine a scale as is practical. Data sharing with other Canada, Washington, Oregon and Idaho is through the Pacific Salmon Commission and Pacific Sates Marine Fisheries Commission. The process and systems described above are diligently maintained and used to make both in-season management decisions and to evaluate those decisions post-season.

Current status/Appropriateness/Effectiveness:	
There are appropriate and reliable data collection and estimation methods. Reliable and accurate data are collected on retained catch, bycatch, discards, and waste (for targeted and non-targeted fisheries), and the direct and indirect impacts of the fishery on the ecosystem. Such information is disseminated to all relevant fishery management authorities. Overall, the data collection system is considered effective for the purposes of this clause if fishery scientists believe there is a high probability that the total estimated mortality is an accurate reflection of the actual total mortality across the entire biological stock. Fishery data are collected with a frequency and level of aggregation, which allows the effective and informed management of the stock,. The appropriate level of aggregation will often be the stock level, but could also reflect specific habitats, gear types, sub-populations, etc. The requirements for data collection are focused on the need to assess the effects of the unit of certification on non-target stocks. Non-target catches and discards refer to species/stocks that are taken by the unit of certification other than the stock for which certification is being sought. The adequacy of data relates primarily to the quantity and type of data collected (including sampling coverage) and depends crucially on the nature of the systems being monitored and purposes to which the data are being put. Some analysis of the precision resulting from sampling coverage would normally be part of an assessment of adequacy and reliability. The currency of data is important, inter alia, because its capacity for supporting reliable assessment of current status and trends declines as it gets older.	☑

EVIDENCE:

Both in-season and historic commercial catch data are readily available on the Commercial Fisheries Division 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 Wilburn and Renick 2018 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/. Examples of sharing catch, effort and stock composition data with Canada for transboundary rivers in Southeast Alaska is PSC-TCTR (2019) and for coastwide Chinook Salmon stock status is PSC-JTCC (2019). An example of sharing catch data through the NPAFC is NPAFC (2018).

Evidence Basis:	
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that all significant fishery removals and mortality of the target species are considered by the fishery management organizations. Specifically, reliable and accurate data required for assessing the status of fishery/ies and ecosystems—including data on retained catch, bycatch, discards, and waste—are collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can objectively be verified (i.e., the knowledge has been collected and analyzed though a systematic, objective, and well-designed process, and is not just hearsay). Examples may include stock assessment reports, catch data, and observer data.	☑

EVIDENCE:

NPAFC. 2018. NPAFC Pacific salmonid catch statistics (updated 31 July 2019). North Pacific Anadromous Fish Commission, Vancouver. Accessed Month, Year. Available: https://npafc.org.

PSC-JCTC. 2019. Annual report of catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/

[169] http://www.adfg.alaska.gov/index.cfm?adfg=library.main

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

PSC-TCTR. 2019. Final estimates of Transboundary River salmon production, harvest and escapement and a review of joint enhancement activities in 2017.Report TCTR (19)-2 PSC. Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/transboundary/

Romberg, W., I. Rafferty, and M. Martz. 2018. Alaska statewide sport fish harvest survey, 2018. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan ROP.SF.4A.2018.07, Anchorage. http://www.adfg.alaska.gov/sf/Publications/index.cfm?ADFG=main.mainSearchSubmit

Salomone, P., T. Elison, T. Sands, J. Head, and T. Lemons. 2019. 2018 Bristol Bay annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-12, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR19-12.pdf

Wilburn, D., and R. Renick. 2018. Chignik management area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR18-32.pdf

References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.1.1.

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

Evaluation Parameters	**Met?**
Process: *There is a process or system that allows for the production, maintenance, update, and verification of statistical data to international standards. Such standards include the FAO Coordinating Working Party on Fishery Statistics Handbook of Fishery Statistical Standards. Also, there is a process for the use and distribution of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice). Please note that stock assessment for salmon is intended as the process that leads to enumeration, escapement goal development, and fishery management activities to meet escapement goals.*	☑

EVIDENCE:

The process for collection of catch data via fish tickets (as appropriate by District/subdistrict) is outlined above as required by state statute. Area management and research biologist stationed near the fishing grounds and rivers supporting salmon are charged with estimating escapements using a variety of methods (e.g. towers, weirs, sonar, aerial survey, test fishing). As appropriate, they also estimate the age and stock composition of both catches and escapements. Catch and escapement data are then combined to determine annual run size. These data are used to re-evaluate escapement goals every three years and presented during annual Board of Fish meetings. Once escapement goals are set (typically as a range) they become the legal basis for regulating fishing opportunity on those stocks.

Current status/Appropriateness/Effectiveness: *There is evidence for the production, maintenance, updating, and review of statistical data on catch and fishing effort in the fishery under assessment. There is evidence that the best scientific evidence available is used to inform the fisheries management process. Where there is a legal requirement for the advice of scientific authorities to be adopted, this shall be viewed as conformance with this evaluation parameter.*	☑

EVIDENCE:

Evidence of the production, maintenance, updating, and review of data includes a public process for reviewing escapement goals every three years through the Alaska Board of Fisheries. Alaska Statute 39.222 states (among other things) that:

> A "biological escapement goal" or "(BEG)" means the escapement that provides the greatest potential for maximum sustained yield; BEG's will be the primary management objective for the escapement unless an optimal escapement or in-river run goal has been adopted; BEG's will be developed from the best available biological information, and should be scientifically defensible on the basis of available biological information; BEG's will be determined by the department and will be expressed as a range based on factors such as salmon stock productivity and data uncertainty; the department will seek to maintain evenly distributed salmon escapements within the bounds of a BEG".

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that timely, complete, and reliable statistics are compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data are updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) is promoted. Analysis results are distributed accordingly as a contribution to fisheries conservation, management, and development. Examples may include stock assessment reports and other data.*	☑

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

EVIDENCE:

Basic catch and effort data are both stored electronically within the Division of Commercial Fisheries fish ticket system and in annual area management reports (see for example Salomone *et al.* 2019). Escapement data is also reported annually in area management reports and when advanced technology such as sonar is used it may also be reported separately in research reports that lay out technical methods used to collect and analyze the data (see for example (Matter and Tyers 2019). Likewise, stock composition estimates that are made for either catches or escapements is typically reported in research reports where methods and results are presented (see for example Barclay 2017). Results of analysis to estimate escapement goals are typically documented in reports to the Board of Fish (see for example Schaberg et al. 2019). A summary of statewide escapement goals is published annually (Munro. 2019).

References:

Barclay, A. 2017. Annual genetic stock composition estimates for the Upper Cook Inlet Sockeye Salmon commercial fishery, 2005–2016. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J17-05, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2017.05.pdf

Matter, A. N., and M. Tyers. 2019. Chinook Salmon escapement in the Chena and Salcha Rivers and Coho salmon escapement in the Delta Clearwater River, 2019-2023. Alaska Department of Fish and Game, Regional Operational Plan ROP.SF.3F.2019.03, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.3F.2019.03.pdf

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Salomone, P., T. Elison, T. Sands, J. Head, and T. Lemons. 2019. 2018 Bristol Bay annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-12, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR19-12.pdf

Schaberg, K, T. McKinley and A. St.Saviour. 2019 Review of salmon escapement goals in the Alaska Peninsula/ Aleutian Islands and Chignik management Area. Oral Report to the Alaska Board of Fisheries 2019. Oral Report: RC 3, Tab 1. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/rc3_or1.pdf

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**–**	**(0 x 3)**		**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.1.2.

4.1.2.	**In the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that allows for the use of generic evidence based on similar stocks for fisheries with low risk. The greater the risk, the more specific evidence is necessary to assess sustainability. In principle, "generic evidence based on similar stocks" should not suffice, but it may be adequate where there is low risk to the stock under consideration. In general, "low risk to that stock under consideration" would suggest that there is very little chance of the stock becoming overfished (e.g., where the exploitation rate is very low and the resilience of the stock is high). However, the evidence for low risk and the justification for using surrogate data shall come from the stock assessment itself.*	☑

EVIDENCE:

When stock specific catch and or age composition is not available, to develop a "Biological Escapement Goal or "BEG", ADFG has several methods for establishing a Sustainable Escapement Goal or "SEG" utilizing the available escapement data. The first is theoretical Spawner–Recruit Analysis. It may be used in in situations with few or no stock-specific harvest estimates and/or age data. In this case, information from nearby stocks, or generalizations about the species, are used in a spawner–recruit production model to estimate the number of spawners needed to achieve maximum sustained yield (e.g., Clark 2005). The second method that may be used is termed "Empirical Observation" in this case, 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). The third method is "Risk Analysis". This method uses possible management error (unneeded management action or mistaken inaction) in future years based on 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 nontargeted stocks. A fourth method uses a "3- tier percentile approach" and is based on the principle that escapements of a stock within some range of percentiles observed over the time series of escapements and associated harvest from fishing represents a proxy for maintaining escapements within a range that encompasses a sustainable yield.

Current status/Appropriateness/Effectiveness: *Information has been utilized from generic evidence based on similar fishery situations. Based on the risk of overfishing, the information utilized is of higher precision to account for higher risks (i.e., intensive fisheries).*	☑

EVIDENCE:

Every three years, escapement goals are evaluated for each region and presented to the Board of Fisheries and a statewide summary of current goals, the type of goal and escapements for the last ten years is published (Munro 2019). Munro (2019) reported that the type of escapement goals for all species, by region, show that the majority of goals in Central, Westward, and AYK regions are SEGs. Whereas in Southeast most goals are BEGs. The majority of goals statewide are SEGs. Optimal escapement goals (OEG) and in-river goals imposed by the board, management targets, and goals based upon international agreements collectively represent a small proportion of escapement goals in Alaska. For the most recent years, 48% of the stocks assessed had escapements that were within the goal range (or above the lower bound if a lower-bound SEG) and this is similar to previous years. Twenty-eight percent of the minimum established goals were not achieved, and this is within the range of recent years (Munro 2019).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used for fisheries with low risk to that stock under consideration. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries. Examples may include stock assessment reports and other data.*	☑

EVIDENCE:

There is substantial evidence regarding how sustainable escapement goals were set. This includes detailed information on how escapements are measured and the factors that may affect precision and accuracy (see for example Wilburn, and Renick 2018) and how the available escapement data were analysed (see for example Clark *et al.* 2014). Last, a detailed summary of annual escapements in relation to goals is published (Munro 2019).

4.1.2.	**In the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.**
References:	ADF&G. 2004. Escapement goal review of select AYK Region salmon stocks. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A04-01, Anchorage. http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.3A.2004.01.pdf Bernard, D. R., J. J. Hasbrouck, B. G. Bue, and R. A. Clark. 2009. Estimating risk of management error from precautionary reference points (PRPs) for non-targeted salmon stocks. Alaska Department of Fish and Game, Special Publication No. 09-09, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/SP09-09.pdf Clark, R. A. 2005. Stock status and recommended escapement goals for Coho Salmon in selected waters along the Juneau road system, 1981-2004. Alaska Department of Fish and Game, Special Publication No. 05-21, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/sp05-21.pdf Clark, R. A., D. M. Eggers, A. R. Munro, S. J. Fleischman, B. G. Bue and J. J. Hasbrouck. 2014. An evaluation of the percentile approach for establishing sustainable escapement goals in lieu of stock productivity information. Alaska Department of Fish and Game, Fishery Manuscript No. 14-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS14-06.pdf Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf Wilburn, D. M., and R. L. Renick. 2018. Chignik management Area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR18-32.pdf

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**–** **(**	**0**	**x 3** **)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.2.

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

Evaluation Parameters	**Met?**
Process: *An observer program is present. There may be cases where collection of accurate data for research and support compliance could be established without the use of observers or a formal observer scheme (i.e., inspection scheme, enforcement, port sampling, at shore inspection, voluntary or compulsory logbooks, e-logbooks or other harvester collected data, electronic monitoring [video], or bycatch surveys). The reliability and accurateness of that system(s) would need to be verified accordingly. Note also that some fisheries observer programs are designed to collect biological data and others serve mainly as a compliance or enforcement tool. This shall be considered accordingly in the overall evaluation of this clause. Assessors shall question primarily whether the required data for fisheries management are collected or if there are important data gaps (e.g., because of the absence of an observer program).*	☑

EVIDENCE:
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.

Current status/Appropriateness/Effectiveness: *The data collected by the observer program is considered accurate and useful.*	☑

EVIDENCE:
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 legal and sublegal Chinook salmon during Chinook salmon non-retention periods as well as immature Chinook Salmon caught and released during Chinook salmon retention periods in the Southeast troll fishery and to verify estimates of sublegal Chinook Salmon caught in the Southeast purse seine fishery. These studies were designed to provide accurate estimates of the incidental catch. The data was collected by ADFG employees and permitted estimates of total take. Another example was implementation of the Alaska Marine Mammal Observe Program that provides encounter and mortality estimates for both marine mammals and sea birds in several gillnet fisheries throughout the state.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established. Examples may include stock assessment, survey, observer, or other reports.*	☑

EVIDENCE:
Results of the observer programs in Southeast for Chinook Salmon were reported by Seibel *et al.* (1989) and by Rowse and Marshall (1988). Results of the Marine Mammal Observer program were reported to/by NOAA for gillnet fisheries in Kodiak, Cook Inlet, Prince William Sound, Yakutat and Unimak Island, see for example Wynne *et al.* (1991).

References:	Rowse, M. and S. Marshall. 1988. Estimates of catch and mortality of Chinook salmon in the 1987 Southeast Alaska purse seine fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-18, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/rir.1j.1988.18.pdf Seibel, M., A. Davis, A., J. Kelly and J. E. Clark. 1989. Observations on Chinook salmon hook and release in the 1988 Southeast Alaska troll fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-41, Juneau. (not available on-line).

4.2.	An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established.					
	Wynne, K, D. Hicks and N. Munro. 1991. 1990 Salmon gillnet fisheries observer programs in Prince William Sound and South Unimak Alaska. Final report to NOAA. Saltwater Inc. Anchorage AK. https://www.fisheries.noaa.gov/resource/document/1990-salmon-gillnet-fisheries-observer-programs-prince-william-sound-and-south.					
Numerical score:	**Starting score**	**–**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10		**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						

Supporting Clause 4.2.1.

4.2.1.	**Where necessary, fisheries management organizations and regional fisheries management organizations and other such arrangements should strive to achieve a level and scope of observer programs sufficient to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a clear system that allows the observer program, or any other appropriate data gathering system as appropriate, to provide sufficient quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.*	☑

EVIDENCE:
As mentioned in 4.2, observer programs are not often used in Alaska salmon fisheries. However, port sampling is used extensively to collect biological samples of catches. The legal authority for this activity is spelled out in state regulations as noted above. The scope of the port sampling program varies greatly by species and region depending on need.

Current status/Appropriateness/Effectiveness: *The data collected by the observer program is considered accurate and useful, especially for providing quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.*	☑

EVIDENCE:
For stocks where BEG can/have been established, age, sex and size composition of the harvest is taken; examples include Sockeye Salmon in Bristol Bay, Chignik, Copper River, Taku River, Chinook Salmon in Southeast and Chum Salmon in the Yukon. Sex composition is taken for Pink Salmon in Southeast to help determine run timing. Genetic samples are taken to determine stock composition in several high-profile Chinook and Sockeye salmon fisheries such as Bristol Bay and Cook Inlet. Coded microwire tags are sampled to determine stock specific exploitation rates for Coho and Chinook in Southeast. Otolith sampling is used to determine hatchery of origin for Pink and Chum salmon in Southeast and Prince William Sound.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the observer program is established and able to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources. Examples may include stock assessment, observer, survey, or other reports.*	☑

EVIDENCE:
Raw or summarized biological data collected in port sampling programs has been reported for some programs (for example Oliver 1991 and Wood and Van Alen1990). Most often however, the data is incorporated into either Research reports such as Gorman et. al. (2018), Eskelin and Barclay (2018) and Gilk-Baumer *et al.* (2017) or stock status reports such as Hein et al. (2017).

References:

Eskelin, A., and A. W. Barclay. 2018. Eastside set gillnet Chinook Salmon harvest composition in Upper Cook Inlet, Alaska, 2017. Alaska Department of Fish and Game, Fishery Data Series No. 18-30, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-30.pdf

Gilk-Baumer, S., D. F. Evenson, K. Shedd, and E. L. Jones. 2017. Mixed stock analysis of Chinook Salmon harvested in Southeast Alaska commercial troll and sport fisheries, 2016. Alaska Department of Fish and Game, Fishery Data Series No. 18-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-01.pdf

Gorman, K., J. McMahon, P. Rand, E. Knudsen, and D. Bernard. 2018. Interactions of wild and hatchery Pink Salmon in Prince William Sound. Final Report for 2017 For Alaska Department of Fish and Game. Contract CT 160001756. Prince William Sound Science Center. Cordova, AK. http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/2017_annual_report_pwssc_hw.pdf

Heinl, S. C., E. L. Jones III, A. W. Piston, P. J. Richards, L. D. Shaul, B. W. Elliott, S. E. Miller, R. E. Brenner, and J. V. Nichols. 2017. Review of salmon escapement goals in Southeast Alaska, 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 17-11, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS17-11.pdf

4.2.1.	**Where necessary, fisheries management organizations and regional fisheries management organizations and other such arrangements should strive to achieve a level and scope of observer programs sufficient to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.**
	Oliver, G. T. 1991. Southeast Alaska port sampling project report for the period July 1, 1987 to June 30, 1991. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J91-23, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/rir.1j.1991.23.pdf Wood, D. S. and B. W. Van Alen. 1990. Abundance, age, sex, and size of Coho Salmon catches and escapements in Southeast Alaska in 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report No. 90-01, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/tfr.90.01.pdf

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**–** **(**	**0**	**x** **3** **)**	**=**	

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.3.

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

Evaluation Parameters	**Met?**
Process: *There is a system within the regional body structure that allows for data distribution in line with confidentiality requirements.*	☑

EVIDENCE:
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, ADFGs policy is that if three or fewer fishermen 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.

Current status/Appropriateness/Effectiveness: *There is evidence proving that confidentiality requirements are satisfied when data is distributed to the various parties.*	☑

EVIDENCE:
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 Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fisheries management organization, regional fisheries management organizations or arrangements compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures. Examples may include reports where confidentiality requirements have been effected.*	☑

EVIDENCE:
Evidence of maintaining strict confidentially is often observed at Board of Fish meetings when 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-JCDS 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 (2019).

References:	PSC-JCTC. 2019. Annual report of catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/ PSC-JCDS. 1989. Information content and standards for a coastwide coded-wire tag database. PSC Report TCDS (89) – 1. Vancouver, B.C. Canada. 183p. https://www.psc.org/publications/technical-reports/technical-committee-reports/data-sharing/

4.3.	**A fisheries management organization, regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.**					
	Weiland, K. 2003. Summary of Bristol Bay sockeye salmon catches by gear type, 1965-2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-25, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.2A.2003.25.pdf					
Numerical score:	**Starting score**	**–**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10		**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						

Supporting Clause 4.4.

4.4.	States shall stimulate the research required to support policies related to fish as food.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is research to support policies related to fish as food.*	☑

EVIDENCE:
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, industry training and sustainability certification. 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 of their products.

Current status/Appropriateness/Effectiveness: *There is evidence of this research.*	☑

EVIDENCE:
In fiscal year 2018, the Kodiak Marine Science Center reported conducting ten research projects in the areas of seafood science, product development, fisheries, climate change, harmful algal blooms and safe subsistence harvest of shellfish (KMSC 2018).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State stimulates the research required to support policies related to fish as food.*	☑

EVIDENCE:
The existence and operation of the ASMI and Kodiak Center along with research reports (see for example Faber et al. (2010) and Nettleton (2009) is sufficient evidence that the state stimulates research in support of policies related to fish as food.

References:

Faber, T., P. Bechtel, D. Hernot, C. Parsons, K. Swanson, S. Smiley and G. Fahey. 2010. Protein digestibility evaluations of meat and fish substrates using laboratory, avian, and illegally cannulated dog assays. Journal Animal Science. 88: 1421-1432.
https://academic.oup.com/jas/article/88/4/1421/4745685

KSMSC. 2018. Annual report FY2018 (July 1, 2017–June 30, 2018). 2018. Kodiak Seafood and Marine Science Center, University of Alaska Fairbanks, College of Fisheries and Ocean, Kodiak.
https://www.uaf.edu/files/cfos/Locations/kodiak/annual-report-FY18-KSMSC.pdf

Nettleton, Joyce. 2009. Are fish and plant omega-3s the same? ASMI. Juneau, AK.
https://www.ncbi.nlm.nih.gov/pubmed/1825498

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.5.

4.5.	**There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a system in place for collecting economic, social, marketing, and institutional knowledge of the fisheries.*	☑

EVIDENCE:

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 Commercial Fisheries Entry Commission (CFEC) uses economic and biological data to establish the number of permits that will be issued to participate in the state's commercial fisheries.

Current status/Appropriateness/Effectiveness: *These data are used for ongoing monitoring, analysis, and policy formulation.*	☑

EVIDENCE:

The state relies on several sources of 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 value of commercial landings and on wholesale value.

The Sport Fish Division periodically estimates the value of recreational fishing. The Division of Subsistence publishes studies on the history and current use of salmon for subsistence. The University of Alaska maintains Institute of Social and Economic Research that periodically conducts research on the salmon fisheries of Alaska. The CFEC evaluates the optimum number of permits that should be issued for a fishery.

The social and economic data obtained are routinely used by the Board of Fish when establishing fishing regulations as required by statute. The Alaska Seafood Marketing Institute (ASMI) uses these data in developing marketing campaigns. And the Alaska legislature is made aware of the social, cultural and economic value of salmon when crafting statutes.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries, that they are adequately researched, and that comparable data are generated for ongoing monitoring, analysis, and policy formulation. Examples may include reports on social/cultural/economic value of the resource.*	☑

EVIDENCE:

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 and 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 conducts research on the salmon fisheries of Alaska (see for example Knapp 2011). The Sport Fish

4.5.	**There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.**

Division has published reports on the value of recreational fishing (see for example Southwick *et al.* 2008). The Commercial Fisheries Division maintains data on the ex-vessel value of commercial landings[170] and on wholesale value[171]

Various institutions have also contracted to have economic studies done and made public. For instance the public non-profit hatcheries contracted 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).

References:

Fall, J., A. Godduhn, G. Halas. L.Hutchinson-Scarbrough, B. Jones, B. McDavid, E. Mikow, L. Sill, A. Wiita, T. Lemons. 2019. Alaska subsistence and personal use salmon fisheries 2016 annual report. ADF&G Division of Subsistence, Technical Paper No. 446. Juneau. http://www.adfg.alaska.gov/techpap/TP446.pdf

Knapp, G. 2011. Local permit ownership in Alaska salmon fisheries. Marine Policy 35(5) pgs. 658-666. https://www.semanticscholar.org/paper/Local-permit-ownership-in-Alaska-salmon-fisheries-Knapp/11585d74a42c486c4fc9d62e970552f1f486fbc9

McDowell Group. 2015. The economic impact of the seafood industry in South Central Alaska. Mc Dowell Group. Glacier Hwy. Suite 201. Juneau AK. https://www.mcdowellgroup.net/portfolio-posts/economic-impact-of-the-seafood-industry-in-southcentral-alaska/

McDowell Group 2018. The economic impact of Alaska's Salmon hatcheries. Mc Dowell Group. 3960 Glacier Hwy. Suite 201. Juneau AK. http://www.mcdowellgroup.net/wp-content/uploads/2018/10/economic-impact-of-alaskas-salmon-hatcheries.pdf

Sill, L., G. Halas, D. Koster. 2019. Copper River Chinook Salmon: the intersection of commercial fisheries and the subsistence way of life in Cordova, Alaska. ADF&G Division of Subsistence, Technical Paper No. 444.Juneau. http://www.adfg.alaska.gov/techpap/TP444.pdf

Schelle, K., K. Iverson, N. Free-Sloan and S. Carlson. 2004. Bristol Bay salmon drift gillnet fishery optimum number report. CFEC Report 04-3N. Juneau AK. https://www.cfec.state.ak.us/RESEARCH/04_3N.htm

Sethi, S., M. Reimer, And G. KnAPP. 2014. Alaskan fishing community revenues and the stabilizing role. of fishing portfolios. Marine Policy 48 (2014)134–141. https://pdfs.semanticscholar.org/ed6a/dc3bc8d9bbff628544b553d4b04c9d3c30dc.pdf

Southwick Associates Inc. and W. J. Romberg, A. E. Bingham, G. B. Jennings and R. A. Clark. 2008. Economic impacts and contributions of sport fishing in Alaska, 2007. Alaska Department of Fish and Game, Professional Paper No. 08-01, Anchorage, AK. http://www.adfg.alaska.gov/FedAidpdfs/PP08-01.pdf

Trainor, A. B.M. McDavid, L.A. Sill, L.S. Naaktgeboren. 2019. Local traditional knowledge of the freshwater life stages of Yukon River Chinook and Chum salmon in Anvik, Huslia, Allakaket, and Fort Yukon. ADF&G Division of Subsistence, Technical Paper No. 447. Juneau. http://www.adfg.alaska.gov/techpap/TP%20447.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[170] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery
[171] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch_wholesale

Supporting Clause 4.6.

4.6	**The fisheries management organization 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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Traditional fisher knowledge has been investigated. Note that for highly developed fisheries that knowledge may already have been integrated into fisheries management.*	☑

EVIDENCE:

While traditional knowlwdge is used when setting fishing regulations in the Board of Fisheries process and in-seaon to help assess run strength and set time and area fishing regulations, we do not consider any of the Alaska commercial fisheries to be " small scale", as such we do not believe thus clause to be particuarily applicable. However, we do not wish to diminish the role traditional knowledge plays in the management of Alaska's commercial salmon fishery. As such we provide the following information.

Although agency stock assessments used for commercially harvested salmon runs are based on fishery science, which is objective and quantitative, traditional fisher knowledge, while subjective and qualitative, plays an important role in management decisions and efforts to sustain salmon runs. Tradition knowledge is useful because it is based on long-term observations of the salmon runs and their interaction with a variable environment. Recognising the importance of local knowledge for fisheries management, Advisory Committees (http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory), comprised of local residents were established by statute in 1959 to work with the Alaska boards of Fish and Game. There are 84 of these committees throughout the state that provide a local forum to discuss fish and wildlife issues and to work with the boards in developing, modifying, and evaluating regulations as well as on related issues. During the fishing season, ADFG commercial fishery managers routinely interact with fishers and local advisory committees to obtain their assessment of the run and fishing conditions, and, in some areas, local fishers are contracted to conduct test fishing during fishery closures to collect information on salmon runs. Structured collaborations with stakeholders have been developed in some fisheries to provide local fishing communities a more active role in management and to provide managers with qualitative information on salmon runs and fishing conditions. Two examples of structured collaborations are the Kuskokwim Salmon Management (KSM) Working Group, formed by the Alaska Board of Fisheries in 1998, and the Yukon River Drainage Fisheries Association's (YRDFA; a non-profit group) In-Season Weekly Teleconferences, begun in 1994, and YRDFA's Yukon River Pre-Season Summer Preparedness Planning Meetings, begun in 2010. The KSM Working Group is made up of 14-members, with seats provided for elders, subsistence fishermen, a processor, a commercial fisherman, a sport fisherman, the Kuskokwim River Inter-Tribal Fish Commission, a member at large, a federal subsistence regional advisory committee member, and the ADFG. The goal is for all parties to work together to reach a consensus on management of the fishery, although final emergency order authority rests with ADFG. YRDFA's In-Season Weekly Teleconferences (Jenkins 2017)involve fishers from 16 villages and locations (including one in Canada) and managers from ADFG, USFWS, and DFO Canada. Managers get information from local fishers about current and past conditions as well as input and buy-in on potential management actions. Local fishers get to share their knowledge with and obtain information from managers as well as provide input to management decisions.

Current status/Appropriateness/Effectiveness: *There are records of the documentation of small-scale fisher practices.*	☑

EVIDENCE:

The working group remains active and a record of the meetings can be found at:
http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.kswg.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization investigates and documents 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. Examples may include various fisheries reports.*	☑

EVIDENCE:

4.6	**The fisheries management organization shall investigate and document traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development.**
The state has conducted research to document traditional knowledge for several commercially fished salmon stocks (Bronwyn and Kukkonen 2017;Trainor et al. 2019; Ream and Merriam, 2017; Joshua and Merriam, 2017).	
References:	Bronwyn, J, and M. Kukkonen. 2017. Local and traditional knowledge of abundance of Chinook Salmon in the Kenai River. ADF&G Division of Subsistence, Technical Paper No. 431. http://www.adfg.alaska.gov/techpap/TP431.pdf Jenkins, W. 2017. Yukon River In-Season Salmon Management Teleconferences Final Report for Project CC-01-16. 6p, and weekly summaries for 2015 teleconferences - http://www.yukonsalmon.org/?s=in-season+weekly+teleconference. Ream, J. and J. Merriam. 2017. Local and traditional knowledge of Stikine River Chinook Salmon: A local perspective on a vital commercial, sport, and subsistence fish. ADF&G Division of Subsistence, Technical Paper No. 430. http://www.adfg.alaska.gov/techpap/TP430.pdf Trainor, A. B.M. McDavid, L.A. Sill, L.S. Naaktgeboren. 2019. Local traditional knowledge of the freshwater life stages of Yukon River Chinook and Chum Salmon in Anvik http://www.adfg.alaska.gov/techpap/TP%20447.pdf, Huslia, Allakaket, and Fort Yukon. ADF&G Division of Subsistence, Technical Paper No. 447. Juneau.

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 4.7.

4.7	If a fisheries management organization is conducting scientific research activities in waters of another State, it shall ensure that their vessels comply with the laws and regulations of that State and international law.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a system in place to manage the conduct of research vessels operating in waters of other States.*	☑
EVIDENCE: The state of 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.	
Current status/Appropriateness/Effectiveness: *If a fisheries management organization is conducting scientific research activities in waters of another State, there is record of such shared research activities and they comply with required regulations.*	☑
EVIDENCE: All cooperative research in the Canadian portion of the Transboundary Rivers is organized through the Pacific Salmon Commissions Transboundary Rivers Technical Committee or Yukon River Technical Committee.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if a fisheries management organization is conducting scientific research activities in waters of another State, it ensures that their vessels comply with the laws and regulations of that State and international law. Examples may include survey reports.*	☑
EVIDENCE: All cooperative research on the Transboundary Rivers is reported annually[172] . All research on the Yukon Rover is reported annually[173]	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–** **(**	**0**	**x**	**3**	**)** **=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[172] https://www.psc.org/publications/technical-reports/technical-committee-reports/transboundary/
[173] https://www.yukonriverpanel.com/about-us/organizational-structure/joint-technical-committee/.

Supporting Clause 4.8.

4.8.	**Adoption of uniform guidelines governing fisheries research conducted on the high seas shall be promoted and, where appropriate, support the establishment of policies that include, inter alia, facilitating research at the international and sharing the research results with affected States.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place to allow the development and review of guidelines governing fisheries research conducted on the high seas.*	☑

EVIDENCE:
There is no high seas salmon fishing on stocks originating in Alaska or salmon fishing by Alaskans on the high seas.. 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.

Current status/Appropriateness/Effectiveness: *There is a record of uniform high seas research guidelines or a mechanism to create them.*	☑

EVIDENCE:
The NPAFC is active in coordinating scientific research that is conducted under the Commission's Science Plan (NPAFC 2010) and has developed a consensus long-term research and monitoring plan for Pacific salmon in the North Pacific (Beamish et. al. 2009).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that adoption of uniform guidelines governing fisheries research conducted on the high seas is promoted and, where appropriate, supports the establishment of mechanisms, including, inter alia, adopting uniform guidelines to facilitate research at the international level, and encouraging such research results be shared with affected States. Examples may include survey reports, or high seas guidelines.*	☑

EVIDENCE:
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 and, workshops. See for example Farley et al. Eds. (2009). 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. Comprehensive accounting of NPAFC activities are outlined in their annual report NPAFC (2018).

References:

Beamish, R., B. Riddell, K. Lang, E. Farley Jr., S. Kang, T. Nagasawa, V. Radchenco, O. Temnykh and S. Urawa. 2009. A long –term research and monitoring plan (LRMP) for Pacific salmon (Onchorynchus spp.) in the North Pacific Ocean. N. Pac. Anad. Fish. Comm. Special. Pub No. 1. NPAFC Suite 502.
West Pender St, Vancouver , B.C. VC 3B2 Canada. 48 pp.
http://www.richardbeamish.com/uploads/1/6/0/0/16007202/lrmp-finalreport.pdf

Farley jr., E. , T. Azumaya, R. Beamish, M. Koval, K. Meyers, K.B. Seong and S. Urawa. 2009. Climate change, production trends, and carrying capacity of Pacific Salmon in the Bering Sea and adjacent waters. N. Pac. Anad. Fish Comm. Bull. 5. NPAFC Suite 502. West Pender St, Vancouver , B.C. VC 3B2 Canada.
https://npafc.org/bulletin-5/

4.8.	**Adoption of uniform guidelines governing fisheries research conducted on the high seas shall be promoted and, where appropriate, support the establishment of policies that include, inter alia, facilitating research at the international and sharing the research results with affected States.**						
	NPAFC. 2010. North Pacific Anadromous Fish Commission science plan 2011 – 2015. NNPAFC Doc 1255. 34 pp. Committee of Scientific Research and Statistics (CSRS) . NPAFC Suite 502. West Pender St, Vancouver , B.C. VC 3B2 Canada. https://npafc.org/science-plan/ NPAFC. 2018. Annual Report for 2018. NPAFC Suite 502. West Pender St, Vancouver , B.C. VC 3B2 Canada. https://npafc.org/annual-report/						
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 4.9.

4.9	**If appropriate, the fisheries management organization and relevant international organizations shall promote and enhance the research capacities of developing countries, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources.**
Relevance:	Not Relevant
	This clause is not applicable because the shared stocks are not fished by one or more developing States.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the research capacities of developing countries can be developed and enhanced. This could include, but is not limited to, the provision of personnel, equipment, funding, or cooperation on data collection and stock assessment.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There are recognizable examples of instances in the history of the fishery under assessment where actions by the managers of the unit of certification have promoted or enhanced the research capacity of one or more developing nations in the ways described above.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if appropriate, the fisheries management organization and relevant international organizations promote and enhance the research capacities of developing States, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources. Examples may include various data or reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Supporting Clause 4.10.

4.10.	**Competent national organizations shall, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished.**
Relevance:	Not Relevant
	Not relevant because all the Alaska salmon fisheries are fully developed.

Evaluation Parameters	**Met?**
Process: *There is a mechanism to allow a national organization to render technical and financial support to the State.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is a record of the provided technical and financial support.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that competent national organizations, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished. Examples may include various data or reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**	
	10	**–** **(**		**x** **3** **)**	**=**	**NA**	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Supporting Clause 4.11.

4.11.	**Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries—in particular the least developed among them and small developing island countries.**
Relevance:	Not relevant.
	This clause is not relevant because there is no international management component of Alaska salmon fisheries occurring within a developing country.

Evaluation Parameters	**Met?**
Process: *The international management component of the fishery is engaged in processes that support the fishery based in developing countries.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is a record of the provided technical and financial support.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that relevant technical and financial international organizations are, upon request, supporting States in their research efforts, and are devoting special attention of developing countries—in particular the least developed among them and small island developing countries. Examples may include various data or reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–** **(**		**x** **3** **)**	**=**		**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Fundamental Clause 5. Stock assessment

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.

Supporting Clause 5.1.

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.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is an established institutional framework for fishery management purposes that determines applied research needs and use.*	☑

EVIDENCE:

Alaska salmon resources are abundant, diverse and spread over an immense landscape. To develop the scientific knowledge and management expertise needed to successfully implement sustained yield, as required by the state's constitution, ADFG is organized in a hierarchal scheme. The core research and management functions are conducted by professional staff deployed to 23 area offices located throughout the state. Overarching the area office structure, are four specialized Divisions within the Department that have responsibilities for fisheries issues. The Commercial Fish Division has the primary responsibility for research and management of stocks that are harvested commercially. The Sport Fish Division is responsible for research and management of stocks of primary interest to recreational fishermen, and also takes the lead role in research on several stocks that are shared between commercial and recreational fishers. The Habitat Division conducts applied research to develop methods and means to minimize impacts of development projects on fish and wildlife resources, issue permits for activities that may impact fish and maintains a catalogue of waters that salmon inhabit. The Subsistence Division compiles and analyze data and conducts research on subsistence fishing by Alaskans.

Within each Division, administrative regions have been established. Staff at the regional offices provide administrative, biometric, computer hardware and software, research and management support to the area office staff. At the Division level, senior staff provide overall guidance to the regional staff in management, research and biometrics as well as providing statewide technical services, such as the Gene Conservation Laboratory and coded micro-wire tag laboratory.

ADFG has an outstanding institutional building structure and function. The heart of the system is a structure where students can enter the Department as seasonal employees to gain field or laboratory experience as technicians. Upon graduation with a bachelors' (or higher) degree, entry level positions at the Biologist 1 or 2 level are employed in development positions to assist area management or research biologist. Fishery Biologist 3's are responsible for leading the management activities of the area office, supervising research programs at the area office, or for conducting specialized research at the regional level. Fishery Biologist 4's coordinate and supervises the overall management of research programs at the regional offices and in headquarters. The highest levels are statewide specialized positions such as the statewide Fishery Scientists for Salmon, Chief Biometrician and the Chief Fishery Scientist. In the management track, biologist can rise to be a Regional Supervisor, Deputy Director and Director.

Educational and experience standards for all ADFG employees are maintained by the State's Department of Administration; the standards are rigorous and specific to help ensure that only appropriately educated and experienced people qualify for the professional and technical positions within the ADFG (see for example specifications for a Biometrician IV https://www.governmentjobs.com/careers/alaska/classspecs/889586).

Current status: *There is evidence to substantiate that essential research for fishery management purposes is determined and carried out. This research generally includes routine stock(s) and ecosystem assessment reports. Assessors shall evaluate the specific stock assessment model/practices for each of the species under assessment and verify the technical appropriateness for use. For salmon, the assessors shall present and evaluate the methods for escapement goal development utilized to develop the annual escapement goals in Alaska (about 300). Statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.*	☑

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.**

EVIDENCE:
At the core of the ADFG's scientific program is a requirement for peer reviewed planning and reporting. Scientific research and applied stock assessment activities undertaken is rigorously reviewed at the area and regional level, and may also be reviewed at the headquarters level to ensure relevance to management and scientific rigor (Regnart and Swanton 2012). In Alaska, escapement goals are the primary management target. As such, establishing rigorous methods for setting and evaluating goals is a primary function of the technical staff. A through discussion of how escapement goals are set can be found in Clause 6.

Current status/Appropriateness/Effectiveness:	☑

EVIDENCE:
The estimation of stock specific catch and escapement, by age, provides the basic data for input to the various models used to set escapement goals. Examples of stock assessment operational plans are Richards et al. (2013) and Bernard and Jones (2010). Each year, the area management staff prepare a detailed report on the results of harvest, effort and escapements and other stock assessment activities undertaken in their area, see for example Salomone *et al.* (2019) and Wilburn and Renick (2018). Regional and headquarters research staff are actively involved in many stock assessment programs. For example, the Gene Conservation Laboratory staff's work in understanding the structure of salmon stocks and making estimates of the stock composition in mixed stock fisheries (Eskelin and Barclay, 2018). An example of headquarters staff using estimates of fish size to differentiate Chinook Salmon from Sockeye Salmon in escapements (Key et al. 2016). An example of the research that was needed to develop methods for setting escapement goals is Clark et al. (2014). Each year a summary of the state's escapement goals, the type of goal and references to how the goals were developed and the actual escapements for the last ten years is written (Munro 2018). The wealth of the Department's publications explain methods and results of stock assessment activities is accessible via a searchable database at
http://www.adfg.alaska.gov/index.cfm?adfg=library.main.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an appropriate institutional framework is established to determine the applied research required and its proper use (i.e., assess and evaluate stock assessment models or practices) for fishery management purposes. Examples may include description of the overall process of research assessment and peer review, as well as stock and ecosystem assessment reports.*	☑

EVIDENCE:
Bernard, D. R. and E. L. Jones III. 2010. Optimum escapement goals for Chinook Salmon in the transboundary Alsek River. Alaska Department of Fish and Game, Fishery Manuscript Series No. 10-02, Anchorage. http://www.sf.adfg.state.ak.us/FedAidpdfs/fms10-02.pdf

Clark, R. A., D. M. Eggers, A. R. Munro, S. J. Fleischman, B. G. Bue and J. J. Hasbrouck. 2014. An evaluation of the percentile approach for establishing sustainable escapement goals in lieu of stock productivity information. Alaska Department of Fish and Game, Fishery Manuscript No. 14-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS14-06.pdf

Eskelin, A., and A. W. Barclay. 2018. Eastside set gillnet Chinook salmon harvest composition in Upper Cook Inlet, Alaska, 2017. Alaska Department of Fish and Game, Fishery Data Series No. 18-30, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-30.pdf

Key, B. H., J. D. Miller, D. L. Burwen, and S. J. Fleischman. 2016. Estimates of Chinook salmon passage in the Kenai River at river mile 8.6 using dual-frequency identification sonar, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 16-13, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS16-13.pdf

Regnart, J. and C. O. Swanton. 2012. Operational planning, policies and procedures for ADF&G fisheries research and data collection projects. Alaska Department of Fish and Game, Special Publication No. 12-13, Anchorage.
http://www.adfg.alaska.gov/FedAidpdfs/SP12-13.pdf

Richards, P., T. Jaecks and P. Etherton. 2013. Estimation of smolt production and harvest of Stikine River Chinook Salmon, 2013. Alaska Department of Fish and Game, Regional Operational Plan No. SF.1J.2013.08, Anchorage.
http://www.adfg.alaska.gov/FedAidpdfs/ROP.SF.1J.2013.08.pdf

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.

Salomone, P., T. Elison, T. Sands, J. Head, and T. Lemons. 2019. 2018 Bristol Bay annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-12, Anchorage.
https://www.adfg.alaska.gov/FedAidPDFs/FMR19-12.pdf

Wilburn, D. M., and R. L. Renick. 2018. Chignik Management Area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage.
https://www.adfg.alaska.gov/FedAidPDFs/FMR18-32.pdf

References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 5.1.1.

5.1.1.	**Less elaborate stock assessment methods are frequently used for small-scale or low-value capture fisheries resulting in greater uncertainty about the status of the *stock under consideration.*, A more precautionary approach to managing fisheries on such resources shall be required, including, where appropriate, a lower level of resource utilization. A record of good management performance may be considered as supporting evidence of the adequacy of the management system.**
Relevance:	Not Relevant.
	Because there are no small-scale or low value commercial salmon fisheries in Alaska this clause is not relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that allows more precautionary approaches to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is evidence that precautionary approaches are applied to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that with less elaborate stock assessment methods frequently used for small-scale or low-value capture fisheries, more precautionary approaches to managing fisheries on such resources are required, including where appropriate, lower level of resource utilization. Examples may include stock assessment reports and other data.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**	
		– (		x	3	) =		**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

Supporting Clause 5.1.2.

5.1.2	**The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There are organizations and processes in place to permit research into the aspects of fisheries listed in the clause.*	☑

EVIDENCE:

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 and 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.

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 in biology and ecology relating to management of salmon while training undergraduate and graduate students.
- The USFWS augments state stock assessment by conducing research on salmon production and habit 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.

Current status/Appropriateness/Effectiveness: *Research is conducted into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The described types of research carried out shall result in the fishery being deemed compliant with this evaluation parameter.*	☑

EVIDENCE:

The types of research outlined above and the evidence of such research documented below is sufficient to meet the requirement of being compliant with this parameter.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States are conducting appropriate research into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The research is disseminated accordingly. States also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research. Examples may include stock assessment, economic value, fleet reports, and other reports.*	☑

5.1.2	**The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.**

EVIDENCE:

Examples of the Commercial Fisheries Division research on technology is Burwen *et al.* (2010), on genetics is Habicht (2019), 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 (2015). 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). An example of the University of Alaska research in ecology is Adkison (2010). An example of research conducted at the University of Washington on biology is Clark et al. (2015). Example of the National Marine Fisheries Service Auke Bay Laboratory research into the early marine life history of salmon is Murphy et al. (2017), on genetics and stock identification Kondezla et al. (2016) and on environmental science and pollution is Farrow et al. (2016). An example of the research conducted by the USFWS on production and habit in Alaska is Tanner and Suresh (2014).

References:

Adkison, M. 2010. Models of the effects of marine-derived nutrients on salmon (Oncorhynchus spp.) population dynamics Canadian Journal of Fisheries and Aquatic Sciences. 67(1). https://www.researchgate.net/publication/237153378_Models_of_the_effects_of_marine-derived_nutrients_on_salmon_Oncorhynchus_spp_population_dynamics

Burwen, D. L., S. J. Fleischman and J. D. Miller. 2010. Accuracy and precision of manual fish length measurements from DIDSON sonar images. Transactions of the American Fisheries Society, 139:1306-1314. https://www.tandfonline.com/doi/abs/10.1577/T09-173.1

Clark, S.C., T.L. Tanner, S.A. Sethi, K.T. Bentley and D.E. Schindler. 2015. Migration timing of adult Chinook Salmon into the Togiak River, Alaska, watershed: is there evidence for stock structure? Transactions of the American Fisheries Society 144: 829-836. https://www.tandfonline.com/doi/abs/10.1080/00028487.2015.1031281

Farrow, K., A. Brinson, K. Wallimo and D. K. Lew. 2016. Environmental attitudes in the aftermath of the Gulf Oil Spill. Ocean Coastal Manage. 119:128-134. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1535&context=usdeptcommercepub

Habicht, C., C. T. Smith, A. Barclay, H. Hoyt, K. Turnquist and W. A. Larson. 2019. Discriminating among Pacific salmon, Rainbow Trout, and Atlantic Salmon species using commonly available genetic screening methods. Journal of Fish and Wildlife Management. https://www.fwspubs.org/doi/pdf/10.3996/052018-JFWM-038

Knapp, G. 2011. Local permit ownership in Alaska salmon fisheries. Marine Policy 35(5) pgs 658-666. https://www.semanticscholar.org/paper/Local-permit-ownership-in-Alaska-salmon-fisheries-Knapp/11585d74a42c486c4fc9d62e970552f1f486fbc9

Kondzela, C. M., J. A. Whittle, D. Yates, S. C. Vulstek, H. T. Nguyen and J. R. Guyon. 2016. Genetic stock composition analysis of Chum Salmon from the prohibited species catch of the 2014 Bering Sea Walleye Pollock trawl fishery and Gulf of Alaska groundfish fisheries. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-314, 49 p. U.S. Dep. Commer., NOAA-TM-AFSC-314, 49 p. https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-314.pdf

Loewen, M., and N. Baechler. 2014. The 2014 Chignik River Sockeye Salmon smolt outmigration: an analysis of

5.1.2	**The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.**

the population and lake rearing conditions. Alaska Department of Fish and Game, Fishery Data Series No. 15-02, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS15-02.pdf

Matter, A. N., and M. Tyers. 2019. Chinook Salmon escapement in the Chena and Salcha Rivers and Coho salmon escapement in the Delta Clearwater River, 2019-2023. Alaska Department of Fish and Game, Regional Operational Plan ROP.SF.3F.2019.03, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.3F.2016.07.pdf

McDowell Group. 2015. The economic value of Alaska's seafood industry. 3960 Glacier Hwy. Suite 201. Juneau. https://www.mcdowellgroup.net/wp-content/uploads/2017/10/ak-seadfood-impacts-sep2017-final-digital-copy.pdf

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Murphy, J., K. Howard, J. Gann, K. Cieciel, W. Templin and C. Gutherie III. 2017. Juvenile Chinook Salmon abundance inn the Nkrthern Bering Sea: Implications for future returns and fisheries in the Yukon River. Deep Sea research Par II: Topical Studies in Oceanography. Vol 135 Pgs 156-167. https://www.sciencedirect.com/science/article/abs/pii/S0967064516301618

Purcell, M., R. Powers, J. Evered, J. Kerwin, TR. Meyers, B. Stewart and JR. Winton. 2018. Molecular testing of adult Pacific salmon and trout (*Oncorhynchus spp*.) for several RNA viruses demonstrates widespread distribution of piscine orthoreovirus in Alaska and Washington. J Fish Dis. 41: 347-355.

Sill, L., G. Halas, D. Koster. 2019. Copper River Chinook salmon: the intersection of commercial fisheries and the subsistence way of life in Cordova, Alaska. ADF&G Division of Subsistence, Technical Paper No. 444. Juneau. http://www.adfg.alaska.gov/techpap/TP444.pdf

Schelle, K., K. Iverson, N. Free-Sloan and S. Carlson. 2004. Bristol Bay salmon drift gillnet fishery optimum number report. CFEC Report 04-3N. Juneau AK https://www.cfec.state.ak.us/RESEARCH/04_3N.htm

Southwick Associates Inc., W. J. Romberg, A. E. Bingham, G. B. Jennings and R. A. Clark. 2008. Economic impacts and contributions of sport fishing in Alaska, 2007. Alaska Department of Fish and Game, Professional Paper No. 08-01, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/PP08-01.pdf

Tanner,T. and S. Sethi. 2014. Estimation of Chinook Salmon escapement, distribution and run timing in the Togiak River watershed using radio telemetry, Togiak National Wildlife Refuge, Alaska, 2012. Alaska Fisheries Data Series Number 2014-11, October 2014 U.S. Fish and Wildlife Service. https://www.fws.gov/alaska/sites/default/files/pdfs/fisheries/data-series/d_2014_11.pdf

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 5.2.

5.2.	**There shall be established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a system that establishes the required research capacity needed to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems; (2) the status of the stock under State jurisdiction; and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Please note that climate science is complex and evolving, and the system shall recognize the ability to assess and monitor these parameters over time.*	☑

EVIDENCE The ADFG Divisions of Commercial and Sport Fisheries take the primary lead on determining the status of salmon stocks. 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, changes in 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 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 their distribution, growth and survival in the ocean (current status); (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 producing them (e.g., modelling).

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 effect. 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.

Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that there is sufficient research capacity in place to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under consideration, and (2) the impacts of fishing activity, pollution, or habitat alteration.*	☑

5.2.	**There shall be established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.**

EVIDENCE:
The number, expertise, ongoing funding provided, and research publications of state and federal agencies involved in conducting research to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of Alaska's salmon stocks, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration demonstrates that there is sufficient ongoing capacity

Evidence Basis:	
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Examples may include stock, ecosystem, and habitat assessment reports.	☑

EVIDENCE:
Examples of ADFG's research on salmon stock status in Clause 4. Examples of research in environmental science is discussed in Clause 5. The extensive reporting on escapement goals is explained in Clause 6. An example the 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 focus on habitats is NOAA (2013). An example of the U.S. Fish and Wildlife Service work on climate change is Prucha et al. (2012). 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 on production of salmon in a changing climate is NPAFC (2016).

References:

ADFG-SF. 2015. Alaska Dept. Fish and Game Division of Sport Fish strategic plan 2015-20120. ADFG. Juneau. https://www.adfg.alaska.gov/static/fishing/PDFs/sport/StrategicPlan2015Final.pdf

Brewster, B.P. 2016. Aquatic studies at the Kensington Gold Mine, 2015. ADFG Tech Rept. 16-03. Douglas AK. http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/16_03.pdf

NOAA. 2013. Biological characterization : An overview of Bristol, Nushagak, Kvichak Bays; essential fish habitat, process and species assemblages. NOAA, Ak Region. Anchorage, AK. https://www.fisheries.noaa.gov/resource/document/biological-characterization-overview-bristol-nushagak-and-kvichak-bays-essential

NPAFC. 2016. Pacific Salmon and Steelhead Production in a Changing Climate: Past, Present, and Future.Proceedings of the 2015 NPAFC International Symposium on Pacific Salmon and Steelhead Production in a Changing Climate: Past, Present, and Future, May 17–19, 2015. Kobe, Japan. Bulletin No 6. https://npafc.org/bulletin/

Prucha, R., J. Leppi, S. McAfee and W. Loya. 2013. Development and application of an integrated hydrological model to study the effects of climate change on the Chutina watershed, Alaska. US https://www.arlis.org/docs/vol1/D/794294243.pdf FWS. Contract report by Integrated Hydro Systems and the Wilderness Society. USFWS Anchorage AK.

Wendler, G. , K. Galloway and M. Stuefer. 2015. On the climate and climate change of Sitka, Southeast Alaska. Theor.Appl.Clim.1-8. https://www.researchgate.net/publication/282539585_On_the_climate_and_climate_change_of_Sitka_Southeast_Alaska

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	**3**	)	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 5.3.

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

Evaluation Parameters	**Met?**
Process: *There is cooperation or interaction between international organizations to ensure optimum utilization of resource.*	☑

EVIDENCE:
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) is an international, inter-governmental organization established by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean. The member countries are Canada, Japan, Republic of Korea, Russian Federation and United States of America. To promote conservation and sustainability of anadromous stocks, the NPAFC 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 and monitor performance. The Commission and Panels meet two 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.

Current status/Appropriateness/Effectiveness: *There is evidence available to substantiate that such cooperation or interaction has taken place. There is data available that substantiates cooperation activities.*	☑

EVIDENCE:
There are regular meetings of the NPAFC. Records of these meetings can be found at https://npafc.org/. There are regular meetings of the Pacific Salmon Commission and its technical committees. Records of their meetings and reports of their technical committees can be found at https://www.psc.org/. Records of meeting of the Yukon Panel and its technical committee can be found at https://www.yukonriverpanel.com/.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management organizations cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources. Examples may include outputs resulting from meetings or other research.*	☑

There is an extensive library of documents available explaining the processes followed for both the NPAFC and PSC available on their web sites. An example of the annual reports of the NPAFC is NPAFC (2018). An example of the annual reports of the PSC is PSC (2018). Likewise, there is an extensive library of technical documents, an example of PSC documents is PSC-JCTC (2019) and an example from the INPAFC is Akenhead *et al*. (2019).

References:

Akenhead, S., N. Bendriem, and J. Par [eds]. 2019. Report of the proceedings for the IYS workshop - first international year of the salmon data laboratory (ISDL) workshop. Technical Report 14. NPAFC. Vancouver, B.C. Canada. https://npafc.org/technical-report/

NPAFC. 2018. Annual report of the North Pacific Anadromous Fish Commission, 2018. North Pacific Fish Commission. Vancouver, B.C. Canada. https://npafc.org/annual-report/

PSC. 2018. Thirty-third annual report of the Pacific Salmon Commission 2017/2018. Pacific Salmon Commission. Vancouver B.C. Canada. https://www.psc.org/publications/annual-reports/commission/

5.3	**Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.**					
	PSC-JCTC. 2019. Annual report of catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/transboundary/					
Numerical score:	**Starting score**	**–**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10		**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						

Supporting Clause 5.4.

5.4.	**The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary, shared, straddling, highly migratory and high seas stocks.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *The collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary aquatic stocks have been developed.*	☑
EVIDENCE: 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, ecology and status of transboundary aquatic stocks.	
Current status/Appropriateness/Effectiveness: *There is evidence available to substantiate that such cooperation or interaction has taken place. There are data on collaborative programs to improve understanding of transboundary, shared, straddling, highly migratory or high seas stocks.*	☑
EVIDENCE: The technical committees outlined above and in Clause 5.3 are very active.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations directly, or in conjunction with other States, have developed collaborative technical and research programs to improve understanding of the biology, environment, and status, of transboundary, shared, straddling, highly migratory or high seas stocks. Examples may include outputs resulting from meetings or other research.*	☑
EVIDENCE: 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 (2019) and an example from the INPAFC is Akenhead *et al.* (2019).	

References:	Akenhead, S., N. Bendriem, and J. Par [eds]. 2019. Report of the proceedings for the IYS workshop - first international year of the salmon data laboratory (ISDL) workshop. Technical Report 14. NPAFC. Vancouver, B.C. Canada. https://npafc.org/technical-report/ PSC-JCTC. 2019. Annual report of catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 5.5.

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

Evaluation Parameters	**Met?**
Process: *There is a process that allows analysis of research data, ensuring, where appropriate, their confidentiality.*	☑

EVIDENCE:
By Alaska Statute (16.05.815 Confidential Nature of Certain Reports and Records), except for certain circumstances, all records obtained by the state concerning the landing of fish, shellfish, or fishery products and annual statistical reports of fishermen, buyers, and processors may not be released. To ensure confidentiality, fishery data are routinely redacted from ADFG reports if the data for a time/area stratum were obtained from a small (typically three or fewer) number of participants. While respecting Alaska's confidentiality statute, ADFG's staff are expected to analyse and report on their research findings through a peer review process.

Current status/Appropriateness/Effectiveness: *There is evidence data was properly analyzed. Data was published respecting, where appropriate, confidentiality agreements. The rules of confidentiality are effectively respected.*	☑

EVIDENCE:
There is extensive library of up-to-date research reports produced by ADFG where the confidentially of fishers is protected by only presenting data in time and strata that makes it impossible to determine the contribution of any fisher.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data generated by research is analyzed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate. Examples may include various data or reports.*	☑

EVIDENCE:
An example of a report that had to be redacted to ensure confidentiality is Weiland et al. (2003). An example of a peer reviewed research project is Habicht *et al.,* (2019).

References:

Habicht, C., C. T. Smith, A. Barclay, H. Hoyt, K. Turnquist, and W. A. Larson. 2019. Discriminating among Pacific salmon, Rainbow Trout, and Atlantic Salmon species using commonly available genetic screening methods. Journal of Fish and Wildlife Management. https://www.fwspubs.org/doi/pdf/10.3996/052018-JFWM-038

Weiland, K. 2003. Summary of Bristol Bay Sockeye Salmon catches by gear type, 1965-2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-25, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/RIR.2A.2003.25.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Fundamental Clause 6. Biological reference points and harvest control rule

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.

Supporting Clause 6.1.

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *A target reference point(s) or proxy has been officially established. Managers shall be able to apply technical measures to reduce fishing pressure in the event that reference points are approached or exceeded.*	☑

EVIDENCE:

Escapement goals are the primary target 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 ADFG has the authority under 16.05.060 to summarily open or close seasons or areas or to change weekly closed periods by means of emergency orders in order to achieve escapement goals and implement management plans adopted by the Board of Fish.

Current status/Appropriateness/Effectiveness: *The official target reference point or proxy is consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Furthermore, there is evidence that the target reference point/management target has been used as an objective by the management process. If there are historical instances of the reference point being approached or exceeded, managers have taken remedial action as appropriate. In the context of reference points, when data are insufficient to estimate reference points directly, other measures of productive capacity can serve as reasonable substitutes or proxies. Suitable proxies may include, for example, standardized Catch per Unit of Effort (CPUE) as a proxy for biomass; or specific levels of fishing mortality and biomass, which have proven useful in other fisheries, can be used with a reasonable degree of confidence in the absence of better-defined levels. It is important to note that the use of a proxy may involve additional uncertainty, and if so, should trigger extra precaution in setting biological reference points. For salmon, escapement goals are the equivalent of a target reference point proxy.*	☑

EVIDENCE:

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.

1. A Biological Escapement Goal (BEG) is defined as an escapement range that provides the greatest potential for maximum

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

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 and Volk 2015). A brief description of each is summarized below. The most commonly used methods are listed first, followed by the less common methods.

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, a 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

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

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.
- 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. There are approximately 295 active salmon stock escapement goals in the state.

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that target reference points have been established and are consistent with achieving MSY, a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators. Examples may include stock assessment reports or fishery management plans. ☑

EVIDENCE:
The ADFG publishes a summary of statewide 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 2018). Escapement goals may be established for individual stocks when stock-specific catch and escapement data are available. Bristol Bay sockeye provide a good example of where goals have been set for individual stocks (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. 2015).

References:

ADF&G. 2004. Escapement goal review of select AYK Region salmon stocks. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A04-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS15-08.pdf

Bernard, D. R., J. J. Hasbrouck, B. G. Bue and R. A. Clark. 2009. Estimating risk of management error from precautionary reference points (PRPs) for non-targeted salmon stocks. Alaska Department of Fish and Game, Special Publication No. 09-09, Anchorage. http://www.sf.adfg.state.ak.us/fedaidpdfs/SP09-09.pdf

Burgner, R. L., C. J. D. Costanzo, R. J. Ellis, G. Y. Harry, Jr., W. L. Hartman, O. E. Kerns, Jr., O. A. Mathison and W. F. Royce. 1969. Biological studies and estimates of optimum escapements of Sockeye Salmon in the major river systems of Southwestern Alaska. Fishery Bulletin 67: 405–459. https://www.st.nmfs.noaa.gov/spo/FishBull/fcontentarchive2.htm

Carlson, S. R., K. E. Tarbox and B. G. Bue. 1999. The Kenai Sockeye Salmon simulation model: A tool for evaluating escapement and harvest Levels. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A99-08, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/RIR.2A.1999.08.pdf

Clark, R. A. 2005. Stock status and recommended escapement goals for Coho Salmon in selected waters along the Juneau road system, 1981-2004. Alaska Department of Fish and Game, Special Publication No. 05-21, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/sp05-21.pdf

Clark, R. A., D. M. Eggers, A. R. Munro, S. J. Fleischman, B. G. Bue and J. J. Hasbrouck. 2014. An evaluation of the percentile approach for establishing sustainable escapement goals in lieu of stock productivity information. Alaska Department of Fish and Game, Fishery Manuscript No. 14-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS14-06.pdf

Erickson, J.,C. Brazil, X. Zhang, T. McKinley and R. Clark. 2015. Review of salmon escapement goals in Bristol Bay, Alaska. 2015. ADFG. Fishery Manuscript Series15-06, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS15-06.pdf

Hagerman, G., and R. Ehresmann. 2019. 2019 Summer troll fishery management plan. Alaska Department of Fish and Game, Regional Information Report No. 1J19-08, Douglas, Alaska. https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.08.pdf

Hilborn, R., and C. J. Walters. 1992. Quantitative fisheries stock assessment: Choice, dynamics and uncertainty. Chapman and Hall, New York. https://www.springer.com/gp/book/9780412022715

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

Koenings, J. P. and R. D. Burkett. 1987. Population characteristics of Sockeye Salmon (Oncorhynchus nerka) smolts relative to temperature regimes, euphotic volume, fry density, and forage base within Alaskan lakes. Pages 216– 234 [In] H. D. Smith, L. Margolis and C. C. Wood, editors. Sockeye Salmon (Oncorhynchus nerka) population biology and future management. Canadian Special Publications of Fisheries and Aquatic Science No. 96, Ottawa.
http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs41-31-96-eng.pdf

Koenings, J. P. and G. B. Kyle. 1997. Consequences to juvenile Sockeye Salmon and the zooplankton community resulting from intense predation. Alaska Fishery Research Bulletin 4(2): 120–135. http://www.adfg.alaska.gov/static/home/library/PDFs/afrb/koenv4n2.pdf

Munro, A. R., and E. C. Volk. 2015. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2006 to 2014. Alaska Department of Fish and Game, Fishery Manuscript Series No. 15- 34, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS15-04.pdf

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Nelson, P. A., J. J. Hasbrouck, M. J. Witteveen, K. A. Bouwens and I. Vining. 2006. Review of salmon escapement goals in the Alaska Peninsula and Aleutian Islands Management Areas. Report to the Alaska Board of Fisheries, 2004. Alaska Department of Fish and Game, Fishery Manuscript No. 06-03, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMS09-09.pdf

Nelson P. A., M. J. Witteveen, S. G. Honnold, I. Vining and J. J. Hasbrouck. 2005. Review of salmon escapement goals in the Kodiak Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 05-05, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fms05-05.pdf

Schaberg, K. L., H. Finkle, M. B. Foster, D. L. Tracy and M. L. Wattum. 2015. Review of salmon escapement goals in the Alaska Peninsula and Aleutian Islands Management Areas, 2015. Alaska Department of Fish and Game, Fishery Manuscript No. 15-03, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS15-03.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					

Supporting Clause 6.2.

6.2.	**The fishery management organization shall establish appropriate 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; Appendix 1, Part 1). 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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *A scientifically based limit reference point or proxy has been officially established, and together with the measure to be taken, ensures the reference point(s) will not be exceeded.*	☑

EVIDENCE:

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.

Current status/Appropriateness/Effectiveness: *The stock under assessment shall not currently be overfished (see glossary) according to the best scientific evidence available. The stock is currently estimated to be on the sustainable side of this reference point (e.g., spawning stock biomass is above the limit reference point, F is below F_{lim}, etc.). F_{lim} shall not exceed F_{msy}. The limit reference point or proxy is consistent with avoiding recruitment overfishing and other severe negative impacts on the stock. There are mechanisms in place (e.g., harvest control rule or mechanism) to ensure that the level of fishing pressure is reduced if the limit reference point is approached or reached, and these mechanisms are consistent with ensuring to a high degree of certainty that the limit reference point will not be exceeded, and that actions are taken to decrease the fishing mortality (or its proxy) below that limit reference point. The level of B_{lim} should be set on the basis of historical information, applying an appropriate level of precaution according to the reliability of that information. In addition, an upper limit should be set on fishing mortality, F_{lim}, which is the fishing mortality rate that, if sustained, would drive biomass down to the B_{lim} level. It is important to clarify that for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered a suitable minimum reference point for salmon management. Specific to this point, underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4–5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to ensure stocks are managed with the objective of returning them to safe biological targets.*	☑

EVIDENCE:

The statewide summary of escapements for the last 10 years in relation to goals (Munro 2018) shows that through 2017 (the most recent years summary available) that 17% of the stocks did not achieve their minimum goal and this is within the range (11- 31%) of what has been observed in recent years. Also, in 2017, 50% of the stocks assessed had escapements that were within the goal range (or above the lower bound if a lower-bound SEG); this too is typical of recent years. Last, 33% of established goals were exceed in 2017. There are 18 stocks that have chronically not met their escapement goals and listed as Stocks of Concern. The fact that the vast majority of stocks have met their goals over a 5-year period is evidence that measures are taken to achieve escapement goals.

The current status of each of th approx. 300 annually wild salmon with respect to stock escapement goals and escapement goal performance can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year] with tables from the most recent report being included in Appendix 5.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are established 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 are 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 are taken to decrease the fishing mortality (or its proxy) below that limit reference point. Examples may include stock assessment reports or fishery management plans.*	☑

6.2.	**The fishery management organization shall establish appropriate 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; Appendix 1, Part 1). 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.**

EVIDENCE:

That Alaska has established escapement goals as ranges with the lower bound of the goal range serving as a proxy for a "limit reference point" and that the state's fisheries are managed to achieve those goals is evident in the statewide summary of goals and actual escapements provided by (Munro 2018).

Examples of how ADFG manages the fisheries are numerous and documented in annual management reports. A good example of how ADFG uses stock assessment data to achieve an escapement goal comes from the Chignik watershed in 2015 (Wilburn and Stumpf, 2016).

"The Chignik weir was completed on May 18 at approximately 6:00 PM, with the first full day of escapement enumeration on May 19. Sockeye salmon escapement into the Chignik River in early to mid-June was below average and began tracking near the upper mid-range of the escapement goal around June 20). Results from 4 test fisheries conducted on June 12, 14, 17 and 19 in Chignik Lagoon also indicated that there was no build-up of sockeye salmon in the lagoon. Fish harvested in the test fish were predominately males and smaller than average. Based on the test fisheries results and that escapement numbers were not increasing as anticipated, the Chignik Bay and Central districts remained closed to commercial salmon fishing during most of June. After several days of strong escapement, the Chignik Bay and Central districts opened to commercial salmon fishing on June 24 at 9:30 AM for 48 hours. In addition, an increase in the female proportion of the run was observed from escapement samples taken at the weir. This initial fishing period was extended an additional 72 hours and then closed for 48 hours to allow additional escapement into the Chignik River."

References:

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Wilburn, D. M. and L. K. Stumpf. 2016. Chignik Management Area salmon annual management report, 2015. Alaska Department of Fish and Game, Fishery Management Report No. 16-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR16-01.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 6.3.

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Data and assessment procedures (i.e., stock assessment process) are in place to measure the position of the fishery in relation to the target and limit reference points.*	☑

EVIDENCE:

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 and escapements are collected in real time and for comparison with historic fishery performance in relation to 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 (2018).

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 for Pink Salmon in Prince William Sound and for Chum Salmon in Southeast. Genetic stock Identification has/is used for Chinook Salmon in Cook Inlet and Southeast; it is also used 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.

These 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.

Current status/Appropriateness/Effectiveness: *The current stock status in relation to reference points is used to determine the level of fishing permitted. The latter is commensurate with the current state of the fishery resources (i.e., close to or above target reference point and most importantly, not overfished or at or below its limit reference point or proxy), and takes into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. The stock is positioned at or above the target reference point. As a minimum, the stock is located above the midway point between the target and the limit reference point. It is important to clarify that, for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered as a suitable minimum reference point for salmon management. Underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4– 5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to return them to safe biological targets. Assessors shall present evidence and evaluate escapement goals and escapement goal performance (i.e., met, not met) for all the wild salmon stock with a formal escapement goal in force in Alaska (about 300 annually). Overall, statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.*	☑

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

EVIDENCE:

Statewide, area management biologists, with support from research staff, issue emergency orders consistent with Board of Fish management plans to regulate the harvest so as to achieve escapement goals. The current stock status in relation to reference points is used to determine the level of fishing permitted. The latter is commensurate with the current state of the fishery resources (i.e., close to or above target reference point and most importantly, not overfished or at or below its limit reference point or proxy), and takes into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. The stock is preferably positioned at or above the target reference point. Ideally, as a minimum, the stock is located above the midway point between the target and the limit reference point. It is important to clarify that, for salmon, spawning escape- ment goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered as a suitable minimum reference point for salmon management. Underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4– 5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to return them to safe biological targets.

ADF&G present evidence and evaluate escapement goals and escapement goal performance (i.e., met, not met) for all the wild salmon stock with a formal escapement goal in force in Alaska (about 300 annually). Overall, statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year] with tables from the most recent report being included in Appendix 5.

The latest statewide summary of escapements for the last 10 years in relation to goals (Munro, 2018; see also Appendix 5) shows that through 2017 (the most recent years summary available) 17% of the stocks did not achieve their minimum goal and this is within the range (11- 31%) of what has been observed in recent years. Also, in 2017, 50% of the stocks assessed had escapements that were within the goal range (or above the lower bound if a lower-bound SEG); this too is typical of recent years. Last, 33% of established goals were exceed in 2017.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data and assessment procedures are installed measuring the position of the fishery in relation to the reference points. Accordingly, the stock under consideration is not overfished (i.e., it is above limit reference point or proxy) and the level of fishing permitted is commensurate with the current state of the fishery resources—maintaining its future availability and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. Examples may include stock assessment reports or fishery management plans.*	☑

EVIDENCE:

Evidence comes from three basic sources. First are the annual management reports filed after each fishing season. These 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. Salomone *et al.* 2019; Wilburn and Renick 2018). Annual management reports may be supplemented with annual research papers that explain how specific estimates of escapement, age or stock compositions were estimated (e.g. Eskelin and Barclay 2918; Kerkvliet and Booz 2018). Every three years these data are synthesized to re-evaluate escapement goals so that productivity changes can be detected and goals revised, if appropriate, for example Savereide *et al.* (2018). Last, a statewide summary of escapements for the last ten years in relation to goals is reported (Munro 2018).

References:	Eskelin, A., and A. W. Barclay. 2018. Eastside set gillnet Chinook salmon harvest composition in Upper Cook Inlet, Alaska, 2017. Alaska Department of Fish and Game, Fishery Data Series No. 18-30, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-30.pdf Kerkvliet, C. M., and M. D. Booz. 2018. Anchor River Chinook Salmon escapement, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 18-32, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-05.pdf

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**
	Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf Salomone, P., T. Elison, T. Sands, J. Head, and T. Lemons. 2019. 2018 Bristol Bay annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-12, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR19-12.pdf Savereide, J. W., M. Tyers, and S. J. Fleischman. 2018. Run reconstruction, spawner-recruit analysis, and escapement goal recommendation for Chinook Salmon in the Copper River. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-07, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMS13-03.pdf Wilburn, D. M., and R. L. Renick. 2018. Chignik Management Area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/AR6_FMR18-32.pdf

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 6.4.

6.4.	**Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is an agreed process, system, or contingency plan in the eventuality that the data sources and analyses indicate that these reference points have been exceeded—detailing the appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource. Accordingly, the contingency plan/harvest control rule shall be agreed in advance to allow an appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource.*	☑

EVIDENCE:

The statewide 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 responsibility 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.

Last, preseason, ADFG typically produces both a statewide forecast of abundance and from that forecast develops expected management actions on a regional or area basis.

Current status/Appropriateness/Effectiveness:	
In the eventuality that the current level of the stock has exceeded target or limit reference points, the agreed and corresponding management action (as directed by the harvest control rule or framework) shall be immediately implemented and fishing reduced or halted as necessary. The harvest control rule is effective at keeping or bringing back the stock to acceptable and safe biological levels (i.e., to avoid overfishing/ed status). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.	☑

EVIDENCE:

Escapement goals have been established for the exploited salmon stocks in Alaska. 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[174] (see h for ADFG commercial fish regulations by area).

[174] http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

6.4.	**Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.**

ADFG uses in-season estimates of stock status in relation to goals data to manage the time and area fished so as to meet both escapement goals and social/economic/cultural objectives specified in Board of Fish management plans. This system has been very effective in managing fishing mortality so as to achieve escapement goals. ADFG has successfully implement BoF management plans for stocks of concern.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management actions are agreed should data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans are agreed in advance for the appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource. Such measures may be temporary and are based on best scientific evidence available. Examples may include stock assessment reports or fishery management plans.*	☑

EVIDENCE:

The open, 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 BoF management plan is the Situk-Ahrnklin Inlet and Lost River King Salmon Management Plan (5AAC 30.365). 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.
- If the projected 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; and
- 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.

6.4.	**Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.**

In 2019, the BoF addressed management of the salmon fisheries in the Artic-Yukon-Kuskokwim Region (AYK) and for the Chignik, Alaska Peninsula and Aleutian Islands areas. For the AYK meeting ADFG developed 14 written reports and 7 oral reports. Examples of reports presented at these meetings include the annual management report for the Yukon (Estensen et al. 2018) a report on the stock status and action plan for Chinook Salmon in Norton Sound (Leon 2018), recommendations for escapement goals in the region (Liller and Savereide 2018). In the Chignik, Ak Peninsula and Aleutian Is areas ADFG developed 10 written and 7 oral reports. Examples include: the annual management report for the North Peninsula (Johnson and Murphy 2019), a review of escapement goals in the Chignik area (Schaberg *et al.* 2019) and a review of the stock composition of Sockeye Salmon caught in western Alaska fisheries (Dann et al. 2012). This level of reporting on stock status, goal setting and annual management actions is typical for a BoF meeting.

References:

Dann, T. H., C. Habicht, S. D. Rogers Olive, H. L. Liller, E .K .C. Fox, J. R. Jasper, A. R. Munro, M. J. Witteveen, T. T. Baker, K. G. Howard, E. C. Volk, and W. D. Templin. 2012. Stock composition of Sockeye Salmon harvests in fisheries of the Western Alaska salmon stock identification program (WASSIP), 2006-2008. Alaska Department of Fish and Game, Special Publication No. 12-22, Anchorage. https://www.arlis.org/docs/vol1/G/896520208.pdf

Estensen, J. L., H. C. Carroll, S. D. Larson, C. M. Gleason, B. M. Borba, D. M. Jallen, A. J. Padilla, and K. M. Hilton. 2018. Annual management report Yukon Area, 2017. Alaska Department of Fish and Game, Fishery Management Report No. 18-28, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR18-14.pdf

Johnson, R. H., and R. L. Murphy. 2019. North Alaska Peninsula commercial salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 19-03, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/AR4_FMR19-03.pdf

Leon, J. M. 2018. Norton Sound Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) king salmon stock status and action plan, 2019: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 18-17, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ayk/3_SP18-17.pdf

Liller, Z. W., and J. W. Savereide. 2018. Escapement goal recommendations for select Arctic-Yukon-Kuskokwim Region salmon stocks, 2019. Alaska Department of Fish and Game, Fishery Manuscript No. 18-08, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ayk/1_FMS18-08.pdf

Schaberg, K. L., M. B. Foster, and A. St. Saviour. 2019. Review of salmon escapement goals in the Chignik Management Area, 2018. Alaska Department of Fish and Game, Fishery Manuscript Series No. 19-02, Anchorage. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/AR7_FMS19-02.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 6.5.

6.5	**Measures shall be introduced to identify and protect depleted stocks and those stocks 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 stocks, which have received adverse impacts by fishing or other human activities, are restored.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that identifies depleted stocks, resources, and habitats. A depleted stock is usually a stock, which has been overfished, the stock status is below limit reference point, and the ability of the stock to recover has been impaired.*	☑

EVIDENCE:

Alaska statute 5 AAC 39.222 is the policy for the management of sustainable salmon fisheries. Among other things the policy states:

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 is 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;
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…"

Current status/Appropriateness/Effectiveness: *There is evidence that where depleted or adversely impacted stocks, resources, and habitats have been identified, efforts have been made to ensure they are restored or allowed to recover (i.e., ideally within a two generations timescale). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.*	☑

In 2017 there were 18 stocks of concern in the state (Munro, 2018). Fourteen stocks were identified as a Management Concern and 4 were identified as Yield Concern.

Table 10. Stocks of concern thru 2011-2018 Board of Fish cycle

Region	System	Species	Year Listed	Type of Concern	BoF Cycle Last Reviewed
Southeast	Chilkat R.	Chinook	2017	Management	2017-18
	King Salmon R.	Chinook	2017	Management	2017-18
	Unuk R.	Chinook	2017	Management	2017-18
	McDonald Lk.	Sockeye	2017	Management	2017-18

6.5	**Measures shall be introduced to identify and protect depleted stocks and those stocks 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 stocks, which have received adverse impacts by fishing or other human activities, are restored.**

Central	McNeil R.	Chum	2016	Management	2016-17
	Yenta R.	Sockeye	2007	Yield	2016-17
	Chuitna R.	Chinook	2010	Management	2016-17
	Theodore R.	Chinook	2010	Management	2016-17
	Lewis R.	Chinook	2010	Management	2016-17
	Alexander Cr.	Chinook	2010	Management	2016-17
	Goose Cr.	Chinook	2010	Management	2016-17
	Sheep Cr.	Chinook	2013	Management	2016-17
Westward	Karluk R.	Chinook	2010	Management	2016-17
	Swanson Lagoon	Sockeye	2010	Management	2016-17
AYK	Yukon R.	Chinook	2000	Yield	2015-16
	Norton Sound Subdistricts 5&6	Chinook	2003	Yield	2015-16
	Norton Sound Subdistricts 2&3	Chum	2000	Yield	2015-16

Note: The Goose Creek Chinook Salmon stock was originally designated as a stock of yield concern then modified to a stock of management concern in 2013.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that measures are introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts are made to ensure that resources and essential habitats critical to the wellbeing of the stocks, which have been adversely impacted by fishing or other human activities, are restored. Examples may include laws and regulations, fishery management plans, and stock assessment reports.*	☑

EVIDENCE:

The development of a Board of Fish management plan and ADFG in-season actions to implement the BoF plan for Stocks of Concern constitutes evidence that the measures are being implemented. We reviewed current regulations and found that BoF regulations are in place, see for example the following plans:

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

There is substantial evidence that ADFG implements these plans. Examples include:

- There has been no commercial fishery for Chinook Salmon on the Yukon River since 2011 (Carroll et al. 2018).
- The gillnet fisheries targeting the Chinook Salmon stocks of concern in Southeast have been eliminated (Gray et al. 2019) as have the recreational fisheries by emergency order (ADFG 2017).
- For Chinook and Sockeye salmon stocks in Upper Cook Inlet of Central Region see (ABF 2011).

References:

ABF. 2011. Findings regarding Regulatory Action Taken to Address Stocks of Concern in Upper Cook Inlet–2011-266-FB.ADFG. Juneau. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/uci/findings.pdf

ADFG. 2017. Emergency Order No. 1-KS-R-03-19 Issued at: Sitka, Monday, January 7, 2017. http://www.adfg.alaska.gov/Static-sf/EONR/PDFs/2019/R1/03.0_EO_%2001-KS-R-3.0-19(F).pdf

ADFG. 2019a. 2019–2021. Southeast Alaska and Yakutat Commercial Salmon Fishing Regulations. ADFG. Juneau. https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2021_cf_se_yakutat_salmon_regs.pdf

6.5	**Measures shall be introduced to identify and protect depleted stocks and those stocks 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 stocks, which have received adverse impacts by fishing or other human activities, are restored.**

ADFG. 2019b. 2019-2021 Arctic-Yukon-Kuskokwim Commercial-Subsistence-Personal Use Finfish and Shellfish Fishing Regulations ADFG. Juneau. https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2019_2021_ayk_regs.pdf

Carroll, H. C, D. M. Jallen, and F. W. West. 2018. Yukon River king salmon stock status and summer chum salmon fishery, 2019: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 18-18, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ayk/5_SP18-18.pdf

Gray, D., N. Zeiser, T. Kowalske, S. Forbes, B. Meredith, and A. Dupuis. 2019. 2019 Southeast Alaska drift gillnet Fishery Management Plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J19-03, Douglas. http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.03.pdf

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage.http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Fundamental Clause 7. Precautionary approach

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.

Supporting Clause 7.1.

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.[175]**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There are management measures, regulations, and laws that command or direct the use of the precautionary approach (PA) for conservation, management, and exploitation of the aquatic resources under assessment. This could either take the form of an explicit commitment to the application of the PA, or be evidenced by an overarching approach applied throughout the management literature.*	☑
EVIDENCE: Alaska's policies for Sustainable Fisheries Management, embodied in the State Constitution and regulations includes, key elements of the precautionary approach for salmon fisheries and habitats. Faced with various uncertainties current evidence provided by ADFG is consistent with a conservative approach to the management of salmon stocks, fisheries, artificial propagation, and essential salmon habitats. Alaska State Regulation, the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222 (a) (1); (a) (5) (A, B),) codifies the precautionary approach in State regulation of salmon fisheries and habitats. This policy states that in the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats shall be managed conservatively as follows; a precautionary approach, involving the application of prudent foresight that takes into account the uncertainties in salmon fisheries and habitat management, the biological, social, cultural, and economic risks, and the need to take action with incomplete knowledge, should be applied to the regulation and control of harvest and other human-induced sources of salmon mortality; a precautionary approach requires consideration of the needs of future generations and avoidance of potentially irreversible changes; prior identification of undesirable outcomes and of measures that will avoid undesirable outcomes or correct them promptly; initiation of any necessary corrective measure without delay and prompt achievement of the measure's purpose, on a time scale not exceeding five years, which is approximately the generation time of most salmon species; that where the impact of resource use is uncertain, but likely presents a measurable risk to sustained yield, priority should be given to conserving the productive capacity of the resource; appropriate placement of the burden of proof, of adherence to the requirements of this subparagraph, on those plans or ongoing activities that pose a risk or hazard to salmon habitat or production; a precautionary approach should be applied to the regulation of activities that affect essential salmon habitat.	
Current status/Appropriateness/Effectiveness: *The FAO Guidelines for the PA for fisheries management (FAO CCRF 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review. More specifically, prior identification of desirable (target) and undesirable (limit) reference points must be carried out, and measures are required that will avoid undesirable outcomes with high probability and correct them promptly should they occur. The guidelines suggest that this be achieved through rules that specify in advance what action should be taken when specified deviations from operational targets are observed (i.e., harvest control rules). Furthermore, the guidelines suggest that a management plan should not be accepted until it has been shown to perform effectively in terms of its ability to avoid undesirable outcomes (for example through simulation trials). Lastly, the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent predator, or non-target species*	☐

[175] FAO Technical Guidelines for Responsible Fisheries No. 2 – Precautionary approach to capture fisheries and species introductions. http://www.fao.org/docrep/003/w3592e/w3592e00.htm

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.[175]**

and their environment (https://www.sciencebase.gov/catalog/item/50538887e4b097cd4fce2446). There is evidence for the practical application of the PA for resource management and conservation. Note that the PA may be integrated into stock assessment practices, specific management measures enacted for everyday fisheries operations, or other measures. Application of the PA considers enhanced fisheries (e.g., at the policy level) where appropriate, and relevant uncertainties are considered using a suitable method of risk management (e.g., evaluation of potential impacts of increased hatchery releases on wild salmon), including that associated with the use of introduced or translocated species.

EVIDENCE:

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; and
2. Concern over hatchery origin pink salmon in Prince William Sound (PWS) and hatchery origin chum salmon in Prince William Sound and Southeast Alaska.

Regarding the first issue, 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.

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, developed a research plan with 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.

Fishery closures and restrictions have been necessary in many areas in the effort to pass as much of the Chinook salmon 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.

With few exceptions, since 2007, Chinook salmon runs across the state have been well below the long term average.

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.[175]**

As a result, strict fishery management actions have been necessary to try and meet escapement objectives, and many fisheries have been curtailed to protect Chinook salmon. Even so, in some cases Chinook salmon runs have been so poor that even with complete closures and no harvest at all not enough fish returned to make escapement objectives.

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" has 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 salmon 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 statewide 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 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.

With regard to the concern over hatchery pink salmon and chum salmon in PWS and hatchery Chum salmon, in 2011 the Alaska Department of Fish and Game (ADF&G) organized a science panel composed of current and retired scientists from ADF&G, 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?
3. 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 2019 to provide answers to these questions.

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.[175]**

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) was 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 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 – In a systematic manner, following a robust design, the project sampled otoliths 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 SEAK and PWS streams, but this is the first study designed to provide an unbiased estimate for an entire region. Three years of field work focused on the variability and extent of hatchery pink and chum salmon straying in PWS, and chum salmon straying in SEAK were completed in 2015.

Things that we can infer from work to date:

1. Hatchery proportions of pink salmon in streams across PWS ranged from 4 to 10% in the two odd years and was 14% in the even 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. The stream with the highest hatchery proportion (87% in one year) was proximate to a hatchery, while more distant streams had hatchery proportions below 2%.

Estimating Production in PWS – Ocean sampling in the entrances to PWS has provided an un-biased 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 provided a means to estimate:

- the number of natural-origin salmon spawning in streams,
- the number of hatchery salmon spawning naturally (Hatchery strays),
- total production of hatchery salmon (including strays; Hatchery run), and
- 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 and fitness (Table 11). It is also possible to estimate the proportion of the hatchery return that spawned naturally. These results were included in the manuscript submitted to a peer-reviewed journal in 2019.

The following table can be found in the ADFG report,
http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/ak_hatchery_research_project_synopsis_2019.pdf

Table 11. Estimated production of pink and chum salmon in Prince William Sound.

	Estimated Run sizes		Estimated Harvest Rates	
Species Year	Hatchery	Natural	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

1. Between 1% and 5% of the pink salmon hatchery returns, and 2% and 5% of the hatchery chum salmon returns in PWS during the three study years spawned naturally. Preparations are underway to publish run reconstruction and straying results.
2. These results indicate that natural populations in PWS continue to be productive in the presence of over 18 generations of straying from large scale hatchery production.
3. The natural production of PWS pink salmon has been particularly robust in the three brood years represented in the work so far: 17 million spawners in 2013 produced an estimated natural return of just under 64 million return, a 4 to 1 return-to-spawner ratio.

Comparison of harvest rates indicates that ADF&G achieved its policy of preferential harvest of hatchery produced fish (>90%) and sustainable harvest of naturally produced fish (<60%) in 2013-2015 even in the face of large hatchery production.

Fitness Studies – This ground-breaking work is based on first identifying the origin (hatchery/natural using otolith marks) and genotype of potential parents spawning in study streams and subsequently identifying parental origin (hatchery/natural) of returning fish using genetic pedigree reconstruction. This information will allow estimation of the relative reproductive success (fitness) of hatchery 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 7 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 4 chum salmon study streams in SEAK. Collectively 237,145 salmon have been sampled for this research through 2019. The laboratory analysis using single nucleotide polymorphism (SNP) genetic markers to determine pedigrees for pink salmon in PWS began in 2018. The first step in this analysis was refining methods to use cost effective sequencing technology to screen samples taken from carcasses. Pedigree data for two full generations (2 brood years for both odd and even-year runs) in 2 streams completed in spring of 2019. Generally, hatchery fish produced fewer progeny than natural fish during this first generation, but variation was observed by sex, stream, and year. Population dynamics models have been employed to better understand how differences in where and when hatchery- and natural-origin fish spawn affect fitness. Results were reported in the summer of 2019 to the funding entities that supported this portion of the project. 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.

Funding – In 2015, a finance committee was formed comprised of hatchery operators, a processor representative, and the ADF&G commissioner's office and aquaculture section. This team has focused attention on maintaining the funding to meet the targeted research costs of $16.7 million necessary to complete the work intended to answer the fundamental questions about spawner fitness. The current State of Alaska budget precludes additional state funds, however 7 of Alaska's largest hatchery corporations (SSRAA, NSRAA, DIPAC, PWSAC, VFDA, KRAA, and CIAA) have combined to provide $353,500 for the coming year's work. Those funds in concert with existing funds, and the processor's requested contribution of $500,000 will provide for this year's field work. ADF&G will continue to provide considerable in-kind support. In 2016, ADF&G successfully secured funding from NOAA's Saltonstall Kennedy Grant Program ($250,000) and North Pacific Research Board ($289,000) to genetically analyze adult and offspring pink salmon from 2 streams in PWS over 2 brood years as part of the fitness study. In addition, NSRAA has received $275,000 in grants from the Pacific Salmon Commission to support sampling of chum salmon in the fitness streams in SEAK. To date, funding received in support of the project totals $10.263 million. Of this, the Seafood Processors Association has provided $2.994 million, PNP operators combined have provided $3.003 million, the State of Alaska appropriated $3.5 million, and $0.447 million is from grants. In 2019, $2.5 million from the 2016 Pink Salmon Disaster funds have been awarded to this project and this funding is earmarked to replace contributions, rather than adding to the total available.

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.**[175]

Future –Field work for Questions 1 and 2 has been completed and portions have been submitted for publication in peer-reviewed scientific journals. 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 hatcheries via additional cost recovery, as well as the processor community through a consensus agreement. It is particularly important that hatchery operators and processors continue their support of the project, both for financial reasons as well as 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: http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/ak_hatchery_research_project_synopsis_2019.pdf

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the PA is applied to conservation, management, and exploitation of an ecosystem to protect them and preserve the ecosystem. Examples may include stock assessment reports, fishery management plans and other documents.*	☑

EVIDENCE:
The comprehensive nature of the response to both of the fishery management concerns described above testify to the ADFG's strong commitment to precautionary management of Alaska's salmon fishery.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 7.1.1.

7.1.1.	**In implementing the PA, the fishery management organization shall take into account, *inter alia*, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality, the impact of fishing activities (including discards) on non-target and associated or dependent predators, and environmental and socioeconomic conditions.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system in place under which the potential uncertainties listed above can be examined and taken into account during the decision-making process.*	☑
EVIDENCE: There is a system in place 5 AAC 39.220 Policy for the management of mixed stock salmon fisheries, 5 AAC 39.222 Policy for the management of sustainable salmon fisheries and 5 AAC 39.223 Policy for statewide salmon escapement goals.	
Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that in the fishery under assessment, uncertainties considered include those associated with the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent predators, as well as environmental and socio-economic conditions.*	☑
EVIDENCE: The current status is thoroughly discussed in supporting clauses 6.1, 6.2 and 6.3.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in implementing the PA, the fishery management organization takes into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent species, as well as environmental and socio-economic conditions. Examples may include stock assessment reports, fishery management plans and other documents.*	☑
EVIDENCE: The evidence is sufficient to substantiate that ADFG is using all the necessary tools to manage the Alaska salmon fisheries implementing precautionary management.	

References:	**5AAC 39.2223, 5AAC 39.222, 5AAC 39.205, 5AAC 75.017 and 5AAC 77.007**							
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Supporting Clause 7.1.2.

7.1.2.	In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process that identifies weaknesses in the scientific information available to fishery management organizations, and initiates additional research as necessary. The primary focus of this requirement is the status of the stocks under consideration.*		☑
EVIDENCE: The policy for the Management of Sustainable Fisheries specifies "that where the impact of resource use is uncertain, but likely presents a measurable risk to sustained yield, priority should be given to conserving the productive capacity of the resource"(5 AAC 39.222 (a) (5)(A)(iv).		
Current status/Appropriateness/Effectiveness: *There is evidence that such a process has been applied in the case of the fishery under assessment, including examples of initiated research. Depending on the situation, appropriate research or further analysis of the identified risk is initiated in a timely fashion.*		☑
EVIDENCE: The best example of the application of current status and effectiveness is the two examples of research and management actions for the Chinook salmon decline statewide and the issue of the interaction of wild origin and hatchery origin pink and chum salmon discussed in detail in 7.1.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of adequate scientific information, appropriate research is initiated in a timely fashion. Examples may include various data or scientific reports.*		☑
EVIDENCE: The quality and excellence of the evidence together with the collaboration of the stakeholders is more than sufficient to substantiate that action was taken in a timely fashion given the need conduct the research in the field.		
References:	**5 AAC 39.222**	

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					

Supporting Clause 7.2.

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

Evaluation Parameters	**Met?**
Process: *For new or exploratory fisheries, there is a process that allows immediate application of the PA, including catch and effort limits, and the possible adverse impact of such fisheries on the long-term sustainability of the stocks.*	☐
EVIDENCE: While ADFG has a regulatory process in place for new or exploratory fisheries, 5 AAC 39.222(d)(1)(D)(1), the reality is that all salmon resources are fully allocated.	
Current status/Appropriateness/Effectiveness: *There is evidence that catch and effort limits have been implemented, and other management measures, including the assessment of possible adverse impacts, have been performed for these fisheries.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of new or exploratory fisheries, the fishery management organization adopts, as soon as possible, cautious conservation and management measures, including, inter alia, catch and effort limits. Such measures remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment are implemented. Management measures should, if appropriate, allow for the gradual development of the fisheries. Examples may include various data or scientific reports.*	☐
EVIDENCE:	

References:						
Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**		**x 3) =**		**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						
Non-conformance Number (if applicable):						

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

Fundamental Clause 8. Management measures

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.

Supporting Clause 8.1.

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

Evaluation Parameters	**Met?**
Process: *The process by which management measures are developed for the fishery utilizes the best scientific evidence available, including traditional sources where these are verifiable, and also considers the cost-effectiveness and social impact of potential new measures. The assessment team shall provide evidence for the main type of management measures present in the fishery. Some of the main examples may include (but are not limited to) legal gear specifications, permit requirements, observer requirements, reporting requirements, limited access, vessel license limitations, size limits, sex restrictions, total allowable catch, in season adjustments, fishing seasons, geographical registrations areas, bycatch reduction devices, gear modification, minimizing waste and ghost fishing, closed waters, catch limits for other fisheries, and bycatch management.*	☑

EVIDENCE:

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**.**

Current status/Appropriateness/Effectiveness: *There is evidence that the overall framework of management measures in place is effective at achieving the long-term optimum yield, which is defined by the FAO as "the harvest levels for a species that achieves the greatest overall benefits, including economic, social and biological considerations." If the stock has been maintained above the limit reference point, this shall be taken as evidence that management measures are effective in avoiding overfishing.*	☑

State Regulation, 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. It is apparent, that there may not always be the same level of scientific information and data available to the biologists and personnel of AD&G for implementation of fishery management and conservation measures. This can be for a variety of reasons:

1. Historical evolvement of fishery run data sets for fisheries and districts.
2. Access to fisheries and resources, topography and the decision process of allocation of staff resources (i.e. no fishery management system has an infinite access to resources to conduct research, monitoring and conservation planning).
3. Historical fishery runs, concerns and fluctuations and economic interest are the obvious drivers in this decision making process.

The BOF meeting process, provides sufficient insight to understand that such a decision making process exists, that it is transparent and also is undertaken in an appropriate manner with respect to the balance of interests, conservation and sustained use and economic access to fishers. Previous discussion in Supporting Clauses 6.3 and 6.5 discuss how ADFG management measures in terms of escapement monitoring and reporting to the BOF and are prime examples of effectiveness in terms of avoiding overfishing (Munro 2018). Moreover, "It is important to document outcomes for meeting these escapement goals, which are fundamental to ADF&G efforts to manage for sustainable salmon stock productivity. Where escapements chronically (4–5 years) fail to meet expectations for harvestable yield or spawning escapements, ADF&G may recommend and the BOF may adopt a stock of concern designation for those underperforming salmon stocks. The policy for the management of sustainable salmon fisheries (5 AAC 39.222) provides specific definitions for stocks of concern. Yield concerns arise from a chronic inability to maintain expected yields

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

or harvestable surpluses above escapement needs. Management concerns are precipitated by a chronic failure to maintain escapements within the bounds, or above the lower bound of the established goal. A conservation concern may arise from a failure to maintain escapements above a sustained escapement threshold. Methods to develop stock-specific sustained escapement thresholds, as defined in the sustainable salmon fisheries policy, are not well developed for Pacific salmon, and no sustained escapement thresholds or stocks of conservation concern exist in Alaska. In 2017 there were 18 stocks of concern in the state. McNeil River chum salmon was added as a stock of management concern in the 2016/2017 BOF cycle. During the 2017/2018 BOF cycle, 3 Southeast Alaska Chinook salmon stocks were listed as management concerns and McDonald Lake sockeye salmon was relisted as a stock of management concern after being delisted in 2012 (Table 18). The array of methods used to enumerate salmon for each of the stocks with escapement goals, as well as methods used to assist ADF&G staff in developing the escapement goal for a given stock, are summarized by region in Tables 19–22". (Munro 2018).

Where differentlevel s of scientific evidence are available – i.e. where confidence in datasets is lower, ADFG has developed many management approaches, along the principles of BEGs and with regard to the State Policy for conservation and sustained use. Escapement remains the top priority based on 'best' scientific evidence for that particular river system. Additionally, Alaska State Regulation, the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222 (a) (1); (a) (5) (A, B, C),) codifies the precautionary approach in State regulation of salmon fisheries and habitats. This policy states that in the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats shall be managed conservatively as follows; a precautionary approach, involving the application of prudent foresight that takes into account the uncertainties in salmon fisheries and habitat management, the biological, social, cultural, and economic risks, and the need to take action with incomplete knowledge, should be applied to the regulation and control of harvest and other human-induced sources of salmon mortality; a precautionary approach requires consideration of the needs of future generations and avoidance of potentially irreversible changes; prior identification of undesirable outcomes and of measures that will avoid undesirable outcomes or correct them promptly; initiation of any necessary corrective measure without delay and prompt achievement of the measure's purpose, on a time scale not exceeding five years, which is approximately the generation time of most salmon species; that where the impact of resource use is uncertain, but likely presents a measurable risk to sustained yield, priority should be given to conserving the productive capacity of the resource; appropriate placement of the burden of proof, of adherence to the requirements of this subparagraph, on those plans or ongoing activities that pose a risk or hazard to salmon habitat or production.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures are designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources. Examples may include reports, fishery management plans, regulations, or other management measures.*	☑

EVIDENCE:
The availability and quality of evidence is sufficient to substantiate that conservation and management measures are designed for long term sustainability and based on objective science.

References:	Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(** **0**	**x**	**3**	**)** =	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.1.1.

8.1.1.	When evaluating alternative conservation and management measures, the fishery management organization shall consider their cost-effectiveness and social impact.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *The process by which management measures are developed for the fishery allows for consideration of the cost effectiveness and social impact of potential new or modified management measures.*	☑

EVIDENCE:

The BOF has the power to allocate allocate fishery resources among personal use, sport, guided sport, and commercial fisheries under state law (AS 16.05.251). The same law also specifies that the BOF adopt criteria for allocating fishery resources to use as appropriate to particular allocation decisions. The BOF adopted the same criteria specified under state law into regulations to be used when it allocates resources among fisheries (5 AAC 39 .205, 5AAC 77.007, and 5 AAC 75 .01). These criteria include consideration of economic and social impacts.

Current status/Appropriateness/Effectiveness: *There is evidence for the consideration of the cost-effectiveness and social impact of potential new or modified management measures.*	☑

EVIDENCE:

The Board of Fish utilizes the following specific allocation criteria when allocating between fisheries.

1. the life history of each personal use, sport, and commercial fishery;
2. the characteristics and number of participants in the fisheries;
3. the importance of each fishery for providing residents the opportunity to obtain fish for personal and family consumption;
4. the availability of alternative fisheries resources;
5. the importance of each fishery to the economy of the state;
6. the importance of each fishery to the economy of the region and local area in which the fishery is located;
7. the importance of each fishery in providing recreational opportunities for residents and nonresidents.

Social Impact is also dicussed in Supporting Clause 4.5.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact are considered. Examples may include reports, fishery management plans, regulations or other management measures.*	☑

EVIDENCE:

The quality of the evidence is sufficient to substantiate that cost effectiveness and social impact are considered by ADFG.

References:	**AS16.05.251, 5ACC39.205, 5AAC77.007, 5 AAC75.01**						
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3)	=	**Overall score**
	10						**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.1.2.

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *The responsible fisheries management organizations has adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management.*	☑

EVIDENCE:

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 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.

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. It would be extremely difficult to circumvent these regulations, and even if such a situation occurred, the regulatory and management system would be able to effectively respond. Salmon fisheries in Alaska are managed in accordance with the state constitution, which states that, except for limited entry, there will be no exclusive right or special privilege of fishery. Therefore, regulations promulgated by the BOF apply equally to all users of the resource in the state., The setting of regulations as well as in season management are public processes in which new developments and requirements are made available to all fishers as well as the general public.

When a technical device or modification in gear is proposed, the BOF thoroughly examines the issues and either approves its use, usually on a fishery-by-fishery basis, or prohibits it. For example, use of drum seines in Alaska is prohibited (5 AAC 39.155).

The NPAFC is the primary international venue for promoting the conservation of anadromous stocks and ecologically-related species, including marine mammals, sea birds, and non-anadromous 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.

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**

Current status/Appropriateness/Effectiveness:	
There is evidence of adoption and implementation of effective measures to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge. Please note that traditional knowledge should be verifiable. The strategy to ensure the management of bycatch and reduction of discards as part of fisheries management is being implemented successfully (e.g., there is a well-known track record of consistently setting conservative bycatch limits based on quality information and advice about bycatch); or bycatch is minimized to the greatest extent possible, especially for vulnerable species such as sharks, seabirds, turtles, and marine mammals, through mitigation measures that have been shown to be highly effective (e.g., observer coverage and procedures, bycatch caps, utilization measures, full catch accounting, on-deck techniques, avoidance mechanisms and gear technology, etc.). Also, the fishery is not a leading cause of a high level of mortality for any species of concern (e.g., not a Category I fishery for marine mammal bycatch as designated by the National Marine Fisheries Service).	☑

EVIDENCE:

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 have become an alternative 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[176].

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 non-anadromous fish, in the high seas area of the North Pacific Ocean. The NPAFC

[176] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_se_yakutat_salmon_regulations.pdf

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**

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.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the responsible fisheries management organizations have adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management. Examples may include stock assessment, bycatch or other ecosystem assessment reports.*	☑

EVIDENCE: The availability and adequacy of evidence is sufficient to substantiate that ADFG is managing by catch and discards as part of fisheries management.

References:	**5 AAC 93.310, 5AAC 39.155**						
Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**	
	10	**–**	**(**		**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 8.2.

8.2.	The fishery management organization shall prohibit dynamiting, poisoning, and other similar destructive fishing practices.
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There are management measures, or regulations, or laws that prohibit destructive fishing practices.*	☑
EVIDENCE: 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	
Current status/Appropriateness/Effectiveness: *The regulations or laws effectively prohibit dynamiting, poisoning, and other similar destructive fishing practices.*	☑
EVIDENCE: See process above	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization prohibits dynamiting, poisoning, and other similar destructive fishing practices. Examples may include laws, fishery management plans, regulations, and enforcement data.*	☑
EVIDENCE: Evidence is sufficient based upon Alaska regulation 5AAC 39.150.	

References:	**5AAC 39.150**

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10								**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.3.

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

Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that allows for identifying and consulting with domestic parties (giving due recognition where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood) having a legitimate interest in the use and management of the fisheries resource.*	☑

EVIDENCE:
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.

Current status/Appropriateness/Effectiveness: *In accordance with national laws and regulations, there is evidence that domestic parties having a legitimate interest in the use and management of the fishery (as described above) have been identified and encouraged to collaborate in the fisheries management process.*	☑

EVIDENCE:
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 represent 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.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization seeks to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition is given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements are made to consult all the interested parties and gain their collaboration in achieving responsible fisheries. Examples may include laws, fishery management plans, regulations, and meeting records.*	☑

EVIDENCE:
The quality of evidence is sufficient to substantiate that the management of the fishery is directed by state and Federal laws.

References:	**AS 16.06.258 (b), AS 16.05.251 (e), ANILCA Title VIII**						
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 8.4.

8.4.	**Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization 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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a system to measure fleet capacity and maintain regularly updated data on all fishing operations. Research has been conducted to determine or estimate the fishing capacity commensurate with the sustainable use of the resource. There are mechanisms in place to measure the total fishing capacity within the unit of certification, and to reduce this capacity if it is determined to exceed the sustainable level.*	☑

EVIDENCE:

The Alaska State Constitution Section 4 states "Sustained Yield. Fish, forests, wildlife, grasslands, and all other replentishable 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). It is also important to asknowledge the important role of the Alaska Commercial Fisheries Entry Commission (CFEC) which helps to conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers. The Commission issues permits and vessel licenses to qualified individuals in both limited and unlimited fisheries, and provides due process hearings and appeal processes for disputes related to limitations on fishery participation. Additionally, refer to the discussions in Supporting Clauses 3.21 and 3.22.

Current status/Appropriateness/Effectiveness: *There is evidence of the size of fleet capacity, and of data describing fishing operation, and that the mechanisms described above are successful at maintaining the effective fishing capacity of the unit of certification at a level commensurate with the sustainable use of the resource. Management mechanisms, which restrict the application of fishing capacity, such as quotas, shall be considered valid mechanisms in relation to this parameter. The core emphasis of this requirement is to ensure that exploitation is sustainable. Assessment teams should ensure that fisheries are within catch limit recommendations to determine whether excess capacity is having an effect on resource overexploitation.*	☑

EVIDENCE:

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)[177]. 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;

1. The characteristics and number of participants in the fisheries;
2. The importance of each fishery for providing residents the opportunity to obtain fish for personal and family consumption;
3. The availability of alternative fisheries resources;
4. 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;
5. 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 (CFEC?) 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 (CFEC?) can be found at: https://www.cfec.state.ak.us/Publications/salmon.htm.

[177] https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

8.4.	**Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization 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.**

Since implementation of limited entry, other actions have been taken to improve economic viability of 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. In addition, area management reports contain information on the number of permits fished each year.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fleet capacity operating in the fishery is monitored and measured, and statistical data on all fishing operations allowed is updated and maintained. Where excess capacity exists, mechanisms are established to reduce capacity to levels commensurate with sustainable use of the resource. Examples may include fleet reports or other documents or reports.*	☑

EVIDENCE:
The evidence provided above substantiates the fleet capacity is monitored and measured.

References:	**AS 16.05.251, AS 16.43.140, www.cfec.state.ak.us/Publications/salmon.htn**

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.4.1.

8.4.1.	**Studies shall be promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a need and a process that allows, as appropriate, for studies to understand the costs, benefits, and effects of alternative management options designed to rationalize fishing.*	☑

Summary of Evidence

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 Alaska Commercial Fisheries Entry Commission (CFEC) helps to conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers in certain fisheries, including all salmon fisheries[178]. CFEC issues permits and vessel licenses to qualified individuals in both limited and unlimited fisheries, and provides due process hearings and appeals for those individuals denied permits. Attempts have been made to measure fleet capacity in most of Alaska's salmon fisheries. In 2008, the Southeast Revitalization Association (SRA) 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. This example supports the fact that each area has a unique gear and manner of fishing.

Current status/Appropriateness/Effectiveness: *There is evidence for studies conducted on alternative management options designed to rationalize fishing.*	☑

EVIDENCE:

In the early 1970s, the Alaska government realized that the state's salmon resources could not produce livelihoods for an increasing and unlimited number of fishermen and still be managed for maximum sustained yield. Then Governor Egan suggested the only alternative was to limit the number of permits issued for fishing (ADFG, 2009). 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 Alaska Commercial Fisheries Entry Commission (CFEC) helps to conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers. CFEC issues permits and vessel licenses to qualified individuals in both limited and unlimited fisheries, and provides due process hearings and appeals for those individuals denied permits .

Participants in a fishery who believe the number of gear operators should be limited in order to preserve the resource and economic health of the fishery can initiate the limited entry process. If research by CFEC indicates limiting entry to the fishery would help solve the problem, the commission establishes a maximum number of permits for the fishery based upon historic participation levels. Next, CFEC develops a point system to rank eligible applicants according to the relative degree of hardship they would suffer if not awarded an entry permit. The basic criteria used to evaluate hardship are: establishing that economic dependence upon the fishery exists (which could include determining the percentage of income derived from the fishery and amount of investment in a vessel and gear); and past history of participation in the fishery, including the consistency and number of years that applicant participated. A person must have legally participated in the fishery, held the required licenses, and made at least one landing of fish during an eligible period prior to the established qualification date in order to qualify for that period. A specific application period, usually a few months in length, is established for each limited fishery. All persons who are eligible to apply must submit their applications during the specified time period. CFEC is continuing to study alternative types of limited entry for fisheries managed by a harvest quota.

CFEC issues three basic types of permits: limited entry permits, interim-use permits, and vessel permits. Limited entry permits are the permanent permits issued for limited fisheries. They are issued to applicants who received a sufficient number of points on their

[178] http://www.cfec.state.ak.us/

8.4.1.	**Studies shall be promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort.**

applications. Limited entry permits must be renewed annually and most can be transferred to another person after initial issuance (e.g., sold, or inherited). Interim-use permits are issued annually for all commercial fisheries not under entry limitation, and to applicants waiting to find out if they qualify for permanent permits. Vessel permits (in contrast to vessel licenses) are issued annually for vessels qualified to participate in the Bering Sea hair crab or weathervane scallop fisheries .

A limited entry or interim-use permit entitles the holder to operate gear in a specific commercial fishery in accordance with BOF regulations. The term "fishery" refers to a specific combination of fishery resource(s), gear type(s), and area(s). For example, Southeast salmon trolling (there are separate permits for hand and power troll gear), Cook Inlet salmon drift gillnetting and Chignik salmon seining are distinct fisheries, requiring separate permits. Permits for some species other than salmon are issued on a statewide basis; however, most are valid only for specific areas of the state (e.g., Southeast, Cook Inlet or Bristol Bay). This "right to fish" is embodied in a permit card that is issued annually.

Attempts have been made to measure fleet capacity in most of Alaska's salmon fisheries. In 2008, the Southeast Revitalization Association (SRA) 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. The SRA is a qualified salmon fishery association formed under the authority of AS 16.40.250 for the purpose of fleet consolidation. The SRA buy-back program was financed using $2.8 million in federal funds from appropriations to the Pacific Coast Salmon Recovery Fund. The buy-back program was conducted using a reverse auction system to achieve the greatest reductions in permits. The SRA is currently pursuing federal loan financing for an additional buy-back program. CFEC is open to considering any proposal within the limits of the law that would lead to improvements for Alaska salmon fishermen and their families. Salmon purse seine vessels are limited in length in order to limit their fishing capability. State statutes (AS 16.05.835) restrict Alaska salmon purse seine vessels to 58 feet in overall length, with the exception of vessels that recorded salmon purse seine harvests prior to 1962. The State Legislature amended the law in 2004 to give the BOF the salmon fisheries. Gear allowed for commercial fishing is restricted by regulation by fishery. Examples include limitations on mesh size and gear length. Some gear types, including drum seines are banned by statute.

As indicated in the previous section, the purpose of the Commercial Fisheries Entry Commission is to promote the economic health and stability of the commercial fishing industry in Alaska, as well as to promote the conservation and sustained yield management of fisheries resources. CFEC maintains a research section tasked with providing economic analyses and studies on fishery limitation for its commissioners and occasionally for the BOF. Recent research involved fleet consolidation and fishery restructuring in Kodiak, Bristol Bay and Southeast. CFEC provides data directly to 12 Alaska Regional Development Organizations that encourage and assist locally-driven economic development in areas that depend on commercial fishing as their economic base (2016 CFEC Annual Report)

The Alaska Sea Grant program provides economic assistance to fishers in part through the Alaska Fisheries Business Assistance Project, including an online Business Resource Guide for Alaska Fishermen that is a searchable database of organizations, agencies, and companies that provide services to individuals and businesses in the seafood industry .

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that studies are promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort. Examples may include various evaluation or reports on fishing rationalization.*	☑

EVIDENCE:
The evidence is sufficient to substantiate studies have been conducted designed to rationalize the fleet.

References:							
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.5.

8.5.	**Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *The management system has taken into account technical measures, where and as appropriate (i.e., some fisheries do not have the requirement for a minimum fish size), to the fishery and stock under assessment, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners.*	☑

EVIDENCE:

Types of legal gear for Alaskan fisheries are listed in regulation (5 AAC39.105), and all types are strickly regulated. Specific requirement for gear (i.e. gillnet length, depth, and mesh sizes) are defined for each management area as well as in specific management plans and regulations. Harvest of juveniles is not permitted. However, immature Chinook may be retained in the troll fishery if they are legal size. Waters near spawning grounds are closed to fishing (5 AAC 39.290). In addition, law (SEC 16.10.010) prohibits Interference with salmon spawning streams and water regulation activities in and or around streams in either fresh or salt water.

Current status/Appropriateness/Effectiveness: *Technical measures are related to sustainability objectives, ensuring sustainable exploitation of the target species, and minimizing the potential negative impacts of fishery activities on non-target species, ETP species, and the physical environment.*	☑

EVIDENCE:

All gear types in Alaska are strictly regulated. Types of legal gear are listed in 5AAC 39.105. Specific requirement for gear (i.e. gillnet length, depth, and mesh sizes) are defined for each area and in specific management plans and regulations. For example, regulation 5 AAC 06.330 'Gear' in the Bristol Bay area: A) Salmon may be taken with set and drift gillnets only in districts described in 5 AAC 06.200. Salmon may be taken with set gillnets on the Northwest shore of Kvichak Bay from the Naknek-Kvichak district boundary south to 58˚43.80'N. lat., 157˚42.70' W. long. …etc. 5 AAC 06.331. 'Gillnet specifications and operations' in the Bristol Bay area. 1) Gillnet mesh size may not exceed five and one half inches during periods established by emergency order for the protection of chinook salmon; 2) gillnet mesh size may not be less than five and three-eights inches during the periods established by emergency order for the protection of pink salmon; 3) gillnet mesh size may not exceed four and three quarters inches during periods established by emergency order for the protection of sockeye and coho salmon; 4) gillnet mesh size may not be less than seven and one half inches during periods established by emergency order for the protection of sockeye salmon; 5) from 9:00 am June 15 to 9:00 am July 15, mesh size restrictions for the Togiak District are as provided in 5 AAC06.369(d); from June 1 through July 1, mesh size restrictions for the Egegik District are specified in 5 AAC 06.333, a person may not operate or assist in the operations of a drift gillnet exceeding 150 fathoms in length or a set gillnet exceeding 50 fathoms in length…etc. Also, mesh size is regulated in the various gill net fisheries from time to time during the fishing season to promote the catch of target species while preventing harvest of non-target salmon. In the case of Chinook salmon the SE and Yakutat troll and sport fisheries taking subadults are restricted to fish larger than 28 inches, smaller fish must be released. For troll fisheries regulations include: 5AAC 29.140(a) Size limits, possession, and landing requirements. For sport fisheries: 5AAC 47.020(1).

Broad areas are designated for gear-specific fisheries, including artisanal fisheries, in regulation. Within these areas local area managers open and close sub-areas during the year depending on the abundance of fish and the progress toward escapement goals. For example, regulation 5 AAC 06.350 'Closed waters' describes the precise locations (latitude and longitude) closed to the taking of salmon in the Nushagak, Naknek-Kvichak, Egegik, Ugashik and Togiak Districts...etc. Also, Local area managers open and close seasons during the year, within planned calendar dates, depending on the abundance of fish and the progress toward escapement goals, typically on a week to week basis.

Harvest of juveniles is not permitted. However, immature Chinook may be retained in the troll fishery if they are legal size. Waters near spawning grounds are closed to fishing. In addition, section 16.10.010, Interference with salmon spawning streams and water regulates activities in and or around streams in either fresh or salt water.

8.5.	**Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that technical measures regarding the stock under consideration are taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners. Examples may include fishery management plans, regulations or various other reports.*	☑

EVIDENCE:
The availability and quality of evidence is sufficient to substantiate capability to manage the fishery using technical measures identified in this clause.

References:	**5 AAC39.105, 5AAC 06.330, 5AAC 47.140(a), 5AAC 39.290, Sec 16.10.010**

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.5.1.

8.5.1	**Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism by which management measures are developed to minimize the catch, waste and discarding of non-target species and the impact of the fishery on associated, dependent, and ETP species. This system shall include the development of specific management objectives.*	☑

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.

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.

Waste of salmon is covered under Alaska law (AS 16.05.831), which prohibits waste of harvested salmon.

In all fisheries, and in ADF G regulation (5 AAC 93.310.), which requires operators of all salmon fishing gear to minimize incidental harvest of non-target species. Fisheries management regulatory and in season Emergency Order time and area restrictions limit when and where specific fisheries occur, and restrictions are also imposed by regulation on all types of fishing gear (e.g., mesh size restrictions and length of nets for gillnets, number of fishing lines, rods, and gurdies for troll gear, and mesh size, net length and depth for purse seine gear).

With regard to endangered salmon, no Alaskan salmon are listed by the ADFG as endangered[179] and no Alaskan salmon species are listed federally under ESA[180] in terms of by-catch impact. These references indicate that no other Alaskan fish species as potential by-catch are on the list. The marine mammals and marine sea birds are unlikely by-catch species in the Alaskan salmon fishery.
Under the ESA the following Alaska marine mammals and marine birds are listed as endangered:

- Aleutian Shield Fern
- Blue Whale
- Bowhead Whale
- Cook Inlet Beluga Whale
- Eskimo Curlew
- Fin Whale
- Humpback Whale ("Western North Pacific DPS")
- Leatherback Sea Turtle
- North Pacific Right Whale
- Sei Whale
- Short-tailed Albatross
- Sperm Whale
- Steller Sea Lion (west of 144º)

The Marine Mammal Protection Act (MMPA) directs the Secretary of Commerce to monitor the marine mammal mortlity and serious injury occurring incidentally to commercial fishing and to monitor the progress of commercial fisheries in reducing incidental takes to insignificant levels approaching zero mortality rate goal (ZMRG). The NMFS currently uses a value of 10% of the stock's potential biological removal (PBR) as a criterion to evaluate whether the incidental take of a stock is at an insignificant level approaching the ZMRG (Wade and Angliss, 1997). In the MMPA the NMFS classifies each U.S. commercial fishery (state and federal) in one of three categories based upon the level of incidential serious injury and mortality of marine mammals that occur in the fishery. Each fishery

[179] www.adfg.alaska.gov/index.cfm%3Fadfg=specialstatus.akendangered
[180] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.fedendangered

8.5.1	Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.

is cxlassified through a two tiered anlaysis which assesses the potential impact of fisheries on each marine mamal stock by comparing serious injury and mortality levels to the stocks PBR.

In the Tier 1 analysis, for each marine mammal stock, serious injuries and mortalities are totaled from all commercial U.S. fisheries. If the total is less than 10% of the PBR of that stock then all fisheries interacting with this stock are placed in Category III. A fishery remains in Category III unless it interacts with a stock for which the serious injury or mortality rate exceeds 10% of the PBR. In that case is put into a Tier 2 analysis. If the fishery has a serious injury and mortality that exceeds 50% of the PBR then it is in Category I whereas Category II is a serious injury and mortality greater than 1% but less than 50%.

The MNFS created the Alaska Scientific Review Roup in 1994 to review the science used as the basis for marine mammal management. In addition, the Alaska Marine Mammal Observer Program (AMMOP) was created in 1990. Observers also collect information on incidental injury abd mortality of marine birds during fishing operations.

NOAA Fisheries is not operating the Alaska Marine Mammal Observer Program (AMMOP) due to a lack of available resources to fund additional observations of the southeast Alaska salmon drift gillnet fishery. NOAA Fisheries will reassess future AMMOP activities as funding permits.

Current status/Appropriateness/Effectiveness: *There are measures in place to minimize catch, waste, and discards of nontarget species (both fish and non-fish species). These measures are considered effective at achieving the specific management objectives described in the process parameter. There are measures in place to minimize impacts on associated, dependent, or endangered species. These measures are considered effective at achieving the specific management objectives described in the process parameter.*	☑

In all fisheries, and in ADF G regulation (5 AAC 93.310.), which requires operators of all salmon fishing gear to minimize incidental harvest of non-target species. Fisheries management regulatory and in season Emergency Order time and area restrictions limit when and where specific fisheries occur, and restrictions are also imposed by regulation on all types of fishing gear (e.g., mesh size restrictions and length of nets for gillnets, number of fishing lines, rods, and gurdies for troll gear, and mesh size, net length and depth for purse seine gear).

Operation of all salmon fishing gear (purse seines, gillnets, and troll gear) is required to minimize incidental harvest of non-target species.

Time and area restrictions limit when and where specific fisheries occur and restrictions are also imposed by regulation on all types of fishing gear (e.g., mesh size restrictions and length of nets for gillnets, number of fishing lines, rods, and gurdies for troll gear, and mesh size, net length and depth for purse seine gear). Specific regulations also exist to limit bycatch of non-target species. One area where questions regarding gear selectivity have arisen is the Yukon River gillnet fishery for Chinook salmon. Fishers are concerned that older and larger Chinook salmon are being selected for in the fishery and that some age-classes may be being removed from the population. This issue is being examined through the AYK Sustainable Salmon Initiative [228]. There are other recent efforts to reduce bycatch of chinook such as use of fish wheels on Yukon to harvest chum salmon while releasing Chinook and closure areas such as the one from sea mount pinnacles off Sitka to salmon trolling to protect lingcod as a non-target species.

Alaska law(AS 16.05.831) prohibits waste of salmon harvested in all Alaska fisheries as well as in ADFG regulation (5 AAC 93.310), which requires operators of all salmon fishing gear to minimize incidental harvest of non-target species. Fisheries management regulatory and in season Emergency Order time and area restrictions limit when and where specific fisheries occur, and restrictions are also imposed by regulation on all types of fishing gear (e.g., mesh size restrictions and length of nets for gillnets, number of fishing lines, rods, and gurdies for troll gear, and mesh size, net length and depth for purse seine gear). This statute does allow the commissioner of ADFG, upon request, to "authorize other uses of salmon that would be consistent with maximum and wise use of the resource." In some specific cases involving the Prince William Sound pink salmon fishery, the commissioner has allowed the carcasses of pink salmon to be discarded after the roe was removed because the fish were otherwise not saleable , and, because they were of hatchery origin. These hatchery fish were harvested to prevent them from straying into wild stock spawning streams in areas around the hatcheries. The fish are now sold to

8.5.1	**Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.**

processors who strip the roe and then render the carcass into fish meal. Hatcheries are not allowed to strip the roe and discard the fish.

With regard to endangered salmon, no Alaskan salmon are listed by the ADFG as endangered[181] and no Alaskan salmon species are listed federally under ESA[182] in terms of by-catch impact. These references indicate that no other Alaskan fish species as potential by-catch are on the list. The marine mammals and marine sea birds are unlikely by-catch species in the Alaskan salmon fishery. Also refer to previous discussion in Process as part of this Supporting Clause.
More evidence is provided in 8.12.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that appropriate measures are applied to minimize catch, waste and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that appropriate measures are taken to minimize catch, waste and discards of non-target fish.

References:	**5AAC 16.05.831, 5 AAC 93.310** Wade, Paul R., and Robyn P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-1593 p.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[181] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.fedendangered
[182] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.fedendangered

Supporting Clause 8.6.

8.6	**Fishing gear shall be marked in accordance with the State's legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is regulation for gear marking.*	☑
EVIDENCE: 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.	
Current status/Appropriateness/Effectiveness: *Fixed gear is marked according to national legislation, and lost fixed gear can be identified back to owner.*	☑
EVIDENCE: 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 which are also marked and identified.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing gear is marked in accordance with State's legislation in order that the owner of the gear can be identified. Gear marking requirements take into account uniform and internationally recognizable gear marking systems. Examples may include various fleet reports and regulations.*	☑
EVIDENCE: The adequacy of the evidence is sufficient to substantiate that fishing gear is marked in accordance with Alaskan legislation so that the owner can be Identified.	

References:	**AS 16.05.510, AS 16.05.520, 5 ACC 06.334**						
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3)	=	**Overall score**
	10						**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 8.7.

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

Evaluation Parameters	**Met?**
Process: *The management system and relevant groups from the fishing industry have encouraged the development of technologies and operational methods to reduce waste and discard of the target species. Relevant groups includes fishers, processers, distributers, and marketers. There are mechanisms in place by which the selectivity, environmental impact, and cost-effectiveness of gears included in the unit of certification are measured.*	☑

EVIDENCE:

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.

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.
See evidence in 8.51.

Current status/Appropriateness/Effectiveness: *Such technologies and operational methods have been implemented. The methods in use are effective in reducing waste and discards of the non-target species. There is evidence that the gears used in the fishery are appropriate, in terms of selectivity, environmental impact, and cost-effectiveness, as assessed by the responsible scientific authority of the fishery. Methods shall be considered successful if there is evidence that the fishery under assessment is not causing significant risk of overfishing to non-target species.*	☑

EVIDENCE:

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 have become an alternative 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[183].

[183] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_se_yakutat_salmon_regulations.pdf

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

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 (Yukon and Copper River subsistence) 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 non-anadromous 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. Additional evidence in 8.51.

The State of Alaska, Department of Fish and Game (ADF&G) is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the Commissioner of ADF&G determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened.

The State Endangered Species List currently includes two birds (Short-tailed Albatross and Eskimo Curlew) and three marine mammals (blue whale, humpback whale, and right whale[184]).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant groups from the fishing industry measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost effective gear, technologies and techniques, that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent species. Examples may include various reports, regulations, or other data.*	☑

EVIDENCE:
The availability and adequacy of the evidence is sufficient to substantiate that ADFG encourages through regulations and the fishing industry use selective and environmentally safe gear to minimize by-catch.

References:	**5AAC 93.310**						
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[184] http://www.adfg.alaska.gov/index.cfm%3Fadfg=specialstatus.akendangered

Supporting Clause 8.8.

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

Evaluation Parameters	**Met?**
Process: *There has been development of technologies, materials, and operational methods that minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, and a system to minimize pollution and waste.*	☑

EVIDENCE:
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. As one example of how ADFG address issues of lost or abandoned salmon gill net gear, regulation (5 AAC 06.331(t)) requires Bristol Bay permit holders to report a loss to the local ADFG office within 15 hours of the loss.

Current status/Appropriateness/Effectiveness: *Technologies, materials, and operational methods that minimize the loss of fishing gear and ghost fishing by lost or abandoned gear are applied whenever appropriate. Also, these measures are effective in minimizing, to the extent practicable, pollution and waste.*	☑

EVIDENCE:
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. As one example of how ADFG address issues of abandoned gear in the salmon fishery , 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. State fishery regulation 5 AAC 06.331 (t) states "A permit holder fishing in the Bristol Bay Area must report the loss of a gillnet, or portion of a gillnet, to the local ADFG office in Dillingham or King Salmon within 15 hours of the loss of the gillnet, or portion of the gillnet. The report must be made directly to a local representative of ADFG in person or by radio or telephone." The ghost fishing effect of lost fishing gear does not appear to be a major problem in other salmon fisheries; however, it is a more recognized problem with pot-type gear used for crab and some bottom-fish fisheries. Specific requirements are in place for those fisheries that require the inclusion of escapement devices in the construction of pots used in personal use as well as commercial fisheries.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques—are applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
The availability and adequacy of evidence is sufficient to substantiate measures are applied to minimize loss of fishing gear.

References:	**5AAC 06.331(t)**

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x 3)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.9.

8.9.	The intent of fishing selectivity and fishing impacts-related regulations shall not be circumvented by technical devices. Information on new developments and requirements shall be made available to all fishers.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a system that makes available information on new developments and requirements to all fishers to avoid circumvention of fishing regulations.*	☑

EVIDENCE:

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. It would be extremely difficult to circumvent these regulations, and even if such a situation occurred, the regulatory and management system would be able to effectively respond. Salmon fisheries in Alaska are managed in accordance with the state constitution, which states that, except for limited entry, there will be no exclusive right or special privilege of fishery. Therefore, regulations promulgated by the BOF apply equally to all users of the resource in the state. The setting of regulations as well as in season management are public processes in which new developments and requirements are made available to all fishers as well as the general public.

Current status/Appropriateness/Effectiveness: *The adopted methods are successful and effective and fishing regulations are made known to the participants. Enforcement data are highlighting significant violations.*	☑

EVIDENCE:

Salmon fisheries in Alaska are managed in accordance with the state constitution, which states that, except for limited entry, there will be no exclusive right or special privilege of fishery. Therefore, regulations promulgated by the BOF apply equally to all users of the resource in the state. Furthermore, fishery regulations in Alaska are extremely detailed with regard to the configuration of acceptable gear for use in each fishery. For example, state-wide regulation 5 AAC 39.250 states gillnet web must contain at least 30 filaments, except that (1) in the Southeast Alaska, Yakutat, Prince William Sound, and Cook Inlet areas, gillnet web must meet one of the following requirements: (a) the web must contain at least 30 filaments and all filaments must be of equal diameter, or (b) the web must contain at least six filaments, each of which must be at least 0.20 mm in diameter; (2) the requirements contained in (1a) and (1b) of this subsection apply in the Kodiak, Chignik, Aleutian Islands, Alaska Peninsula, Bristol Bay, Kuskokwim, Yukon-Northern, Norton Sound-Port Clarence and Kotzebue Areas. In addition, the float line and floats of gillnets must be floating on the surface of the water while the net is fishing, unless natural conditions cause the net to temporarily sink. The restriction of this subsection does not apply in the Kotzebue Area, the Norton Sound-Port Clarence Area, the Yukon-Northern Area, the Kuskokwim Area, and the Kodiak Area.

In the Southeastern Alaska Area, gillnet mesh size is measured by averaging the length of 5 consecutive meshes measured from inside the first knot and including the last knot when wet. The five meshes being measured must be an integral part of the net, as hung, and measured perpendicular to the selvages. Measurements must be made by means of a metal tape measure while the five meshes are suspended vertically from a single peg or nail, under a one-pound weight. For Alaskan fisheries everything from boat length to gear allowed is specified in BOF regulation. When a technical device or modification in gear is proposed, the BOF thoroughly examines the issue and either approves its use, usually on a fishery-by-fishery basis, or prohibits it. For example, use of drum seines in Alaska is prohibited (5 AAC 39.155).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the intent of fishing selectivity and fishing impacts-related regulations is not circumvented by technical devices. Information on new developments and requirements is made available to all fishers. Examples may include various data and reports.*	☑

EVIDENCE:

The availability and quality of the evidence is sufficient to substantiate that the intent of fishing selectively is not circumvented by technical devices made available to members of the fishing industry.

References:	**5AAC 39.155**

8.9.	The intent of fishing selectivity and fishing impacts-related regulations shall not be circumvented by technical devices. Information on new developments and requirements shall be made available to all fishers.						
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 8.10.

8.10	**Assessment and scientific evaluation shall be carried out on the impacts of habitat disturbance on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the impacts of such introductions shall be monitored.**
Relevance:	Not relevant.
	This clause is not applicable as no new gears have been introduced in the past 3 years.

Evaluation Parameters	**Met?**
Process: *New gear has been recently introduced on a commercial scale within the last 3 years, or there is a plan to introduce new gear in the foreseeable future.*	☐
EVIDENCE: Supporting Clause 8.10 is NOT RELEVANT as any proposed fishing gear would be monitored by ADFG and before implementation must be approved by the BOF.	
Current status/Appropriateness/Effectiveness: *An appropriate assessment of potential impacts has been carried out. There is evidence to suggest that the assessment is adequate to support habitat conservation and fishery management purposes. Additionally, there is a monitoring regime in place.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that assessment and scientific evaluation is carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the effects of such introductions are monitored. Examples may include various regulations, data, and reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3)**	**=**		**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Supporting Clause 8.11.

8.11.	International cooperation shall be encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a system of international information exchange to allow knowledge to be shared.*	☑

EVIDENCE:
ADFG has participated in research programs on an international basis with other entities on issues such as fishing gear selectivity and improvements to fishing methods and strategies. Results of such research and technology transfer are disseminated through entities such as the NPAFC. The NPAFC, made up of representatives from Canada, Japan, Korea, Russia, and the United States (including Alaska), serves as a forum for promoting the conservation of anadromous stocks and ecologically-related species, including marine mammals, sea birds, and non-anadromous fish, in the high seas area of the North Pacific Ocean. In addition, the NPAFC serves as a venue for coordinating the collection, exchange, and analysis of scientific data regarding these species. It also coordinates high seas fishery enforcement activities by member countries because directed fishing for salmonids is prohibited in the area and agreements have been made to minimize the incidental take of salmonids in other area fisheries. NOAA Fisheries and USFWS are also involved in international cooperative research programs in collaboration with ADFG and in collaboration with the Pacific Salmon Commission and both Transboundary Panel and the Yukon River Panel. Outreach and eduction of research results and management actions by ADFG are shared with commercial, sport and subsistence user groups and tribes in Alaska through NPAFC and PSC.

Current status/Appropriateness/Effectiveness: *There is evidence for international information exchange, such as meeting records or other information.*	☑

EVIDENCE:
ADFG has participated in research programs on an international basis with other entities on issues such as fishing gear selectivity and improvements to fishing methods and strategies. Results of such research and technology transfer are disseminated through entities such as the NPAFC. The NPAFC, made up of representatives from Canada, Japan, Korea, Russia, and the United States (including Alaska), serves as a forum for promoting the conservation of anadromous stocks and ecologically-related species, including marine mammals, sea birds, and non-anadromous fish, in the high seas area of the North Pacific Ocean. Also the NPAFC serves as a venue for coordinating the collection, exchange, and analysis of scientific data regarding these species. It also coordinates high seas fishery enforcement activities by member countries because directed fishing for salmonids is prohibited in the area and agreements have been made to minimize the incidental take of salmonids in other area fisheries. In addition, see US-Canada collaboration on transboundary stock management and research discussion.

There are a number of current examples of international research and information exchange. One example of ADFG reacting to depressed runs of Chinook salmon statewide was the collaborative effort of joint research described in Supporting Clause 7.1.

A team of nine Alaska Department of Fish and Game biologists and scientists worked collaboratively with federal agencies, academic partners and non governmental entities to develop this plan to guide efforts towards better understanding productivity and abundance trends of Chinook salmon.

Recent impacts of drought in Alaska have caused rivers in Alaska to exhibit high temperatures during Chinook salmon adult spawning migrations and specifically locations in the Yukon River system. This reality has caused ADFG, USFWS, USGS and academic partners to propose that heat stress during spawning migration has the potential to cause significant prespawn mortality of adult fish. In this field study, fish will be collected during the spawning migration at established monitoring sites throughout the Yukon River watershed including test fisheries at Emmonak and Eagle, weirs on tributaries (East Fork Andreafsky River and Gisasa River), and a subsistence fish wheel near Tanana. The potential influence of migration timing, age, and size on the presence of stress indicators will also be evaluated. The results of this study will be used to assess the likelihood of increases in freshwater adult mortality and reduced reproductive success from heat stress. If heat stress indicators are present, managers may adjust escapement goals to compensate for the likelihood of higher prespawn mortality rates.

8.11.	**International cooperation shall be encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology.**

NOAA Fisheries forecasts how many adult pink (Southeast Alaska) and Chinook (Yukon River) salmon will be available to harvest by monitoring juvenile salmon and studying how they are affected by climate, prey abundance, and predators.

This example of research collaboration between agencies is NOAA Fisheries pink salmon forecast which in Southeast Alaska has been within 10% of actual harvests in most years. The forecast is used by the ADFG, seafood processors, and local fishermen for pre-season planning. In addition, up to 90% of Alaskan subsistence harvest of Chinook salmon occurs in the Arctic-Yukon-Kuskokwim region. Recent declines in Chinook salmon returns in the region have resulted in complete closures of commercial and sport fishing, and severely restricted subsistence harvests. A team of NOAA Fisheries and ADFG biologists have used data from marine surveys to accurately predict run size of Yukon River Chinook salmon up to three years into the future. This work enables managers and subsistence fishermen to plan ahead for and better respond to changing run sizes. Active publication of research from all of these studies has promoted outreach and education among commercial, sport and subsistence fishermen, processors and non governmental agencies.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that international cooperation is encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology. Examples may include various data and reports.*	☑

EVIDENCE:
Based on the above discussion, the availability and adequacy of the evidence is sufficient to substantiate that ADFG is leveraging research efforts which form the basis of fisheries management by collaborating with multiple agencies both on a statewide and international or transboundary scale.

References:	**www.psc.org/about-us/structure/panel/yukon-river//**,www.fws.gov/alaska/pages/fisheries-aquatic-conservation/alaska-fisheries-studyreports//, www.fisheries.noaa.gov/alaska/sciencedata/salmon-research-alaska

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.12.

8.12	**The fishery management organization and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species regarding such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is collaborative research into fishing gear selectivity, fishing methods, and strategies.*	☑

EVIDENCE:
Please refer to supporting clause 8.11. Additionally, The following text for current status outlines the collaborative research with federal agencies like NOAA Fisheries, USFWS, UAF, commercial, sport, personal and subsistence fishermen that describes the basis and rational for decisions to deploy appropriate fishing gear and methods in Alaska.

Current status/Appropriateness/Effectiveness: *There is evidence of such research, and the results have been applied accordingly in fisheries management.*	☑

EVIDENCE:
In addition to discussion in supporting clause 8.11, 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 have become an alternative 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[185].

Other examples of research collaboration on fishing methods and strategies involve ADFG Commercial, Sport and Subsistence Divisions working with federal agencies, UAF and subsistence fishermen. NOAA Fisheries is working to forecast how many adult pink (Southeast Alaska) and Chinook (Yukon River) salmon will be available to harvest by monitoring juvenile salmon and studying how they are affected by climate, prey abundance, and predators. The pink salmon forecast in Southeast Alaska has been within 10% of actual harvests in most years. This forecast is used by the Alaska Department of Fish and Game, seafood processors, and local fishermen for pre-season planning. Up to 90% of Alaskan subsistence harvest of Chinook salmon occurs in the Arctic-Yukon-Kuskokwim region. Recent declines in Chinook salmon returns in the region have resulted in complete closures of commercial and sport fishing, and severely restricted subsistence harvests. NOAA Fisheries and Alaska Department of Fish and Game biologists have used data from marine surveys to accurately predict run size of Yukon River Chinook salmon up to three years into the future. This work enables managers and subsistence fishermen to plan ahead for and better respond to changing run sizes. This information helps to provide the basis for ADFG to manage the fishery and deploy the most effective and efficient fishing gear.

[185] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2015_2018_se_yakutat_salmon_regulations.pdf

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

The Chinook Salmon Research Initiative described in Supporting Clause 7.1. One area that highlights the collaborative research comes from the Yukon River where sharp declines in Chinook abundance have caused severe hardships for communities in the Yukon River watershed. Sustainable salmon management during periods of low abundance is difficult when there is a lack of knowledge about underlying causes. Initiative funded research will explore local traditional knowledge of spawning grounds, juvenile rearing habitats, and other environmental factors affecting adult salmon migration and reproduction in fresh water. The communities of Anvik, Huslia, Allakaket, and Fort Yukon were selected based on their proximity to Chinook spawning grounds that have been monitored through weirs or sonars. Collection of local and traditional knowledge can provide important insights to fishery managers and involves subsistence users in fisheries research. It can also provide long-term data to fisheries managers and scientists and aid in understanding environmental changes that influence cycles in populations of salmon.

This initiative produces an effective outreach and education method of tracking research progress on the 12 important Chinook river systems around the state and the progress being made to achieve the research plan goals as outlined by top fishery scientists in Alaska. This can be viewed on the ADFG website at:
https://www.adfg.alaska.gov/static/home/library/pdfs/chinooknews/cn_winter2015_n2.pdf

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant institutions involved in the fishery collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species in relation to such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches. Examples may include various data and reports.*	☑

EVIDENCE:
The quality and adequacy of evidence is sufficient to substantiate that ADFG is making fisheries management decisions based on collaborative research to implement effective fishing gear and to reduce fishing gear impact on non-target species.

References:	**5AAC 93.310, 5 AAC 06.331 (t),** https://www.fisheries.noaa.gov/alaska/science-data/salmon-research-alaska, https://www.adfg.alaska.gov/static/home/library/pdfs/chinooknews/cn_winter2015_n2.pdf

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 8.13.

8.13	**Where appropriate, policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed.**
Relevance:	Not relevant.
	This clause is not relevant as there is no use of artificial structures.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place for identifying potential for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. This mechanism ensures that where artificial structures are deemed appropriate, environmental protection, safety, and navigation are considered in their application.*	☐
EVIDENCE: Artificial reefs are not not used in Alaska marine waters.	
Current status/Appropriateness/Effectiveness: *This mechanism has been applied to the stocks under consideration, resulting in the conclusion to either use artificial structures, or that artificial structures are inappropriate. Care has been taken in the selection of materials to use in constructing artificial reefs, the selection of sites for their deployment, and to ensure that relevant conventions concerning the environment and the safety of navigation have been observed.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where appropriate, policies are developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall also ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed. Examples may include various laws, data and reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Fundamental Clause 9. Appropriate standards of fishers' competence

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

Supporting Clause 9.1.

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

Evaluation Parameters	**Met?**
Process: *There are implemented education programs for fishers (e.g., health and safety, fisheries management framework, rule and regulation, etc.).*	☑

EVIDENCE:

The Alaska Institute of Technology (formerly called Alaska Vocational Training & Education Centre), is within the Department of Labor Workforce Development, operates the Alaska Maritime Training Centre. 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 Centere is a USCG approved training facility located in Seward, Alaska, and offers USCG and international Standards of Training, Certification, & Watch keeping -compliant maritime training.

The University of Alaska Sea Grant Marine Advisory Program provides education and training in several sectors, including fisheries management, in the form of seminars and workshops. In addition, the program conducts sessions of their Alaska Young Fishermen's Summit.

Current status/Appropriateness/Effectiveness: *These programs are effective in training fishers, in line with international standards and guidelines.*	☑

EVIDENCE:

The State of Alaska, Department of Labor & Workforce Development (ADLWD) includes AVTEC (formerly called Alaska Vocational Training & Education Centre, now called Alaska's Institute of Technology). One of AVTEC's main divisions is the Alaska Maritime Training Center[186]. 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 United States Coast Guard (USCG) approved training facility located in Seward, Alaska, and offers USCG/STCW compliant maritime training (STCW is the international Standards of Training, Certification, & Watch keeping)[187]. In addition to the standard courses offered, customized training is available to meet the specific needs of maritime companies. Courses are delivered through the use of their world class ship simulator, state of the art computer based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technologies. The Centre's mission is to provide Alaskans with the skills and technical knowledge to enable them to be productive in Alaska's continually evolving maritime industry. Supplemental to their on-campus classroom training, the Alaska Maritime Training Centre has a partnership with the Maritime Learning System to provide mariners with online Training for entry-level USCG Licenses, endorsements, and renewals.

The Centre's course offerings include Video Tutorials such as:

1. How to get your Merchant Mariner's Credential
2. Which Course Do You Need? U.S. Coast Guard Approved/STCW-Compliant Courses
3. Able Seaman
4. Assistance Towing Operations
5. Automatic Radar Plotting Aids (ARPA) Operations
6. Basic Safety Training -
7. First Aid & CPR
8. Personal Safety and Social Responsibility

[186] http://www.avtec.edu/AMTC.htm
[187] http://www.stcw.org/

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

9. Basic Fire Fighting
10. Personal Survival Techniques
11. Bridge Resource Management (BRM)
12. Global Maritime Distress & Safety System (GMDSS)
13. Master Not More Than 200 Tons Program
14. Meteorology
15. Operator of Uninspected Passenger Vessels (OUPV)
16. Proficiency in Survival Craft
17. Qualified Member of Engine Department (QMED) Oiler
18. Radar Observer (Unlimited), Original
19. Radar Observer (Unlimited), Refresher
20. Radar Observer (Unlimited), Recertification
21. Rating Forming Part of a Navigational Watch
22. Seafood Processor Orientation and Safety Course
23. Shipboard Emergency Medicine
24. Tankship – Dangerous Liquids (P.I.C.)
25. Visual Communications/Flashing Lights
26. Medical Care Provider
27. FCC Marine Radio Operators Permit Examination

The University of Alaska Sea Grant Marine Advisory Program (MAP)[188] provides education and training in several other sectors, including –

* better process control
* HACCP (Hazard Analysis / Critical Control Point)
* sanitation control procedures
* marine refrigeration technology
* net mending
* icing & handling
* direct marketing
* financial management for fishermen
* maximizing fuel efficiency

In addition, MAPconducts 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, to seafood markets & marketing. The target audience for these Summits is young Alaskans from coastal communities. Additional education is provided by the Fishery Industrial Technology Centre, in Kodiak, Alaska as well as the Alaska Marine Safety Education Association (AMSEA) which is a forum for safety, health and environmental information in Sitka, Alaska.

Alaska fisheries management processes such as the cycle of BOF meetings provides a very accessible and open process in which fishers participate regularly in proceedings and thereby, become educated with the fishery issues of the day specific to each region. Advisory Committees are composed of stakeholders in each region and all meetings are held in public forum for fishers and stakeholders to witness- and thereby become educated. ASMI also provide educational type information, including on the FAO Code across a whole range of fishery and fish related matters[189], quality, hygiene, food safety, sustainability, environmental protection. Evidence of "FAO CCFR provisions provided to anyone engaged in fishing operations" and interested parties can be found on the website of ASMI[190] where it describes the RFM program, the conformance criteria standard along with the FAO documents.

[188] http://seagrant.uaf.edu/map/
[189] http://www.alaskaseafood.org/about/
[190] http://www.alaskaseafood.org/rfm-certification/fisheries-standard/

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

ADFG publish a myriad of documents, booklets and pamphlets which provide information on Alaska salmon- from regulations to educational items to news stories which were reviewed and collected during on-site visits to ADFG and AWT offices [191,192]. By virtue of their regulatory obligations, Alaska Statutes, this literature is consistent with the intent of the FAO Code. Therefore, a high confidence rating is warranted.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States enhance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs take into account agreed international standards and guidelines. Examples may include various data, websites.*	☑

EVIDENCE:
The availability and quality of the evidence is sufficient to substantiate that Alaska through training and education provides skills to improve fishers professional qualifications.

References:	

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x **3**) =	**Overall score**
	10				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[191] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main
[192] http://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish

Supporting Clause 9.2.

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

Evaluation Parameters	**Met?**
Process: *There are relevant measures of the FAO CCFR and other applicable environmental and other standards being exposed to fishers for their training.*	☑

EVIDENCE:

There are no international organizations per se of relevance, however and additional to evidence provided in clause 9.1 (which can be described as consistent with the intent of the FAO CCRF); the University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops. At both Federal and State levels, open and accessible management (e.g. BOF) processes, provide excellent forum for supporting fisheries understanding, are regularly attended by fishers, and by virtue of Alaska fishery statues being consistent with FAO CCRF, provide informal education on these provisions.

Current status/Appropriateness/Effectiveness: *These programs are effective in training fishers, in line with international standards, guidelines, and key CCRF principles. The presence of general training programs for fishermen (e.g., health and safety, fisheries management framework, rule and regulation, etc.) shall be evidence that the key principles of the CCRF have been filtered down from management to fishermen. Furthermore, the existence of laws and regulation with which fishermen are compliant demonstrate further compliance to this clause.*	☑

EVIDENCE:

Additional evidence provided in clause 9.1 (which can be described as consistent with the intent of the FAO CCRF) The University of Alaska Sea Grant Marine Advisory Program (MAP) provides education and training in several sectors, including fisheries management, in the forms of seminars and workshops. Courses range from academic, practical, entry to higher technical levels. In addition, MAP 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.

While program content may not be FAO specific per se, these workshops, science symposiums and practical field training programs do deliver the intent and principles of the FAO Code in their content. There are numerous course examples are available[193]. (In addition, Alaska's fisheries are extremely compliant with the Code, as demonstrated by numerous certifications and this is widely disseminated across fisheries, including Alaska salmon.

Alaska fisheries management processes such as the cycle of BOF meetings provides a very accessible and open process in which fishers participate regularly in proceedings and thereby, become educated with the fishery issues of the day specific to each region. Advisory Committees are made of stakeholders in each region and all meetings are held in public forum for fishers and stakeholders to witness- and thereby become educated. ASMI also provide educational information, including on the FAO Code across a whole range of fishery and fish related matters[194]such as, quality, hygiene, food safety, sustainability and environmental protection. Evidence of "FAO CCFR provisions provided to anyone engaged in fishing operations" and interested parties can be found on the website of ASMI[195] where it describes the RFM program, the conformance criteria standard along with the FAO documents.

To repeat what was described in 9.1, ADFG publishes a myriad of documents, booklets and pamphlets which provide information on Alaska salmon- from regulations to educational items to news stories which were reviewed and collected during on-site visits to

[193] https://seagrant.uaf.edu/conferences/waisc/2016/docs/WAISCagenda-2016.pdf)
[194] http://www.alaskaseafood.org/about/
[195] http://www.alaskaseafood.org/rfm-certification/fisheries-standard/

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

ADFG and AWT offices [196][197]. By virtue of their regulatory obligations, Alaska Statutes, this literature is consistent with the intent of the FAO Code.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States, with the assistance of relevant international organizations, endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations. Examples may include various data, websites.*	☑

EVIDENCE:
The quality and availability of evidence is sufficient to ensure education and training for fishers on intent of the FAO CCRF.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3) =**			**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[196] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main
[197] http://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish

Supporting Clause 9.3.

9.3.	**The fishery management organization shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their State's laws.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system to collect and maintain fisher records.*	☑

EVIDENCE:
Data on fishers is held in a number of agencies. For example, Alaska Fisheries Information Network (AKFIN) and CFEC in addition to ADFG and depending on type of license, application processes require individuals to register information for qualification requirements.

Current status/Appropriateness/Effectiveness: *These records are considered accurate and effective for management purposes.*	☑

EVIDENCE:
Competence and professionalism is typically a learned experience, with the entrants into the fishery usually starting at deck hand level working their way up. Licensing is fishery specific and data bases of commercial permit holders, commercial vessels, fishery area, residency qualifications are maintained and some information is accessible on line and published annually in statistical reports. Application includes permit entry requirements, commercial fishers and commercial vessels. Data on fishing in Alaskan state-managed fisheries can be found in the State of Alaska's Commercial Fisheries Entry Commission website (CFEC), and AFKIN. In addition, the Alaska Department of Commerce and Economic Development, Division of Economic Development provides low interest loans for fishing vessels and permits to commercial fishermen.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization maintains, as appropriate, records of fishers which, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws. Examples may include various data or reports.*	☑

EVIDENCE:
The State of Alaska's Commercial Fisheries Entry Commission (CFEC), and AFKIN website provide current and adequate data on fishermen qualifications participating in Alaskan state-managed fisheries . In addition, the Alaska Department of Commerce and Economic Development, Division of Economic Development provides low interest loans for fishing vessels and permits to commercial fishermen.

References:	http://www.avtec.edu/AMTC.htm http://www.stcw.org/ http://www.seagrant.uaf.edu/map/

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**		**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Fundamental Clause 10. Effective legal and administrative framework

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.

Supporting Clause 10.1.

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

Evaluation Parameters	**Met?**
Process: *There are clear mechanisms established for fisheries monitoring, surveillance, control, and enforcement.*	☑

EVIDENCE:

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[198] to ensure compliance with fisheries regulations[199]. Enforcement of fisheries-related statutes and regulations is conducted by Alaska Wildlife Troopers (AWT), a Division of the Alaska Department of Public Safety[200], that maintains and operates a large fleet of water- and aircraft to perform its mission[201]. 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[202]. Citizens can also report fish and wildlife violations in Alaska through AWT's Safeguard organization.[203]

Current status/Appropriateness/Effectiveness: *These mechanisms are effective, and include effective observer programs, inspection schemes, and vessel monitoring systems where appropriate for the type of fishery under assessment. Monitoring, surveillance, control, and enforcement mechanisms can be considered effective if they are sufficiently broad to cover the entirety of the unit of certification, there is evidence that rules and regulations are consistently enforced, and there is no evidence of frequent or widespread violation of fishery regulations. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified. With respect to fisheries on the high seas, the legal obligations of UNCLOS and UNFSA have particular relevance. Evidence of the performance of the legal framework can be derived from assessing conformance with requirements covering compliance and enforcement. Specifically, the assessment team shall document the general level/type of fisheries controls (e.g., number of boarding's, reprimands) and the respective level of fisheries violations (e.g., %) on a yearly basis.*	☑

EVIDENCE:

The Division of Alaska Wildlife Troopers regularly publishes online reports of fisheries violations, including those associated with commercial salmon fisheries. These reports are publicly accessible and searchable through the Department of Public Safety's Daily Dispatch webpage[204]. Dispatch reports include the date, location and nature of the violation or incident.

198 https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonareas
199 https://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial
200 https://dps.alaska.gov/AWT/Home
201 https://dps.alaska.gov/AWT/Mission
202 http://www.dps.state.ak.us/AWT/mission.aspx
203 https://dps.alaska.gov/awt/safeguard
204 https://dps.alaska.gov/dailydispatch/Home/

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

A query of recent dispatch reports[205] returned evidence of enforcement activities by AWT in Alaska commercial salmon fisheries throughout coastal waters of the state. Several of these citations were subsequently reported to result in convictions with serious fines and penalties, including boat, permit and catch seizures.[206, 207, 208]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that effective mechanisms are established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher or community approaches, provided their performance could be objectively verified. Examples may include rules and regulations, enforcement reports.*	☑

EVIDENCE:

Daily dispatch reports issued by the AWT provide a remarkably transparent record of law enforcement that supports responsible execution of the Alaska commercial salmon fishery. These records are published online and readily accessible to anyone, through the Department of Public Safety's Daily Dispatch webpage[209].

In addition to law enforcement records, ADFG publishes online Advisory Announcements that include in-season reports and end of season summaries for the commercial salmon fisheries, by area.[210] These reports typically include the types of gear fished, catch records, harvest values, escapement estimates and regulations implemented during the course of the fishing season.

2018 Commercial Salmon Fishing(2018 and 2019) (Information from AWT received from Dave Gaudet)
During 2018, Alaska Wildlife Troopers boarded approximately 3200 commercial salmon fishing vessels to conduct routine compliance checks. This number does not include boarding's where an Alaska Wildlife Trooper made contact with the vessel to investigate a violation.

Regarding your request for information related to violation rate and overall level of compliance, I am unable to determine this specific to commercial salmon fishing on a statewide basis. However, we have another reporting method which Troopers use to report daily activity. The system allows reporting resource use types, such as commercial fisheries patrol, sport fish patrol, etc. I chose commercial fishing patrol and selected the date range of June 1, 2018 through August 1, 2018. In most areas of Alaska, during this date range, commercial fishing enforcement activity is primarily focused on salmon fisheries. This data revealed 5,024 contacts with commercial fisheries participants, 207 warnings given during these contacts, and 330 persons charged with offenses. Calculating a violation rate from these statistics indicates violations discovered during commercial fishing contacts occurred at a rate of 6.57 % in 2018.

2019 Commercial Salmon Fishing
During 2019, Alaska Wildlife Troopers boarded approximately 2300 commercial salmon fishing vessels to conduct routine compliance checks. This number does not include boarding's where an Alaska Wildlife Trooper made contact with the vessel to investigate a violation. Regarding your request for information related to violation rate and overall level of compliance, I am unable to determine this specific to commercial salmon fishing on a statewide basis. However, we have another reporting method which Troopers use to report daily activity. The system allows reporting resource use types, such as commercial fisheries patrol, sport fish patrol, etc. I chose commercial fishing patrol and selected the date range of June 1, 2019 through August 1, 2019. In most areas of Alaska, during this date range, commercial fishing enforcement activity is primarily focused on salmon fisheries. This data revealed 4,838 contacts with commercial fisheries participants, 313 warnings given during these contacts, and 310 persons charged with offenses. Calculating a violation rate from these statistics indicates violations discovered during commercial fishing contacts occurred at a rate of 6.40 % in 2019.

[205] https://dps.alaska.gov/SpecialPages/Search-Results?q=commercial%20salmon&submit=DPS
[206] https://www.ktuu.com/content/news/Alaska-fisheries-lobbyist-allegedly-violates-salmon-fishing-boundaries-558952591.html
[207] https://www.ktuu.com/content/news/Alaska-Wildlife-Troopers-seize-illegally-caught-salmon-490196061.html
[208] https://www.ktuu.com/content/news/Southeast-fisherman-forfeits-boat-net-after-convictions-469964443.html
[209] https://dps.alaska.gov/dailydispatch/Home/
[210] https://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main

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

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	**0**

Supporting Clause 10.2.

10.2.	Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a mechanism or system established to maintain a record of fishing authorizations.*	☑

EVIDENCE:
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[211]. 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[212]. CFEC issues permits and vessel licenses to qualified individuals in both limited and unlimited fisheries, 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.[213] Individuals must also apply for and maintain a state-issued Crewmember License to participate in Alaska commercial salmon fisheries.[214]

Current status/Appropriateness/Effectiveness: *This mechanism is effective for maintaining updated records of fishing authorizations and ensuring fishing vessels operate with appropriate authorization.*	☑

EVIDENCE:
In 2014, ADFG performed a review of the CFEC and published a report of their findings, which stated in its Overarching Findings, "The limited entry program implemented for commercial salmon fisheries in Alaska stabilized the number of fishermen and therefore the amount of gear used in each of the state's salmon fisheries. It improved management effectiveness and ability of the fishery managers to regulate the fishery so that harvestable surpluses could be taken while still meeting escapement objectives in an orderly and predictable fishery".[215] CFEC maintains online records of permitted vessels, which ADFG and AWT officers can consult during the course of their duties of managing the Alaska commercial salmon fisheries and enforcing the laws that regulate it.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels are not allowed to operate on the stock under consideration in question without specific authorization. Examples may include various data.*	☑

EVIDENCE:
In accordance with AS 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, organized by region and gear type.[216] The CFEC also maintains and publishes vessel census data, describing the number and types of vessels participating in Alaska commercial fisheries by census region.[217] These databases are publicly accessible and up-to-date.

References:							
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3)	=	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							**0**

[211] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.main
[212] https://www.adfg.alaska.gov/index.cfm?adfg=divisions.cfecmission
[213] https://www.cfec.state.ak.us/
[214] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.main
[215] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&uact=8&ved=2ahUKEwjAyubi6YTnAhWRnp4KHX8hCg8QFjAEegQIAhAC&url=https%3A%2F%2Fwww.adfg.alaska.gov%2Fstatic-f%2Fhome%2Fpdfs%2Fcfec_program_review_final_report.pdf&usg=AOvVaw1QZr35hKxEpu-t1x-VYrX4
[216] https://www.cfec.state.ak.us/pstatus/mnusalm.htm
[217] https://www.cfec.state.ak.us/fishery_statistics/vessels.htm

Supporting Clause 10.3.

10.3.	**States involved in the fishery shall, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside the States jurisdiction.**
Relevance:	Not relevant.
	Alaska commercial salmon fisheries occur entirely within the State's jurisdiction and EEZ.

Evaluation Parameters	**Met?**
Process: *There is a mechanism or system established to conduct enforcement operations outside the State's jurisdiction.*	☑
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *transboundary, shared, straddling, highly migratory or high seas, then the Standard need only be concerned with the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level for the fishery of which the unit of certification is a part. If the unit of certification is part of a States fleet fishing on a transboundary, shared, straddling, highly migratory or high seas stock, then it is still likely to be the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level that shall be assessed. If the unit of certification covers all the fishing on the stock under consideration, then the monitoring, surveillance, control, and enforcement of all of the States fleets is of concern and shall be assessed (to ensure full consideration of total fishing mortality on the stock under consideration).*	☑
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States involved in the fishery do, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their States jurisdiction. Examples may include enforcement reports.*	☑
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Supporting Clause 10.3.1.

10.3.1.	**Fishery management organizations which are members of or participants in fisheries management organizations or arrangements, shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities that undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States shall also proceed, as necessary, to assist other States in achieving the objectives of the FAO CCRF (1995), and should make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State.**
Relevance:	Not relevant.
	Alaska commercial salmon fisheries occur entirely within the State's jurisdiction and EEZ

Evaluation Parameters	**Met?**
Process: *There are regulations established against vessels flying the flag of non-member or non-participant States, which may engage in activities that undermine the effectiveness of conservation and management measures established by fisheries management organizations.*	☑
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *These measures are effective in deterring such practices.*	☑
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations which are members of or participants in fisheries management organizations or arrangements implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States also proceed, as necessary, to achieve and to assist other States in achieving the objectives of the FAO CCRF, and make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State. Examples may include enforcement or other reports.*	☑
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**		**x 3)**	**=**	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							NA
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							NA
Non-conformance Number (if applicable):							

Supporting Clause 10.4.

10.4.	**Flag States shall ensure that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish.**
Relevance:	Not relevant.
	Alaska commercial salmon fisheries occur entirely within the State's jurisdiction and EEZ

Evaluation Parameters	**Met?**
Process: *There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.*	☑
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *These vessels have been issued with a Certificate of Registry and they are required to carry it on board.*	☑
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the flag State ensures that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish. Examples may include various laws, regulations, and other data or reports.*	☑
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**		**x 3) =**			**NA**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

Supporting Clause 10.4.1.

10.4.1.	**Fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State shall be marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels.**
Relevance:	Not relevant.
	Alaska commercial salmon fisheries occur entirely within the State's jurisdiction and EEZ

Evaluation Parameters	**Met?**
Process: *There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.*	☑
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *Foreign vessels authorized to fish in the State's EEZ or its vessels fishing in another State's EEZ have been marked accordingly to international guidelines.*	☑
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State, are marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels. Examples may include various laws, regulations, and other data or reports.*	☑
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–** **(**		**x**	**3**	**)** **=**	**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Fundamental Clause 11. Framework for sanctions

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

Supporting Clause 11.1.

11.1.	**States laws of adequate severity shall be in place that provide for effective sanctions.**	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *The system of States laws is of adequate severity to provide for effective sanctions.*		☑

EVIDENCE:

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[218]. Violations of fishing regulations result in strict penalties that can include fines, suspension of permit[219], imprisonment and seizure of catch, gear and/or vessel[220]. 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[221]. Alaska Statute 16.5.150 formally authorizes ADFG employees, State police and others deputized individuals to enforce Alaska's Fish and Game Code[222].

Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that States laws are of adequate severity to provide for effective sanctions. The evidence here includes largely (a) whether laws set out effective penalty provisions and the courts respond in a manner that deters further or repeat offenses, (b) the views of the industry, other stakeholders, and the general public, and (c) the outcomes and associated trends of the enforcement efforts when measured against appropriate performance indicators.*	☑

EVIDENCE:

Alaska's Fish and Game Code enforces fishing regulations through severe penalties that are strictly enforced by ADFG, AWT and other authorities. The severity of these penalties appears to deter violations, as relatively few are reported despite the vast scale of Alaska's commercial salmon fisheries and vigilant surveillance and law enforcement. When violations do occur, penalties often serve to prevent additional violations directly through permit suspension, gear and/or vessel seizure.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States laws of adequate severity are in place that provide for effective sanctions. Examples may include various laws, regulations, and other data or reports.*	☑

EVIDENCE:

The severity of penalties associated with violation of Alaska's Fish and Game Code are clearly defined through AS 16.5 and described in greater detail in the next Supporting Clause (11.2; including description of demerit system). Reports of violations within Alaska's commercial salmon fisheries are relatively rare, despite the fisheries' vast scale, number of participants and constant enforcement activities, suggestive of high compliance. However, where convictions of violations have been ruled, reports document the enforcement of law and severity of penalties.[223, 224]

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									**0**

[218] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05.htm
[219] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section710.htm
[220] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section723.htm
[221] https://www.fisheries.noaa.gov/about/office-law-enforcement
[222] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter05/Section150.htm
[223] http://www.alaskawaypoints.com/trooper-report?page=1
[224] https://www.ktuu.com/content/news/Four-Homer-men-fined-for-illegal-commercial-fishing-in-2018-510693721.html

Supporting Clause 11.2.

11.2.	**Sanctions applicable to violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force to affect authorization to fish and/or to serve as masters or officers of a fishing vessel in the event of noncompliance with conservation and management measures.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *The system of sanctions in place is sufficiently severe to deter violations and illegal activities. The system shall be considered adequate in severity if the potential sanctions include fines, suspension or withdrawal of permission to fish, and confiscation of catch or equipment.*	☑

EVIDENCE:

According to Alaska Statute 16.43.850[225], a demerit system involving serious sanctions has been developed and is enforced over commercial fishing vessels in Alaska[226]. 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;
(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[227]:

[225] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter43/Section850.htm
[226] https://www.cfec.state.ak.us/demerits/DemeritPoints.pdf
[227] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter43/Section860.htm

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

(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 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.

Together, these laws assign severe sanctions for violations of commercial salmon fishery regulations that include suspension of fishing permits, in addition to monetary fines and other penalties.

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

Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that sanctions for violations of regulations (e.g., suspension, withdrawal, or refusals of fishing permit or of the right to fish) are adequate in severity to secure compliance and discourage violations.*	☑

EVIDENCE:
The penalties and fines established through AS 16.43.850 and AS 16.43.860 reasonably discourage violation of commercial salmon fishery regulations in Alaska, by limiting future participation in the fishery and imposing sanctions commensurate to the scale of violation committed.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that sanctions applicable in respect of violations and illegal activities are adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions are in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures. Examples may include various laws, regulations, and other data or reports.*	☑

EVIDENCE:
Alaska statutes are clearly documented and provide adequate evidence of a system of sanctions that are applied to violations of fishery regulations in Alaska, with laws particular to the commercial salmon fishery defined through AS 16.43.850 - AS 16.43.880[228].

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								**0**

[228] https://casetext.com/statute/alaska-statutes/title-16-fish-and-game/chapter-1643-regulation-of-entry-into-alaska-commercial-fisheries/article-08-point-system-for-commercial-fishing-violations-in-salmon-fisheries

Supporting Clause 11.3.

11.3.	**Fisheries management organizations shall ensure that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. Fisheries management organizations shall ensure the consistent and transparent application of sanctions.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *The system of sanctions in place are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions.*	☑

EVIDENCE:

All commercial catch of salmon in Alaska must be reported to ADFG through Fish Tickets or eLandings documentation, within 7 days of landing or first purchase of the resource[229]. As such, all legal commercial salmon catch in Alaska is reported. Sanctions for illegal commercial harvest of salmon in Alaska are severe, and established through the state's Fish and Game Code AS 16.5, with pertinent detail provided through AS 16.43.850 – as 16.43.880[230]. Penalties include fines, prison time, suspension of permits, as well as seizure of catch, gear and/or vessel.

Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that sanctions for violations of regulations are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. Sanctions are applied transparently and consistently across the board.*	☑

EVIDENCE:

The nature and process of application for sanctions is clearly described in AS 16.43.850, with respect to the number and frequency of violations. Through state statute, Alaska established a system of demerit points attributable to the number and frequency of violations, that result in increasingly severe penalties[231]. A list of individuals with demerit points (all commercial fisheries, including salmon fisheries) is published online and maintained by Alaska's Commercial Fisheries Entry Commission.[232]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions. Examples may include various laws, regulations, and other data or reports.*	☑

EVIDENCE:

The online and publicly accessible list of commercial fishermen with demerit points, published by Alaska's Commercial Fisheries Entry Commission, both tracks and discourages participants in the fishery from committing violations. Demerits ultimately result in severe penalties, suspension of fishing permits and use of vessel in the fishery. CFEC will suspend a permit holder's commercial salmon fishing privileges for a period of one year if the permit holder accumulates 12 or more demerit points in a consecutive 36 month period as a result of convictions for violations of commercial fishing laws in the salmon fishery. Likewise, a permit will be suspended for two years if 16 or more points are accumulated in a 36 month period, or three years if 18 or more points are accumulated in a 36 month period. AS 16.43.860 states that a permit holder who is suspended from fishing will not be allowed crew in the fishery and will not be able to lease or rent his/her vessel for use in the salmon fishery for which the permit holder's fishing privileges are suspended.

[229] http://www.adfg.alaska.gov/index.cfm%3Fadfg%3Dfishlicense.fishtickets
[230] http://www.legis.state.ak.us/basis/Bill/Text/20?Hsid=HB0285D#
[231] https://www.cfec.state.ak.us/demerits/DemeritPoints.pdf
[232] https://www.cfec.state.ak.us/demerits/WD0100_A.htm

11.3.	**Fisheries management organizations shall ensure that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. Fisheries management organizations shall ensure the consistent and transparent application of sanctions.**						
References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full =; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							**0**

Supporting Clause 11.4.

11.4.	**Flag States shall take enforcement measures towards fishing vessels entitled to fly their flag, which have been found by the State to have contravened applicable conservation and management measures. The State shall, where appropriate, make the contravention of such measures an offense under national legislation.**
Relevance:	Not relevant
	Not applicable because Alaska's commercial salmon fisheries are conducted entirely within State waters and no foreign vessels fish within Alaska's EEZ.

Evaluation Parameters	**Met?**
Process: *If applicable, the system of enforcement measures is effective for foreign vessels fishing in the State's EEZ or for its vessels fishing in high seas or in another State's EEZ.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is evidence to substantiate enforcement action in these cases (i.e., boarding, violations).*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that flag States take enforcement measures with fishing vessels entitled to fly their flag if the vessels have been found by the State to have contravened applicable conservation and management measures. These enforcement measures will include, where appropriate, making the contravention of such measures an offense under national legislation. Examples may include various laws, regulations, and other data or enforcements reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**			**Number of EPs NOT met**			**Overall score**
	10	**–**	**(**		**x 3**	**)** =	**NA**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

Section D: Serious Impacts of the Fishery on the Ecosystem

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.

Supporting Clause 12.1.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that allows assessment and monitoring of environmental factors (e.g., climatic, oceanographic) on target and associated species in the same ecosystem, and that assess the relationships between species in the ecosystem.*	☑

EVIDENCE:

Both ADFG and NOAA Fisheries regularly monitor oceanographic and biological conditions that influence salmon populations. They share and incorporate these data into salmon survival and abundance forecasts that are used by ADFG's fisheries management biologists to set escapement and harvest goals, and shape regulations in accordance. This process is consistent with Alaska's Policy for the Management of Sustainable Salmon Fisheries[233], which explicitly recognizes and accounts for the influence of variable environmental conditions on Alaska's salmon stocks. This policy states that "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". The Policy further states that "in formulating fishery management plans designed to achieve maximum or optimum salmon production, the board and department must consider factors including environmental change, habitat loss or degradation, data uncertainty, limited funding for research and management programs, existing harvest patterns, and new fisheries or expanding fisheries".

Current status/Appropriateness/Effectiveness: *There is evidence that assessments have been conducted to determine the impacts of environmental factors on the target and associated or dependent species (to the stock) in the same ecosystems, and on the relationships among these species. The results of these studies are in sufficient detail to allow informed management of the fishery. This requirement is intended to provide information about the current understanding of the overall marine ecosystem structure and relationships among the various species, coupled with environmental monitoring. More information about the effects of the fishery on specific ecosystem components (e.g., associated bycatch and ETPs species interactions, gear-habitat disturbance, ecosystem and food-webs impacts, etc.) are assessed in the following clauses of this section.*	☑

EVIDENCE:

Highly predictive models developed by NOAA to forecast pink salmon harvest incorporate indices of juvenile abundance and sea water temperature, as well as other climatic and oceanographic information[234]. ADFG and NOAA's have similarly developed models that incorporate environmental data, including those collected by the Alaska Ocean Observing System[235], to predict annual returns of Chinook salmon to the Yukon and surrounding region[236] [237]. Sibling models[238] are commonly used to predict returns of Alaska

[233] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[234] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/forecasting-pink-salmon-harvest-southeast-alaska
[235] https://aoos.org/
[236] Mundy *et al.* (2011) http://dev.aoos.org/wp-content/uploads/2012/06/ICES-JMS-Mundy-and-Evenson-2011-Yukon-chinook-timing-full.pdf
[237] https://aoos.org/2019-run-timing-outlook-and-forecast-summary-chinook-salmon-yukon-river-delta/
[238] Haeseker *et al.* (2007) https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1577/M06-094.1

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.

sockeye[239, 240] and chum salmon[241]. Private non-profit salmon hatcheries also monitor environmental and biological conditions – such as zooplankton counts - in Alaskan waters to develop harvest forecasts[242] and optimize release timing of juvenile fish.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization assesses the impacts of environmental factors on target and other species belonging to the same ecosystem or associated with or dependent upon the target species, and the relationship among the populations in the ecosystem. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
Salmon harvest forecasts that utilize extensive biological, oceanographic and other environmental data are regularly posted online and updated by NOAA[243] and ADFG[244]. This information is readily available to managers and the public.

References:	Haeseker, S. L., Dorner, B., Peterman, R. M., & Su, Z. (2007). An improved sibling model for forecasting chum salmon and sockeye salmon abundance. North American Journal of Fisheries Management, 27(2), 634-642. Mundy, P. R., & Evenson, D. F. (2011). Environmental controls of phenology of high-latitude Chinook salmon populations of the Yukon River, North America, with application to fishery management. ICES Journal of Marine Science, 68(6), 1155-1164.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**10**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[239] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1125252246.pdf
[240] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1007623443.pdf
[241] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonforecast
[242] http://www.dipac.net/forecasts
[243] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/forecasting-pink-salmon-harvest-southeast-alaska
[244] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonforecast

Supporting Clause 12.2.

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. This may take the form of an immediate management response or a further analysis of the identified risk. In this context, full consideration should be given to the special circumstances and requirements in developing fisheries, including financial and technical assistance, technology transfer, training, and scientific cooperation. In the absence of specific information on the ecosystem impacts of fishing on the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.** **Note.** Clause 12.2 is a non-scoring clause with no associated Evaluation Parameters.

Supporting Clause 12.2.1.

12.2.1.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on main associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of nontarget fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑

EVIDENCE:

While other fish species may occasionally be bycaught in salmon fisheries including lingcod, various rockfish species and dogfish, the most probable adverse impacts to species associated with Alaska commercial salmon fisheries involve catch of non-target salmon stocks, which are reported to the State through the Fish Tickets or eLandings reporting systems[245, 246]. Individual fish ticket information, Commercial Operator's Annual Report (COAR) data, customized processor and buyer listings and historical catch and production is available upon request from ADF&G.[247] Interactions between Alaska's commercial salmon fisheries with marine mammals and birds have been recorded by NOAA's Alaska Marine Mammal Observer Program[248], which has published a series of reports documenting relatively rare mortalities and injuries from net entanglements. These reports have also identified factors that appear to increase or decrease such interactions, and are readily available online[249 250 251 252].

[245] http://www.adfg.alaska.gov/static/license/fishing/pdfs/salmon_troll_elanding_bycatch_2016.pdf
[246] https://www.adfg.alaska.gov/static/license/fishing/pdfs/elanding_codes.pdf
[247] https://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests
[248] https://www.fisheries.noaa.gov/alaska/fisheries-observers/alaska-marine-mammal-observer-program
[249] https://www.fisheries.noaa.gov/resource/document/incidental-take-and-interactions-marine-mammals-and-birds-yakutat-salmon-setnet
[250] https://www.fisheries.noaa.gov/resource/document/incidental-takes-and-interactions-marine-mammals-and-birds-districts-6-7-and-8
[251] https://www.fisheries.noaa.gov/resource/document/incidental-take-and-interactions-marine-mammals-and-birds-kodiak-island-salmon
[252] https://www.fisheries.noaa.gov/resource/document/incidental-catch-and-interactions-marine-mammals-and-birds-cook-inlet-salmon

12.2.1.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on main associated species (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

The health of (non-target) Alaskan salmon stocks, which are the most probable species to be impacted incidentally by commercial salmon fisheries, are monitored through surveys of adult escapement. ADFG uses aerial surveys, tower counts, sonar counts, and mark-recapture studies to collect escapement data, and adjusts harvest efforts to protect stocks of concern. Importantly, escapement must be sufficient to support sustained yield, as mandated by Alaska's Policy for the Management of Sustainable Salmon Fisheries (MSSF), which states that,

"Management of salmon fisheries by the State of Alaska should be based on the following principles and criteria:

1. Wild salmon stocks and their habitats should be maintained at levels of resource productivity that assure sustained yields.
2. Fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning.
3. Effective salmon 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 shall be sought and encouraged.
5. In the face of uncertainty, salmon stocks, fisheries, artificial propagation and essential habitats shall be managed conservatively."

The Policy for MSSF directs ADF&G to report to the Alaska Board of Fisheries on the status of salmon stocks and identify those that are of yield, management or conservation concern.[253]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on main associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these nontarget species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

Impacts to non-target salmon species are recorded through Fish Tickets (troll fisheries), eLandings, NOAA Fishery Observer Program reports, all either available online or by request, as described above.

References:						
Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						

[253] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks

Supporting Clause 12.2.2.

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on minor associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations (proxies), then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑
EVIDENCE: As for major associated species (see SC 12.2.1), all discards and bycatch of minor salmon species in Alaska commercial salmon fisheries are recorded through eLandings and FishTickets. According to the Alaska salmon Fisheries Management Plan, developed by the North Pacific Management Council, NMFS and ADF&G, bycatch of non-target species in Alaska salmon fisheries is negligible. This regulatory document states that "Chinook salmon fisheries in Alaska have some bycatch associated with them. Generally, the numbers of other species taken during directed Chinook fishing is small and not considered a conservation issue. The most important bycatch issue in the commercial and recreational hook-and-line fisheries is the capture of undersized Chinook salmon that must be released." Allowance of groundfish bycatch in troll fisheries is regulated through annual Management Plans.[254]	
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑
EVIDENCE: As for Supporting Clause 12.2.1, see above.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

[254] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon_managementplans

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

EVIDENCE:

Allowable harvest of bycatch in all commercial salmon fisheries is regulated by limits, season, species, region and gear as described in annual fishery management plans[255] and regulations[256]. See additional evidence cited in SC 12.2.1, above. Bycatch data recorded through eLandings and FishTickets are available from ADFG by request[257].

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[255] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon_managementplans
[256] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.salmon#management
[257] https://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.requests

Supporting Clause 12.2.3.

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

Evaluation Parameters	Met?
Process: *There is a process to set outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).*	☑

EVIDENCE:

Although primarily focused on management of salmon fisheries in Federal waters, the Fishery Management Plan for Salmon Fisheries in the EEZ off Alaska[258] states that, "A combination of factors work together to keep both the number of fish taken as bycatch and the associated mortality of those fish at a negligible amount. First, ADF&G fish tickets serve as a standardized reporting method documenting all retained harvest from both state and EEZ waters. ADF&G regulations require that fish tickets record the type of gear used as well as the number, pounds, delivery condition, and disposition of fish species harvested and retained for both commercial and personal use (5 AAC 39.130(c)). Maximum retainable allowances (MRAs) of certain non-salmon allow for bycatch to be treated as incidental catch so that those species are able to be utilized. In addition, non-retention requirements when MRAs are achieved create incentives to avoid those species taken as bycatch. Specified closure areas during those times of the year when bycatch is generally highest serves to significantly reduce the amount of bycatch taken."

This document reiterates ADFG's approach to track incidental catch of non-target species through FishTickets and eLandings records, which it evaluates against allowable catch, as identified through regulations. ADFG adjusts regulations, as necessary, to redirect fishing effort or gear types to reduce bycatch of these non-target species, and evaluates effectiveness of management actions through monitoring of adult escapement (in context of escapement goals).

Current status/Appropriateness/Effectiveness: *There is evidence that outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible) have been achieved. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

Management plans for Alaska's commercial salmon fisheries include goals and measures to minimize incidental take of non-target species, particularly salmon stocks of concern. For example, the 2019 Southeast Alaska Drift Gillnet Fishery Management Plan[259] states,

- "The [Pacific Salmon Treaty] PST requires the harvest of natural stocks of chum salmon returning to Portland Canal streams be minimized to ensure adequate escapement of these stocks. As a result, no fishing should be expected in Section 1-A for Portland Canal chum salmon."
- "Management goals for the District 6 and District 8 drift gillnet fisheries for the 2019 season are as follows:
  1. Achieve Chinook salmon escapement goals;
  2. Achieve the Stikine River sockeye salmon escapement goals while harvesting the Alaska share of Stikine River sockeye salmon;
  3. Achieve sustainable spawning escapements of sockeye salmon in local Alaska systems;
  4. Achieve pink salmon spawning escapement objectives in Districts 6 and 8;
  5. Manage the District 6 and District 8 drift gillnet fisheries consistent with the provisions of the PST;
  6. Manage the directed Stikine River Chinook salmon drift gillnet fishery in accordance to the District 8 King Salmon Management Plan(5 AAC 33.368) and associated closed water regulations (5 AAC 33.350 (i)(3-9))."

[258] https://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP.pdf
[259] https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.03.pdf

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

Commercial salmon management plans for other regions and gear types include similar escapement and conservation goals associated with incidental catch of non-target species. Escapement goals and estimates of escapement, the latter serving as an outcome indicator, are regularly reported and periodically summarized by ADFG[260].

As recent example of responsiveness to underperformance of several Chinook salmon stocks of concern (relative to escapement goals), ADFG implemented new regulations in 2019 to reduce incidental catch of these stocks, closing multiple areas to commercial troll, purse seine and gillnet fisheries.[261]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible). Examples may include fishery management reports, and stock or ecosystems assessment reports.*	☑

EVIDENCE:

Wild escapement of adult salmon, particularly for stocks of concern, represents an appropriate outcome indicator for management actions aimed to minimize impacts from Alaska's commercial salmon fisheries on the most vulnerable non-target species and stocks. Escapement goals are published by ADFG[262], and fishery management plans outline goals and regulations to minimize incidental catch of non-target species and stocks. These management plans are produced and published online annually by ADFG for commercial salmon fisheries in the Westward[263], Southeast[264], Central[265], and Arctic-Yukon-Kuskokwim[266] regions.

ADFG also publishes bycatch limits for groundfish[267] and lingcod[268] taken through Alaska commercial salmon fisheries, and monitors catch of these species through FishTickets and eLandings.

References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–**	**(** **0**	**x**	**3**	**)** =	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[260] https://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[261] https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1020850172.pdf
[262] https://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[263] https://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southwest
[264] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon_managementplans
[265] https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon_managementplans
[266] https://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.interior
[267] https://www.adfg.alaska.gov/static-f/applications/dcfnewsrelease/1131363858.pdf
[268] https://www.adfg.alaska.gov/static-f/applications/dcfnewsrelease/1131293727.pdf

Supporting Clause 12.2.4.

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on ETP species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑

EVIDENCE:

The State of Alaska, Department of Fish and Game (ADFG) is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the Commissioner of ADFG determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened. The State Endangered Species List currently includes two birds (short-tailed albatross and eskimo curlew) and three marine mammals (blue whale, humpback whale, and right whale). Additionally, two federal agencies, the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), are responsible for maintaining lists of species that meet the definition of threatened or endangered under the U.S. Endangered Species Act of 1973[269]. NMFS is responsible for maintaining the list for most marine species and managing those species once they are listed. The U.S. Fish and Wildlife Service (USFWS) is responsible for maintaining the list for terrestrial and freshwater species, as well as three marine mammal species (polar bear, Pacific walrus, and sea otter), and for managing those species once they are listed. NMFS and USFWS must determine if any species is endangered because of any of the following factors:

- The present or threatened destruction, modification, or curtailment of its habitat of range;
- Overutilization for commercial, recreational, scientific, or educational purposes;
- Disease or predation;
- The inadequacy of existing regulatory mechanisms; or
- Other natural or manmade factors affecting its continued existence.

Serious fisheries interactions with marine mammals (including ETP species) must be reported to NOAA Fisheries in accordance with the Marine Mammal Protection Act[270]. The USFWS tracks the status and identifies threats to listed seabirds[271].

Net entanglements associated with Alaska's commercial salmon fisheries represent a potential threat to listed species. However, interactions between commercial salmon fisheries with endangered, threatened or protected marine mammal species are generally rare in Alaska, as evidenced through entanglement reports[272] and stock assessments[273]. Entanglements with listed seabirds are also rare in salmon fisheries, according to accounts provided at a December 11, 2019 workshop held in Anchorage, Alaska, that involved commercial salmon fishermen, state and federal biologists, seabird advocacy representatives and this Assessment Team.

[269] https://www.fisheries.noaa.gov/topic/laws-policies#endangered-species-act
[270] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act
[271] https://www.fws.gov/alaska/pages/endangered-species
[272] https://seagrant.oregonstate.edu/sites/seagrant.oregonstate.edu/files/wcr_2018_entanglement_report_508.pdf
[273] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

Commercial salmon fisheries are not mentioned among primary threats to Steller's eider[274], spectacled eider[275], short-tailed albatross[276] or eskimo curlew[277]. Nevertheless, NOAA Fisheries does provide guidance to reduce seabird bycatch for other fisheries that may impact these species[278] [279], and continues to pursue technologies that show promise to reduce seabird bycatch[280].

Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species (e.g. negatively impacting rebuilding efforts), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these impacts are monitored and do not impede, slow, or reduce likelihood of recovery of the species to target levels (or other planned outcomes). If such impacts arise, effective remedial actions are taken.*	☑

EVIDENCE:

In accordance with the Marine Mammal Protection Act (MMPA), serious fisheries interactions with marine mammals[281], including ETP species, must be recorded and reported to NOAA Fisheries, which regularly prepares and publishes stock assessment reports for marine mammals[282]. From these reports, no impacts from Alaska's commercial salmon fisheries to blue whales have been reported. But in 2012 and 2015, one humpback whale was killed and another injured in Kodiak Island salmon purse seine and gillnet fisheries, respectively. Based on these reports and other information, NOAA Fisheries classifies Alaska's commercial salmon and other fisheries with respect to impact on marine mammals to determine whether a "take reduction plan" is required under the MMPA. Three categories are recognized:

- Category I: Annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50 percent of the potential biological removal (PBR) level[283] (i.e., frequent incidental mortality and serious injury of marine mammals).
- Category II: Annual mortality and serious injury of a stock in a given fishery is greater than 1 percent and less than 50 percent of the PBR level (i.e., occasional incidental mortality and serious injury of marine mammals).
- Category III: Annual mortality and serious injury of a stock in a given fishery is less than or equal to 1 percent of the PBR level (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

Most Alaskan commercial salmon fisheries are classified as Category III (lowest impact), though many gillnet fisheries are listed as Category II with rare or occasional impacts to sea otters and humpback whales[284]. Owners of vessels or gear engaging in a Category I or II fishery are required under the MMPA (16 U.S.C. 1387(c)(2)), as described in 50 CFR 229.4, to register with NMFS and obtain a marine mammal authorization to lawfully take non-endangered and non-threatened marine mammals incidental to commercial fishing operations. Owners of vessels or gear engaged in a Category III fishery are not required to register with NMFS or obtain a marine mammal authorization, as they are recognized to experience low incidence of interaction with marine mammals species.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action are taken. Examples may include various stock and ecosystems assessment reports.*	☑

[274] https://www.fws.gov/alaska/pages/endangered-species/stellers-eider
[275] https://www.fws.gov/alaska/pages/endangered-species/spectacled-eider
[276] https://www.fws.gov/alaska/pages/endangered-species/short-tailed-albatross
[277] https://www.fws.gov/alaska/pages/endangered-species/eskimo-curlew
[278] https://www.fisheries.noaa.gov/alaska/bycatch/alaska-regulations-seabird-avoidance-and-listed-seabirds
[279] https://www.fisheries.noaa.gov/alaska/bycatch/seabird-avoidance-gear-and-methods
[280] https://www.fisheries.noaa.gov/national/bycatch/bycatch-reduction-engineering-program
[281] https://www.fisheries.noaa.gov/webdam/download/64668195
[282] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock
[283] The PBR level is the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (See section 118 of MMPA).
[284] https://www.federalregister.gov/documents/2019/10/10/2019-22007/list-of-fisheries-for-2020

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

EVIDENCE:

Marine mammal stock assessments[285], MMPA PBR classifications of U.S. fisheries[286], and the USFWS's Alaska Region Endangered Species Program[287] collectively provide substantial evidence documenting the generally low level of impact that Alaska's commercial salmon fisheries have on ETP species. Where negative interactions have occurred measures have been taken to minimize future impacts.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[285] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock
[286] https://www.federalregister.gov/documents/2019/10/10/2019-22007/list-of-fisheries-for-2020
[287] https://www.fws.gov/alaska/pages/endangered-species

Supporting Clause 12.2.5.

12.2.5.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process in place that allowing creation of effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.*	☑

EVIDENCE:

NOAA Fisheries set limits for allowable incidental take of marine mammals, and requires that all Category I and II fisheries (see Supporting Clause 12.2.4) report serious interactions with marine mammals. In general, the MMPA prohibits killing or injuring marine mammals except under certain circumstances. For example, it provides an annual exemption for accidentally killing or injuring marine mammals—referred to as incidental take—during commercial fishing operations. However, this exemption does not include marine mammal stocks listed as endangered or threatened under the ESA. To address incidental take of ETP and other marine mammal species, NOAA Fisheries has developed Take Reduction Plans and Teams to develop goals and means to reduce impacts from fisheries[288].

With respect to ETP bird species in Alaskan waters, the Steller's eider is found only in Southwest Alaska (Yukon, Kuskokwim, Alaska Peninsula and Bristol Bay areas); spectacled eiders are found in the central Bering Sea, south of St. Lawrence Island, where they remain until March or April, then migrate to Norton Sound during molting period; and short-tailed albatross are found throughout offshore areas of the Bering Sea and Gulf of Alaska and occasionally in waters of the Alaska Peninsula, and Kodiak Island. Assessments based on available data do not indicate frequent encounters with or associated mortality from Alaska's commercial salmon fisheries. Accordingly, the USFWS does not require any Alaska salmon fishery to maintain incidental take permits for these species, nor do the recovery plans require or recommend any mitigating actions by salmon fisheries where these seabirds occur.

Current status/Appropriateness/Effectiveness: *There is evidence for established outcome indicators (e.g., in a fishery management plan or other regulation) seeking to ensure that ETP species are protected (through States or international regulations) from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Overall, fishing activity does not impede, slow, or reduce likelihood of recovery of the species to target levels or other planned outcomes. Management objectives shall be achieved accordingly. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

See above and Supporting Clause 12.2.4

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, or stock and ecosystems assessment reports.*	☑

EVIDENCE:

See above and Supporting Clause 12.2.4.

[288] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams

12.2.5.	There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 12.2.6.

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on habitats. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑
EVIDENCE: Alaska's Policy for Management of Sustainable Salmon Fisheries[289] states that "all essential salmon habitat in marine, estuarine, and freshwater ecosystems and access of salmon to these habitats should be protected; essential habitats include spawning and incubation areas, freshwater rearing areas, estuarine and nearshore rearing areas, offshore rearing areas, and migratory pathways". In general, gear and methods used in Alaska's commercial salmon fisheries have little or no impact on salmon habitat, as fishing gear typically do not come in contact with substrate and are frequently removed from the water column in accordance with the regulated timing of fisheries and environmental conditions (i.e. tides).	
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, if these impacts are likely to be irreversible or very slowly reversible, effective remedial action is taken (please see Appendix 1 part 5, noting specifically the 3 habitat assessment elements, and part 7 for cumulative effects evaluation). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑
EVIDENCE: Given the low impact posed by commercial salmon fisheries to sensitive, benthic habitat (as salmon fishing gear typically does not come into contact with the seafloor), habitat impact monitoring and mitigation measures are generally not relevant to Alaska's commercial salmon fisheries.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑
EVIDENCE: Citing the Fishery Management Plan for Salmon Fisheries in the EEZ off Alaska[290], "No evidence suggests salmon troll, drift gillnet, or purse seine gear impacts habitat. The activity targets only adult salmon in the water column, successfully avoiding any significant	

[289] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[290] https://www.fisheries.noaa.gov/management-plan/alaska-salmon-fisheries-management-plan

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**
disturbance of the benthos, substrate, or intertidal habitat. The EEZ salmon fisheries do not occur in any areas designated as Habitat Areas of Particular Concern."	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 12.2.7.

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

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the potential impacts of the fishery upon habitats essential to the stock under consideration and on habitats that are highly vulnerable to damage are identified. This or a similar mechanism shall also be in place to identify habitats that are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives related to avoiding significant adverse impacts on habitats. The knowledge of the habitats in question can therefore include relevant traditional, fisher, or community knowledge, provided its validity can be objectively verified (i.e., the knowledge has been collected and analysed though a systematic, objective, and well-designed process, and is not just hearsay). When identifying highly vulnerable habitats, their value to ETP species shall be considered, with habitats essential to ETP species being categorized accordingly.*	☑

EVIDENCE:

Essential fish habitats (EFHs) for salmon in Alaska's marine and intertidal waters have been designated and are identified in the Fishery Management Plan (FMP) for Salmon Fisheries in the EEZ off Alaska[291]. ADFG maintains a Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes[292], that includes freshwater habitats that are essential to the persistence of various salmon species targeted by the commercial fisheries. According to the FMP, there is "no evidence suggests salmon troll, drift gillnet, or purse seine gear impacts habitat. The activity targets only adult salmon in the water column, successfully avoiding any significant disturbance of the benthos, substrate, or intertidal habitat." And while commercial salmon fisheries are generally excluded from freshwater habitats, in many cases, hatcheries that enhance harvest by these fisheries do occur along freshwater habitats. Appropriately, construction and continued operation of salmon hatcheries in Alaska involves a strict approval and permitting process[293], administrated by ADFG, that explicitly considers and aims to limit hatchery impacts to surrounding habitats.

Current status/Appropriateness/Effectiveness: *Successful management measures have been developed and are in place to achieve the objectives described in the process parameter.*	☑

EVIDENCE:

Approved gear used in Alaska commercial salmon fisheries has little-to-no impact on essential habitats, and hatcheries that enhance these fisheries are subject to a strict permitting process administrated by ADFG that considers and mitigates potential habitat impacts. These approaches appear to be appropriate and effective at limiting significant habitat impacts from Alaska's commercial salmon fisheries.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is knowledge of the essential habitats for the stock under consideration and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered, not just the part of the spatial range that is potentially affected by fishing. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:

NOAA Fisheries has clearly defined Essential Fish Habitat for salmon in Alaska's marine and estuarine environments[294], and ADFG maintains a catalog of freshwater habitats used by anadromous fishes[295]. These resources are used by state and federal managers

[291] https://www.fisheries.noaa.gov/management-plan/alaska-salmon-fisheries-management-plan
[292] https://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=main.home
[293] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery
[294] https://www.fisheries.noaa.gov/alaska/habitat-conservation/essential-fish-habitat-efh-alaska
[295] https://www.adfg.alaska.gov/sf/SARR/AWC/

12.2.7.	**There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.**
to limit and prevent serious impacts to salmon habitat in Alaska, all in accordance mandates specified in Alaska's Policy for the Management of Sustainable Salmon Fisheries. See above and in Supporting Clause 12.2.6 for references to additional evidence.	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 12.2.8.

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

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.*	☑
EVIDENCE: See Supporting Clauses 12.2.6, 12.2.7 and evidence cited therein.	
Current status/Appropriateness/Effectiveness: *Successful outcome indicators and management measures have been developed and are in place to achieve the objectives described in the process parameter.*	☑
EVIDENCE: See Supporting Clauses 12.2.6, 12.2.7 and evidence cited therein.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. Examples may include various regulations, data, and reports.*	☑
EVIDENCE: See Supporting Clauses 12.2.6, 12.2.7 and evidence cited therein.	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 12.2.9.

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑
EVIDENCE: 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"[296]. In accordance with this policy, ADFG establishes escapement goals for major salmon populations throughout their spawning distribution, and monitors actual escapement through aerial surveys, sonar-based counts and other methodologies[297]. Alaska's commercial salmon fisheries are enhanced through the production of hatchery fish[298]. Hatchery Permits are required for the construction and/or operation of a private nonprofit (PNP) salmon hatchery in Alaska. Hatchery permits specify the species and number of salmon than can be incubated at the hatchery, as well as the number released, release sites, broodstock sources, and other conditions of operation. ADFG considers requests for increased hatchery production by asking if an increase can be managed with consideration of potential risks to wild stocks, and ADFG administrates and conducts research to address such uncertainties[299]. At the federal level, NOAA Fisheries conducts research to aid state and federal fishery managers in making informed science-based decisions to help sustain fish populations, fisheries, and fishing communities in accordance with the NOAA's Alaska Fisheries Science Center's Science Plan and the NOAA Annual Guidance Memo. NOAA marine ecosystem monitoring is conducted in several regions, including the Eastern Bering Sea, the Gulf of Alaska, the Arctic and Aleutian Islands. Their research findings contribute to the Alaska Marine Ecosystem Status report[300], which summarizes and synthesizes historical and possible future effects of climate and fishing on large marine ecosystems.	
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on the ecosystem (e.g. food-webs effects), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these impacts are likely to be irreversible or very slowly reversible; or effective remedial action shall be taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. There are policies in place (e.g., harvest control rules) that are effective at protecting ecosystem functioning and accounting for species' ecological role, and precautionary and effective spatial management is used (e.g., to protect spawning areas, prevent localized depletion, and protect important foraging areas for predators of fished species) if applicable.*	☑

[296] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[297] http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[298] https://www.adfg.alaska.gov/static-f/fishing/PDFs/hatcheries/2013_ak_hatcheries.pdf
[299] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main
[300] https://www.fisheries.noaa.gov/resource/data/alaska-marine-ecosystem-status-reports-archive

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

EVIDENCE:

ADFG evaluates the effects of Alaska's commercial salmon fisheries and associated enhancement activities on ecosystem function in several ways. First and foremost, surveys are conducted regularly to monitor the escapement of naturally spawning salmon populations. Where escapment goals are chronically not met, salmon stocks are recognized to be of concern and are protected by the State [301]. Potential for sockeye salmon productivity in westward region lakes, including those of Kodiak and Afognak islands, is monitored by ADFG's Limnology Laboratory, providing managers with valuable information relevant to harvest, escapement and juvenile carrying capacity. The Kodiak Island Limnology Laboratory[302] also provides water quality and stocking recommendations to salmon hatcheries throughout the state. Hatchery production of juvenile salmon is regulated through a permitting process administrated by ADFG, which also conducts research to evaluate potential ecological and genetic impacts from stray hatchery salmon on wild populations and associated ecosystems[303].

Current status/Appropriateness/Effectiveness: *The bait used to capture the stock under consideration shall not be formally classified as ETP species (by Alaska or other international designations), and the fishery under consideration does not hinder recovery or rebuilding of overfished species that are not formally classified as ETP species and used as bait.*	☑

EVIDENCE:

ADFG and NOAA Fisheries regularly evaluate impacts from Alaska's commercial salmon fisheries on associated species and ecosystems. As described in Supporting Clauses 12.2.1-12.2.3, bycatch in Alaska's commercial salmon fisheries is notably low and rarely involves ETP species. Similarly, bait used in commercial salmon troll fisheries is typically herring or anchovy species, which are not listed as threatened or endangered.

Recently, a number of authors have documented correlations between pink salmon abundance and population trends in other species[304] [305] [306] [307]. Several of these studies suggest that pink salmon, a species whose abundance varies drastically between odd and even years, may outcompete other species for prey during years of high abundance and drive trophic cascades across broad ecosystems. Fisheries managers in Alaska consider these findings, but also appear to recognize that hatchery produced pink salmon represent a relatively small fraction of the total species' biomass in the North Pacific Ocean and that even strong correlations cannot conclusively establish causality. As stated by Evenson et al. (2018)[308] in an ADFG Special Publication,

"Although it is possible that hatchery production of salmon could be associated with density-dependent effects, much of the support consists of correlation of some measured effect with salmon numbers or biomass. Generally, the mechanism or connections are posited, but not demonstrated. Given the complexity of the North Pacific Ocean ecosystem and the life history of Pacific salmon, a variety of environmental factors influence salmon growth and productivity, such as prey density, prey distribution, prey quality, inter- and intraspecies interactions (including nonsalmonid fishes, marine mammals, and seabirds), and water temperature. It is likely that there is no single cause for observed changes in salmon growth and productivity—including hatchery production. Differentiating relative effects of various contributing factors in the North Pacific Ocean is difficult. This ambiguity is made even more evident when reviewing the body of literature on density-dependent effects. It is not yet clearly demonstrated how and to what extent density-dependent interactions occur among populations of salmon in the North Pacific Ocean, whether they are always present or occur only under specific combinations of events, and whether these interactions are responsible for the observed declines in salmon size and weight. There are also myriad other factors that potentially influence salmon production, from fine scale nearshore environment effects to macro-scale climate change effects."

[301] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks
[302] https://www.adfg.alaska.gov/index.cfm?adfg=fishinglimnologylab.main
[303] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main
[304] Estes (2014) https://www.pnas.org/content/111/18/6534
[305] Springer *et al.* (2014) https://www.pnas.org/content/111/18/E1880
[306] Springer *et al.* (2018) https://www.pnas.org/content/115/22/E5038.short
[307] Ruggerone *et al.* (2019) https://www.int-res.com/abstracts/meps/v608/p291-296
[308] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

Evidence Basis:	
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.	☑

EVIDENCE:

Ecosystem reports, which include considerations of the condition and abundance of salmon in marine environments, and effects from commercial fisheries, are regularly published by NOAA Fisheries for the Eastern Bering Sea[309], Aleutian Islands[310], Gulf of Alaska[311] and Arctic[312] regions. ADFG also regularly publishes information regarding the role of salmon, salmon enhancement and effects of commercial fisheries on natural ecosystems[313].

References:	Estes, J. A. (2014). Salmon, seabirds, and ecosystem dynamics. Proceedings of the National Academy of Sciences, 111(18), 6534-6535. Ruggerone, G. T., Springer, A. M., Shaul, L. D., & van Vliet, G. B. (2019). Unprecedented biennial pattern of birth and mortality in an endangered apex predator, the southern resident killer whale, in the eastern North Pacific Ocean. *Marine Ecology Progress Series*, *608*, 291-296. Springer, A. M., van Vliet, G. B., Bool, N., Crowley, M., Fullagar, P., Lea, M. A., ... & Woehler, E. J. (2018). Transhemispheric ecosystem disservices of pink salmon in a Pacific Ocean macrosystem. Proceedings of the National Academy of Sciences, 115(22), E5038-E5045. Springer, A. M., & van Vliet, G. B. (2014). Climate change, pink salmon, and the nexus between bottom-up and top-down forcing in the subarctic Pacific Ocean and Bering Sea. Proceedings of the National Academy of Sciences, 111(18), E1880-E1888.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[309] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2019EBSecosys.pdf
[310] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2018ecosysAI-508.pdf
[311] https://access.afsc.noaa.gov/REFM/REEM/ecoweb/pdf/2019GOAecosys.pdf
[312] https://archive.fisheries.noaa.gov/afsc/REFM/Docs/2015/ecosystem.pdf#nameddest=Arctic
[313] https://www.adfg.alaska.gov/index.cfm?adfg=afrb.salmon

Supporting Clause 12.2.10.

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

Evaluation Parameters	**Met?**
Process: *There is a process to allow for drafting effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. There is also a process that states modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.*	☑

EVIDENCE:

Regular ecosystem status reports, developed by NOAA Fisheries, include baseline metrics of ecosystem health in Alaska's marine environments. These reports are published and readily available online[314].

ADFG considers the role of salmon in natural ecosystems, including aquatic environments, and measures trends of abundance through annual estimates of spawner escapement, as directed through Alaska's Policy for the Management of Sustainable Salmon Fisheries.

Through its hatchery research programs[315] and hatchery permitting process[316], ADFG evaluates and conducts management to limit the effects that fisheries enhancement activities (i.e. hatchery production) has on natural ecosystems. Recent research of hatchery effects on natural ecosystems has investigated rates of straying and genetic introgression from hatchery salmon[317]. Alaska's Finfish Genetics Policy[318] establishes that:

- *"Gene flow from hatchery fish straying and intermingling with wild stocks may have significant detrimental effects on wild stocks. First priority will be given to protection of wild stocks from possible harmful interactions with introduced stocks. Stocks cannot be introduced where the introduced stock may have significant interactions or impact on significant or unique wild stocks."*

Current status/Appropriateness/Effectiveness: *There is evidence for outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

The combined effort by ADFG and NOAA Fisheries to 1) monitor the status of marine ecosystems 2) estimate annual spawner escapement 3) regulate hatchery construction and operation through an annual permitting process and 4) evaluate the potential genetic and ecological impact from stray hatchery fish on natural systems provides substantial evidence that managers have established clear outcome indicators for their management objectives that seek to minimize adverse impacts from commercial salmon fisheries (and associated enhancement) to marine and aquatic ecosystems.

[314] https://www.fisheries.noaa.gov/resource/data/alaska-marine-ecosystem-status-reports-archive
[315] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main
[316] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery
[317] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research
[318] http://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

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

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
As cited above, marine ecosystem status reports are published regularly by NOAA Fisheries and ADFG regularly reports on salmon escapement estimates, hatchery operations and research investigating interactions between hatchery and wild salmon in Alaska.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Supporting Clause 12.2.11.

12.2.11.	**The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.*	☑

EVIDENCE:

In Alaska, human impacts on salmon stocks most likely arise through effects from harvest and hatcheries, as salmon habitat in Alaska is by-in-large abundant and pristine.

Alaska's Policy for the Management of Sustainable Salmon Fisheries[319] accounts for potential impacts from harvest and hatcheries, making the following key statements to direct appropriate monitoring and management (excerpted from 5 AAC 39.222):

- "effects and interactions of introduced or enhanced salmon stocks on wild salmon stocks should be assessed; wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts";
- "depleted salmon stocks should be allowed to recover or, where appropriate, should be actively restored; diversity should be maintained to the maximum extent possible, at the genetic, population, species, and ecosystem levels";
- "salmon fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning as follows";
- "impacts of fishing, including incidental mortality and other human-induced mortality, should be assessed and considered in harvest management decisions";
- "salmon abundance trends should be monitored and considered in harvest management decisions";

Regular estimates of salmon escapement are published by ADFG[320] and compared to escapement goals[321] for each population to 1) identify stocks of concern and 2) adjust harvest regulations as necessary to protect such stocks, all in accordance with overarching policy to manage potential negative effects from overharvest.

Negative effects from hatcheries are managed through ADFG's permitting process for the construction and operation of these facilities. ADFG's salmon hatchery permitting process includes the following:

- an analysis of the possible effects the hatchery would have on fisheries management
- submission of an application providing detailed information on the proposed hatchery
- review of the application by department technical staff
- regional planning team review of the hatchery's compatibility with the regional salmon plan
- a public hearing presenting the plans for the proposed hatchery
- commissioner approval or denial of the hatchery permit

Moreover, Hatchery Permits always carry conditions to protect fish health and wild salmon stocks, such as requiring ADFG approval of broodstock sources and release sites, and inspection of salmon before release. These hatchery permitting requirements are intended to limit negative effects of hatcheries on wild salmon and neighboring hatcheries, and are supported by Alaska Statutes AS16.10.375 – 16.10.480 and 5 AAC 40.005 – 40.990.

[319] https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[320] https://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[321] https://www.adfg.alaska.gov/index.cfm%3Fadfg%3Dsonar.escapementgoals

12.2.11.	**The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse human impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge. Accordingly, these impacts are likely to be irreversible or very slowly reversible; if so, effective remedial action shall be taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:
Spawner surveys and other methods are regularly used to estimate escapement from fisheries in Alaska, and these data are published regularly by ADFG (cited above) to ensure responsible management and protection from overharvest. With respect to potential effects from hatcheries, ADFG maintains a strict planning and permitting process, and recently reviewed the effectiveness of this process to protect wild salmon stocks.[322]

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
As described above, ADFG regularly publishes salmon escapement estimates and uses this information in the development of regulations to ensure responsible management and protection of salmon from overharvest. ADFG also administrates salmon hatchery planning and permitting processes, and reviewed the effectiveness of this process to protect wild salmon stocks.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)** =	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[322] https://www.adfg.state.ak.us/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf

Supporting Clause 12.3.

12.3.	**The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species[323] in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the role of the stock under consideration in the food web is assessed and monitored, and its relative importance as a prey species is determined. If the species is considered by the fisheries management organization to be an important prey species, there shall be specific management objectives relating to minimizing the impacts of the fishery on dependent predators. The FAO Guidelines require that all sources of fishing mortality on the stock under consideration are taken into account (whether or not it is a prey species) in assessing the state of the stock under consideration, including discards, unobserved mortality, incidental mortality, unreported catches, and catches in other fisheries.*	☑

EVIDENCE:
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"; and that "the role of salmon in ecosystem functioning should be evaluated and considered in harvest management decisions and setting of salmon escapement goals" . These directives underscore key principles that are considered in the management of salmon in Alaska.

Current status/Appropriateness/Effectiveness: *Management measures have been developed and are in place to achieve the management objectives described in the process parameter, and there is evidence to demonstrate that they are successful to this end. If the species under assessment is not considered to be a key prey species, then this parameter shall be considered fulfilled.*	☑

EVIDENCE:
Although salmon are depredated in the marine environment (at various life stages) by species that include humpback whales (*Megaptera novaeangliae*), killer whales (*Orcinus orca*), harbor seals (*Phoca vitulina*), salmon sharks (*Lamna ditropis*), double-crested cormorants (*Phalacrocorax auratus*) and other species, salmon are not typically categorized as a key prey for most marine predators.

Yet, of all species listed here, resident killer whales are perhaps most dependent upon salmon as prey. Killer whale abundance in southern Alaska has increased in recent decades, possibly in response to increased salmon production[324], although killer whales prefer Chinook salmon (Adams et al. 2016)[325], which have recently experienced sharp declines in abundance throughout their range. As noted elsewhere in this report, commercial harvest of Chinook salmon has been dramatically curtailed in recent years, which should benefit their non-human predators. But, perhaps ironically, predation by marine mammals may be hindering recovery of Chinook salmon. Chasco et al. (2017)[326] estimated that predation from expanding marine mammal populations has steadily increased the biomass consumption of Chinook salmon over the past 40 years. Quoting from their article in *Nature*, "We find that from 1975 to 2015, biomass of Chinook salmon consumed by pinnipeds and killer whales increased from 6,100 to 15,200 metric tons (from 5 to 31.5 million individual salmon). Though there is variation across the regions in our model, overall, killer whales consume the largest biomass of Chinook salmon, but harbor seals (*Phoca vitulina*) consume the largest number of individuals. The decrease in adult Chinook salmon harvest from 1975–2015 was 16,400 to 9,600 metric tons. Thus, Chinook salmon removals (harvest + consumption) increased in the past 40 years despite catch reductions by fisheries, due to consumption by recovering pinnipeds and endangered killer whales. Long-term management strategies for Chinook salmon will need to consider potential conflicts between rebounding predators or endangered predators and prey."

As noted, harvest of Chinook salmon in Alaska's commercial salmon fisheries has been drastically reduced. However, bycatch of Chinook in some Alaskan groundfish trawl fisheries remains common. In 2010, NOAA Fisheries initiated a program to reduce Chinook

[323] See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.
[324] Matkin *et al.* (2014) https://onlinelibrary.wiley.com/doi/epdf/10.1111/mms.12049
[325] Adams *et al.* (2016) https://www.sciencedirect.com/science/article/pii/S1574954116300383
[326] Chasco *et al.* (2017) https://www.nature.com/articles/s41598-017-14984-8

12.3.	**The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species[323] in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.**

salmon bycatch in trawl fisheries operating in the Bering Sea and Aleutian Islands. This program has continued to develop through time with the goal to limit incidental take of Chinook salmon, while maintaining economically important groundfish trawl fisheries[327]. Salmon bycatch in these fisheries is reported annually[328] and regulated through fisheries management plan amendments.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the role of the stock under consideration in the food web is considered, and if it is a key prey species in the ecosystem, objectives and management measures are in place to avoid severe adverse impacts on dependent predators. Examples may include various stock and ecosystem assessment reports.*	☑

EVIDENCE:

Salmon are widely recognized as important species in the natural foodwebs of Alaska's marine, aquatic and terrestrial ecosystems. Significant management actions have been implemented to limit direct and incidental take of Chinook salmon by Alaska's commercial salmon[329] [330] [331]and groundfish trawl fisheries[332]. These actions have undoubtedly offset harvest impacts to Chinook salmon, which is a preferred prey species of resident killer whales in Alaska. That said, expanding populations of (protected) marine mammals may, at some point, threaten the viability of some Chinook salmon populations that have already been granted protection from fisheries. Such scenarios could generate serious management challenges and difficult decisions in future years[333].

Beyond the marine environment, salmon are sometimes recognized as keystone species in freshwater and riparian habitats, providing food resources to bear, mink, otters, eagles and other species[334] [335]. Their ecological role in these habitats is protected by ADFG through establishment of adult escapement goals, designed to ensure sustainable wild salmon production, which in turn protects the integrity of natural foodwebs.

References:

- Adams, J., Kaplan, I. C., Chasco, B., Marshall, K. N., Acevedo-Gutiérrez, A., & Ward, E. J. (2016). A century of Chinook salmon consumption by marine mammal predators in the Northeast Pacific Ocean. Ecological informatics, 34, 44-51.
- Chasco, B. E., Kaplan, I. C., Thomas, A. C., Acevedo-Gutiérrez, A., Noren, D. P., Ford, M. J., ... & Shelton, A. O. (2017). Competing tradeoffs between increasing marine mammal predation and fisheries harvest of Chinook salmon. Scientific Reports, 7(1), 1-14.
- Helfield, J. M., & Naiman, R. J. (2006). Keystone interactions: salmon and bear in riparian forests of Alaska. Ecosystems, 9(2), 167-180.
- Matkin, C. O., Ward Testa, J., Ellis, G. M., & Saulitis, E. L. (2014). Life history and population dynamics of southern Alaska resident killer whales (Orcinus orca). Marine Mammal Science, 30(2), 460-479.
- Willson, M. F., & Halupka, K. C. (1995). Anadromous fish as keystone species in vertebrate communities. Conservation Biology, 9(3), 489-497.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					

[327] https://www.fisheries.noaa.gov/alaska/bycatch/chinook-salmon-bycatch-management-alaska
[328]https://www.fisheries.noaa.gov/alaska/commercial-fishing/fisheries-catch-and-landings-reports#bsai/goa-groundfish-combined
[329] https://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr&release=2019_04_01
[330] https://www.adfg.alaska.gov/static-f/applications/dcfnewsrelease/1020850172.pdf
[331] https://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr&release=2018_03_29
[332] https://www.fisheries.noaa.gov/alaska/bycatch/chinook-salmon-bycatch-management-alaska
[333] Chasco et al. (2017) https://www.nature.com/articles/s41598-017-14984-8
[334] Helfield & Naiman (2006) https://link.springer.com/article/10.1007/s10021-004-0063-5
[335] Wilson & Halupka (1995) https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1523-1739.1995.09030489.x

Supporting Clause 12.4.

12.4.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a *stock under consideration* that is a key prey species[336].**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species[337]. Mortality in Alaska is usually accounted for all removals of given species. The state and federal fish accounting systems operate in depth and make an explicit effort to document all removals to confirm with regulations in force. The assessors shall ensure that all removals are accounted for in the system (fish ticket, eLandings) for stock assessment and management purposes.*	☑

EVIDENCE:

Harvest of salmon in Alaska is managed on the principle of sustained yield, in accordance with Alaska's Constitution, which states in Article 8 – Natural Resources,

- § 2. General Authority — The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the state, including land and waters, for the maximum benefit of the people.
- § 3. Common Use — Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.
- § 4. Sustained Yield — Fish, forests, wildlife, grasslands, and all other replenishable resources belong to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.
- § 15. No Exclusive Right of Fishery [as amended in 1972 to allow limited entry] — No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the state.

Sustained yield is achieved through the accounting of harvest – through FishTickets and eLandings systems[338] – and its impact on adult escapement, which is estimated annually through aerial surveys, tower counts, sonar and other methods. Escapement goals are set to ensure the continued function of natural ecosystems, including the conservation of dependent predators, in accordance with Alaska's policies for the Management of Sustainable Salmon Fisheries, which states that,

- "(2) salmon fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning as follows
  - (F) salmon escapement and harvest management decisions should be made in a manner that protects non-target salmon stocks or species;
  - (G) the role of salmon in ecosystem functioning should be evaluated and considered in harvest management decisions and setting of salmon escapement goals;"

Collectively, these documents provide a management framework and accounting system that avoids adverse impacts from commercial salmon fisheries to dependent predators.

Current status/Appropriateness/Effectiveness: *There is evidence that outcome indicators and management measures have been developed, are in place, and have succeeded in achieving the objectives described in the process parameter.*	☑

[336] See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.

[337] General harvest guidelines based on Lenfest report: "in fisheries with an intermediate level of information (which will include most well managed forage fisheries), there must be at least 40% of virgin or unfished biomass (B_0) left in the water, and fishing mortality should be no higher than 50% of F_{MSY}. Low information fisheries should leave at least 80% of B_0 in the water. High information fisheries (which have a high information not just on the fished stock, but the full ecosystem), may exceed these reference points if justified by the science, but in no case should fishing mortality exceed 75% of F_{MSY} or biomass fall below 30% of B_0. Link: http://www.lenfestocean.org/~/media/legacy/lenfest/pdfs/littlefishbigimpact_revised_12june12.pdf?la=en.

[338] https://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.reporting

12.4.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a *stock under consideration* that is a key prey species[336].**

EVIDENCE:

NOAA Fisheries conducts regular stock assessments[339] of various salmon predators, including killer whales and Steller sea lions. NOAA Fisheries also conducts research in Southeast Alaska[340] to:

- Understand the early marine ecology and distribution of juvenile salmon and associated species
- Build time series of oceanographic and ecological indices for the coastal waters of Southeast Alaska
- Identify factors affecting salmon productivity (e.g., climate change, prey, abundance, and predators)
- Produce data sets to evaluate hatchery and wild stock interactions, and forecast regional adult salmon returns

This work has improved managers' understanding of the role salmon play in natural ecosystems and foodwebs, both as predators and prey. The status of these natural systems is regularly evaluated by NOAA Fisheries, complimenting the monitoring of adult salmon escapement performed annually by ADFG.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

NOAA Fisheries produces annual Ecosystem Status Reports for Alaska marine ecosystems, and publishes these reports online.[341] Each year, ADFG produces adult salmon escapement estimates and publishes reports of these estimates online.[342]

References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[339] https://repository.library.noaa.gov/view/noaa/20606
[340] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/southeast-alaska-coastal-monitoring
[341] https://www.fisheries.noaa.gov/resource/data/alaska-marine-ecosystem-status-reports-archive
[342] https://www.adfg.alaska.gov/sf/FishCounts/

Supporting Clause 12.5.

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).
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *The appropriate regulations have been implemented.*	☑
EVIDENCE: 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.	
Current status/Appropriateness/Effectiveness: *These regulations and their enforcement are effective and in line with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).*	☑
EVIDENCE: As described above, MARPOL 73/78 is enforced in Alaskan waters, and applies to participants to the commercial salmon fisheries.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State has introduced and enforces 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). Examples may include various regulations, data, and reports.*	☑
EVIDENCE: MARPOL 73/78 is applicable and enforced in Alaskan waters, as described by United States code.[343]	

References:							
Numerical score:	**Starting score**			**Number of EPs NOT met**			**Overall score**
	10	**–**	**(**	**0**	**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[343] https://uscode.house.gov/view.xhtml?path=/prelim@title33/chapter33&edition=prelim

Supporting Clause 12.6.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Research is promoted on the environmental and social impacts of fishing gear and its impacts on biodiversity and coastal fishing communities, as applicable to the fishery.*	☑

EVIDENCE:

Both public and private entities fund or otherwise promote research that investigates social and environmental impacts of fishing gear, and associated impacts on biodiversity and local fishing communities in Alaska. Such entities include the Institute of Social and Economic Research at University of Alaska[344], the Saltonstall-Kennedy Program[345], and the Alaska Fisheries Development Foundation[346].

Current status/Appropriateness/Effectiveness: *There is evidence for this research, and is it considered appropriate for overall fisheries management purposes.*	☑

EVIDENCE:

Alaska boasts a long history of promoting research to evaluate a wide range of environmental and social impacts associated with its commercial salmon fisheries. A common topic among gear-focused studies is the effect of net mesh size on the composition of catch, including works by Swanton and Sagalkin (1997)[347], Muir et al. (1994)[348] and Feddern et al. (2018)[349].

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[350] 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.

Despite high compliance with safety precautions, commercial salmon fishing can be a dangerous occupation. The U.S. Center for Disease Control attributed the highest fatality rate among commercial fisheries in Alaska to salmon gillnet fisheries during years 2010-2014[351], though no fatalities were reported in any sector of Alaska commercial salmon fisheries in the following year[352]. Non-fatal social impacts from salmon fisheries have also been researched. A recent study by Eckert et al. (2018)[353] evaluated health risks experienced by commercial salmon fishermen participating in Bristol Bay gillnet fisheries, and found that they experienced higher prevalence of hearing loss and sleep apnea, likely due to loud working conditions with limited opportunity for sleep. On the other hand, Knapp et al. (2013) demonstrated that sport and commercial salmon fishing in Bristol Bay provide considerable benefits to local communities, by supporting a $1.5 billion industry that ultimately employs nearly 14,000 people[354].

[344] https://www.uaa.alaska.edu/research/institute-social-economic-research/
[345] https://www.fisheries.noaa.gov/content/fy19-successful-saltonstall-kennedy-grant-applicants
[346] https://www.afdf.org/projects/current-projects/social-responsibility/
[347] https://www.adfg.alaska.gov/FedAidPDFs/RIR.4K.1997.55.pdf
[348] https://www.arlis.org/docs/vol1/RIR/76896716.pdf
[349] Fedden *et al.* (2019) https://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2018-0018?mobileUi=0&#.Xi9wYiN7nIU
[350] https://www.afdf.org/wp-content/uploads/Social-Responsibility-on-Vessels-in-Alaska-High-Res-FINAL-2019-03-08-WEB.pdf
[351] https://www.cdc.gov/niosh/docs/2017-171/pdf/2017-171.pdf
[352] https://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=757
[353] Eckert *et al.* (2018) https://www.tandfonline.com/doi/abs/10.1080/1059924X.2018.1425172?journalCode=wagr20
[354] https://iseralaska.org/static/legacy_publication_links/2013_04-TheEconomicImportanceOfTheBristolBaySalmonIndustry.pdf

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 number of recent studies have examined more nuanced social aspects of commercial salmon fisheries in Alaska, including demographic evaluations and studies focused on the socio-economic importance of permit portfolio diversity[355] [356]. As postulated by Beaudreau et al. (2019)[357] in their analyses of commercial fisheries in Alaska, "Heterogeneity in human responses and decision-making can contribute to the resilience of social–ecological systems in the face of environmental, political and economic pressures. In fishery systems worldwide, the ability of harvesters to maintain a diverse portfolio of fishing strategies is important for building adaptive capacity." Their findings speak to the importance of vocational versatility amid an ever-changing fisheries management landscape.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that research is promoted on the environmental and social impacts of fishing gear especially the impact of such gear on biodiversity and coastal fishing communities. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
The studies and participating research entities cited above provide robust evidence of a history of well-supported research within and around Alaska's commercial salmon fisheries, with some emphasis placed on the social and environmental impacts of specific gears used by the fleet.

References:	Feddern, M., Bassett, H. R., McElroy, K. N., Ree, M., Gho, M., & Hilborn, R. (2019). A novel method for modeling age and length selectivity of sockeye salmon as applied to the Bristol Bay Port Moller test fishery. Canadian Journal of Fisheries and Aquatic Sciences, 76(6), 989-997. Eckert, C., Baker, T., & Cherry, D. (2018). Chronic Health Risks in Commercial Fishermen: A Cross-Sectional Analysis from a Small Rural Fishing Village in Alaska. Journal of Agromedicine, 23(2), 176-185.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[355] https://www.sciencedirect.com/science/article/pii/S0308597X18300411
[356] https://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2017-0550#.Xi95PiN7nIU
[357] https://onlinelibrary.wiley.com/doi/epdf/10.1111/faf.12364

Supporting Clause 12.7.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process available for the consideration of MPAs as appropriate, as a tool for management.*	☑
EVIDENCE: The establishment of marine protected areas (MPAs) in Alaska involves public processes with stakeholder input and government oversight at state and federal levels[358] [359] [360].	
Current status/Appropriateness/Effectiveness: *There shall be evidence for the use of MPAs, if appropriate (e.g. if they are employed MPAs as part of suite of management tools), as a tool for effective management with the general objectives of ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.*	☑
EVIDENCE: Alaska hosts an extensive and diverse network of MPAs. According to a recent report[361] by NOAA Fisheries, 95 MPAs have been established in Alaska, covering a total area of 2,737,588 km^2 in four major ecoregions.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization has made use, where appropriate, of MPAs. The objectives of establishing MPAs are ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats. Examples may include various regulations, data, and reports.*	☑
EVIDENCE: A federally curated digital map of MPAs, including those established in Alaska, is available at: https://marineprotectedareas.noaa.gov/dataanalysis/mpainventory/mpaviewer/ A detailed map of MPAs in Alaska(Figure 13), indicating management authority and use restrictions, is included below and can also be viewed here: https://nmsmarineprotectedareas.blob.core.windows.net/marineprotectedareas-prod/media/archive/helpful_resources/inventoryfiles/AK_Map_090831_final.pdf	

[358] https://www.adfg.alaska.gov/index.cfm?adfg=conservationareas.marineprotected
[359] https://nmsmarineprotectedareas.blob.core.windows.net/marineprotectedareas-prod/media/archive/fac/products/fac-arctic-principles-0616.pdf
[360] https://marineprotectedareas.noaa.gov/nationalsystem/
[361] https://www.coris.noaa.gov/activities/mpa_us/

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.**

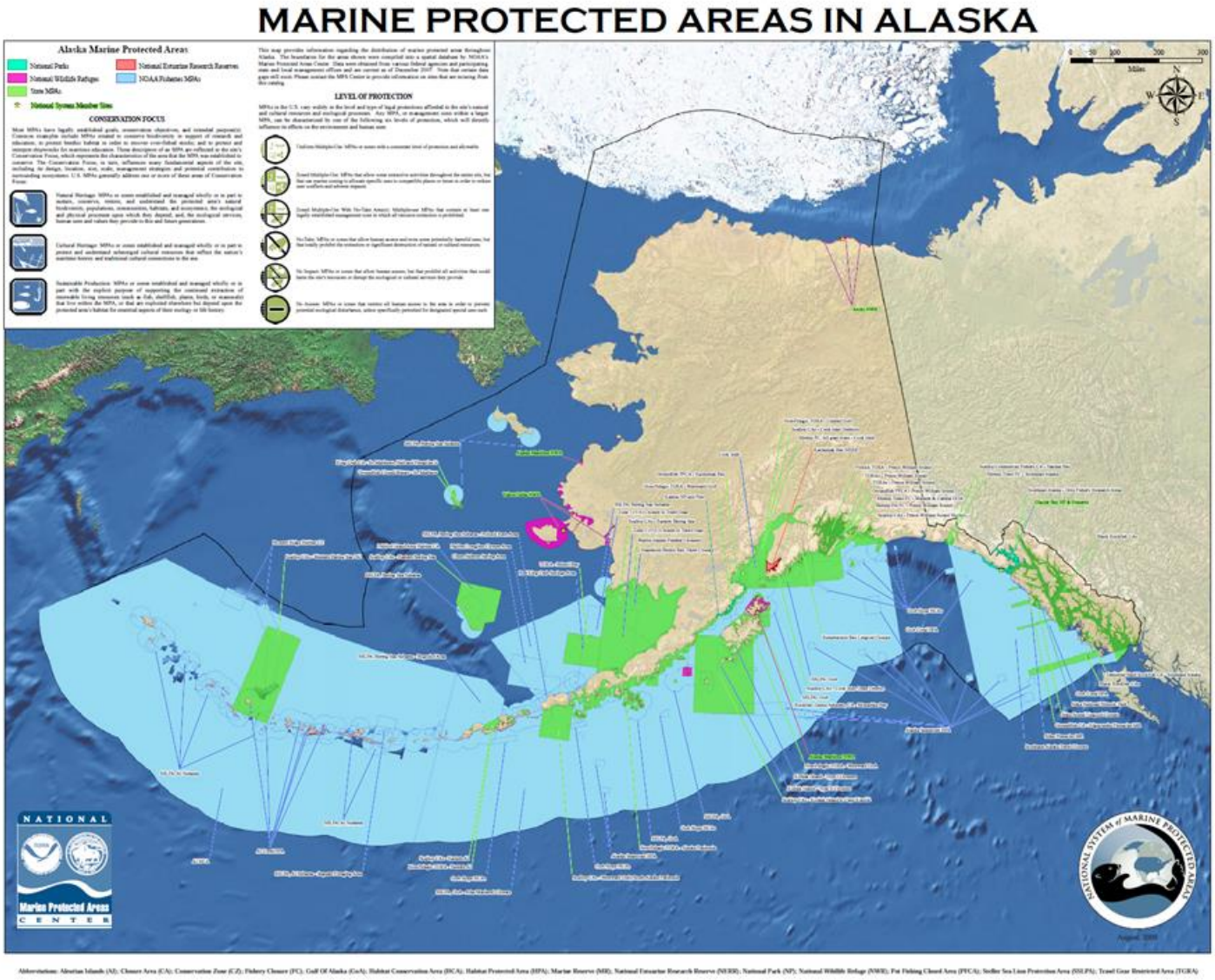

Figure 13. Marine protected Areas in Alaska**.**

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

Fundamental Clause 13. Fisheries enhancement activities (remove if not applicable)

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

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.

Supporting Clause 13.1.

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, based on the best scientific evidence available and/or verifiable and objective traditional, fisher, or community knowledge. Significant uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including culture and enhancement activities. This issue can be addressed by taking a risk assessment/risk management approach.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a high level of evaluation (conducive to proper planning of fisheries enhancement activities), based on the best scientific evidence available , of the effects of fisheries enhancement on genetic diversity and ecosystem integrity.*	☑

EVIDENCE:

Alaska's commercial salmon fisheries harvest both wild- and hatchery-produced fish. Salmon hatcheries in Alaska are run by private non-profit corporations that must obtain a state-issued permit to operate. In accordance with Alaska Statute 16.10.400, ADFG administrates the state's salmon hatchery permitting process[362], and is guided by the following policies:

- The Alaska Finfish Genetics Policy[363]
- Alaska Fish Health and Disease Control Policies[364]
- The Policy for the Management of Sustainable Salmon Fisheries[365]

These policies explicitly promote responsible development and management of salmon hatcheries in Alaska.

In the event that a hatchery operator wishes to alter conditions of their permit (e.g. increase production), a Permit Alteration Request (PAR) must be completed and submitted to ADFG for review, typically by February 15th of the year in which action might take effect. PARs are reviewed by regional planning teams, which make recommendations for their approval or denial. The commissioner may then consider their recommendations or other information to approve or deny the request. An approved PAR will result in a notice of permit alteration, which amends the hatchery permit, and may contain additional conditions or terms specified by the commissioner. This process is codified through Alaska Administrative Code 5 § 40.850, and promotes responsible operation and oversight of salmon hatcheries in Alaska.

Recently, ADFG prepared and published a review of hatchery related plans, permits and policies designed to protect wild salmon stocks in Alaska[366]. This document elegantly chronicles the history of salmon hatcheries in Alaska, reviews pertinent policies, practices, plans and permitting processes and considers two case studies: Chinook salmon in Southeast Alaska and pink salmon in Prince William Sound. Upon reviewing the SEAK Chinook hatchery programs, the authors concluded that:

"On the whole, the Chinook salmon fishery enhancement program in SEAK is consistent with State of Alaska policies. The SEAK Chinook stock assessment program is adequate to provide a basis for some evaluation of the hatchery program in place. It provides quality data on harvest, escapement, and their compositions as well as a basis for monitoring hatchery straying. Recommendations

[362] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery
[363] https://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf
[364] http://www.sf.adfg.state.ak.us/FedAidPDFs/RIR.5J.2010.01.pdf
[365] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[366] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf

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, based on the best scientific evidence available and/or verifiable and objective traditional, fisher, or community knowledge. Significant uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including culture and enhancement activities. This issue can be addressed by taking a risk assessment/risk management approach.**

for actions to improve consistency with state policies for SEAK Chinook salmon and actions that could be taken to improve the state of knowledge include the following:

1. *Continued use of the Stock Appraisal Tool to identify significant and unique stocks (Genetic Policy).*
2. *Identify wild stock sanctuaries (Genetic Policy).*
3. *Consider implementing annual assessments of the Farragut River Chinook salmon stock including sampling to detect hatchery strays in the escapements.*
4. *Encourage hatcheries to collect additional gametes from wild fish to supplement the genetic variation in the broodstocks being used in Southeast Alaska and especially for the Chickamin River and Keta River broodstocks (Genetic Policy).*
5. *Encourage hatcheries to mark and coded wire tag a higher proportion of hatchery-origin Chinook salmon. Increasing the number of tagged hatchery-origin fish will improve the precision of hatchery contribution estimates to fisheries and escapements and provide an improved ability to detect hatchery strays."*

With respect to Prince William Sound pink salmon hatchery programs, the authors found that:

"Generally, the pink salmon fishery enhancement program in PWS is consistent with State of Alaska policies. There were 2 elements that were not consistent with guidance in the Genetic Policy:

1. *identification of significant or unique stocks, and*
2. *establishment of wild stock sanctuaries."*

The authors followed these observations with a list of recommendations to improve compliance with policies aimed to protect the genetic integrity of wild fish and natural ecosystem function.

Also described in this ADFG report by Evenson et al. (2018) are a suite of studies being carried out by and in partnership with ADFG that examine stray rates of hatchery salmon and the magnitude of genetic impacts that result from hatchery-wild interactions on natural spawning grounds. This hatchery research[367], supported by state, federal and private resources, continues to provide managers with valuable information that promises to evaluate and improve the management of hatchery salmon in Alaska.

Current status/Appropriateness/Effectiveness: *The overall fishery enhancement planning activities, policy/ies and management plans are considered appropriate for structuring the efforts to maintain genetic diversity and ecosystem integrity. Evaluation of the ecosystem shall be understood as it relates to the fishery enhancement activity occurring in the unit of certification area. Significant uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including fishery enhancement activities. This issue can be addressed by taking a risk assessment/risk management approach.*	☑

EVIDENCE:

The State of Alaska has developed a series of policies governing the construction and operation of salmon hatcheries, with central focus to protect the genetic integrity and sustainability of wild salmon stocks. These policies are implemented primarily through ADFG, which maintains authority to issue or deny permits to potential hatchery operators. ADFG also regularly reviews and inspects hatchery operations, authorizes cost-recovery fisheries to allow continued operation of hatcheries and limit impacts to wild population, and directs harvest effort to catch hatchery-produced salmon.

Going beyond its management duties, ADFG has also embarked on a major research endeavor to evaluate the effectiveness of its policies governing salmon hatchery management with respect to the protection of wild salmon stocks, genetic diversity and natural ecosystem integrity. The Department has provided major funding for the implementation of this work, developing research partnerships with the Prince William Sound Science Center and the Sitka Sound Science Center, which have conducted much of the field work to date. ADFG has also competed for and successfully been awarded federal research funds, through the Saltonstall-Kennedy Grants Program, to continue this work.

[367] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main

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, based on the best scientific evidence available and/or verifiable and objective traditional, fisher, or community knowledge. Significant uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries, including culture and enhancement activities. This issue can be addressed by taking a risk assessment/risk management approach.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization promotes responsible development and management of fishery enhancement, including an advanced evaluation of the effects of fishery enhancement on genetic diversity and ecosystem integrity, based on the best scientific evidence available . Examples may include various regulations, data, and assessment reports.*	☑

EVIDENCE:

Salmon hatcheries in Alaska significantly enhance harvest opportunities experienced by the commercial fisheries. The number of fish produced by hatcheries and their contributions to harvest are reported annually by ADFG. Please see Figure 11 on background section which shows the average percent contribution to commercial harvest by hatcheries for year (2009-2018), as reported by ADFG[368].

ADFG administrates regulation of hatcheries through a transparent permitting process, that involves careful siting of facilities aimed to reduce interactions with wild stocks of salmon, in accordance with state policies. Alaska's hatchery policies, plans and permitting processes are readily accessible online, and their effectiveness at protecting natural ecosystems and the genetic integrity of wild salmon was recently reviewed in a report published by ADFG.

ADFG-supported research focused on potential effects from hatcheries on wild salmon have generated a wealth of peer-reviewed articles and technical reports that can be easily accessed online[369] [370] [371] [372] [373] [374]. In summary, there is a strong body of evidence that demonstrates that fishery management agencies in Alaska promote responsible development of enhancement practices, and evaluate the effects of hatcheries on wild populations, ecosystems and the environment.

References:	Brenner, R. E., Moffitt, S. D., & Grant, W. S. (2012). Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes, 94(1), 179-195. Jasper, J. R., Habicht, C., Moffitt, S., Brenner, R., Marsh, J., Lewis, B., ... & Grant, W. S. (2013). Source-sink estimates of genetic introgression show influence of hatchery strays on wild chum salmon populations in Prince William Sound, Alaska. PloS one, 8(12).

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	**0**

[368] https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[369] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.findings_updates#reports
[370] Brenner *et al.* (2012) https://link.springer.com/article/10.1007/s10641-012-9975-7
[371] http://146.63.61.200/static/fishing/PDFs/hatcheries/research/pwssc_hw_2015_report.pdf
[372] Jasper *et al.* (2013) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3862497/pdf/pone.0081916.pdf
[373] http://146.63.61.200/static/fishing/PDFs/hatcheries/research/pwssc_2013.pdf
[374] http://www.adfg.alaska.gov/fedaidpdfs/FMS12-01.pdf

Supporting Clause 13.1.1.

13.1.1.	**In the case of enhanced fisheries, the fishery management organization should take into account natural production, and shall take appropriate actions for conserving genetic diversity and biodiversity, protecting ETP species, maintaining aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of enhanced stock. Enhanced fisheries may be supported in part by stocking organisms produced in aquaculture facilities or removed from wild stocks other than the stock under consideration. Aquaculture production for stocking purposes shall be managed and developed according to the above provisions.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There are processes through which the management system can develop enhanced fisheries supported in part by stocking organisms produced in enhancement facilities or removed from wild stocks other than the stock under consideration. The management system takes due regard of the natural production , conserving genetic diversity and biodiversity, protecting endangered species, maintaining the integrity of aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of enhanced material. As appropriate, there are also management objectives and measures consistent with avoiding significant negative impacts of enhancement activities on the natural reproductive component of the stock under consideration and any on other wild stocks from which the organisms for stocking are being removed.*	☑

EVIDENCE:

Enhancement of commercial salmon fisheries in Alaska is guided by three key policy documents that prioritize fish health, protection of genetic diversity, and natural production by wild salmon, these being:

1) The **Alaska Fish Health and Disease Control Policy**[375] states the ADFG Fish Pathology Mission, as it "monitors and controls finfish and shellfish diseases statewide (according to Title 16 of the Alaska Statutes) by oversight of wild and hatchery fish and shellfish health, conducting diagnostic surveys, developing finfish and shellfish disease policies and by advising the commissioner of ADF&G and other state and federal authorities on fish disease issues".

2) **The Policy for Management of Sustainable Salmon Fisheries**[376], which states that, "effects and interactions of introduced or enhanced salmon stocks on wild salmon stocks should be assessed; [and] wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts"; and

3) The Alaska Department of Fish and Game **Finfish Genetic Policy**[377], which states that, "Gene flow from hatchery fish straying and intermingling with wild stocks may have significant detrimental effects on wild stocks. First priority will be given to protection of wild stocks from possible harmful interactions with introduced stocks. Stocks cannot be introduced where the introduced stock may have significant interactions or impact on significant or unique wild stocks."

Taken together, these policies have provided clear guidance for the development of salmon hatcheries that enhance commercial fishing opportunities in Alaska. Implementation of state policies requires careful planning to ensure that the construction and operation of salmon hatcheries in Alaska serves to protect wild fish and surrounding ecosystems.

Salmon hatchery planning in Alaska is described in state law (AS 16.10.375) and is the responsibility of Regional Planning Teams (RPTs). RPTs operate as described in regulation (5 AAC 40.300-370) and prepare regional comprehensive salmon plans[378], provide recommendations on PNP hatchery permit alterations and applications for new hatcheries, and may also review hatchery annual management plans. RPTs are composed of representatives from regional aquaculture associations and ADF&G staff. All RPT meetings are open to the public and public participation is encouraged.

[375] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2014.04.pdf
[376] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf
[377] http://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf
[378] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.enhance

13.1.1.	**In the case of enhanced fisheries, the fishery management organization should take into account natural production, and shall take appropriate actions for conserving genetic diversity and biodiversity, protecting ETP species, maintaining aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of enhanced stock. Enhanced fisheries may be supported in part by stocking organisms produced in aquaculture facilities or removed from wild stocks other than the stock under consideration. Aquaculture production for stocking purposes shall be managed and developed according to the above provisions.**

Current status/Appropriateness/Effectiveness: *These measures are considered effective in terms of reflecting the key overarching management objectives and ensuring that appropriate measures are implemented dealing with the effects and ecological dynamics of enhanced and wild stock interactions, to ensure genetic diversity of wild stocks is maintained. There is evidence that enhancement practices take into account the natural production (wild and enhanced stocks), and take appropriate actions for conserving genetic diversity and biodiversity, protecting ETP species, maintaining the integrity of aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of enhanced material. The ecological and genetic interactions and effects between wild and enhanced stock and the potential deleterious effects arising from this shall be analyzed and assessed here. Accordingly, the individual provisions mentioned above shall be assessed for significant negative effects. Enhanced stocks shall not have a significant negative effect (i.e., genetic, ecological, physical displacement, resource competition) on wild fish stocks.*	☑

EVIDENCE:
Alaska provides clear policy guidance for salmon fisheries enhancement that explicitly prioritizes conservation of genetic diversity of wild populations, fish health and functional natural ecosystems. ADFG regulates the operation of hatcheries through a permitting process that considers facilities siting and potential impacts to wild salmon populations and the environment. One requirement of hatchery permit issuance is that "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" (Alaska Statute 16.10.420)[379]. Beyond permitting, planning meetings for hatchery development and operation are conducted transparently and are open to the public.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of enhanced fisheries, the fishery management organization takes into account the natural production, and takes appropriate actions for conserving genetic diversity and biodiversity, protecting ETP species, maintaining the integrity of aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of stocking material. Enhanced fisheries may be supported in part by stocking organisms produced in enhancement facilities or removed from wild stocks other than the stock under consideration. Enhanced production for stocking purposes is managed and developed according to the above provisions. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
ADFG recently prepared and published a review[380] of hatchery policies, plans and permitting processes, including an assessment of two hatchery programs and their compliance with policies aimed to protect wild salmon and genetic diversity. This report provides a thorough history of salmon hatcheries in Alaska, cites and describes the rationale behind policies designed to protect natural ecosystem structure and function. Additional documents cited throughout this report, such as ADFG's hatchery permitting guidelines, provide clear evidence that fisheries management agencies in Alaska work to protect wild salmon and natural ecosystems from adverse effects that might arise through enhancement activities.

References:						
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**= Overall score**
	10			**0**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						**0**

[379] https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/hatchery_statutes.pdf
[380] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf

Supporting Clause 13.2.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There are defined strategies and plans for enhancement development in accordance with ecological sustainability and rational use of resources shared by enhancement and other activities.*	☑

EVIDENCE:

Regional Planning Teams are tasked with developing Comprehensive Salmon Plans and Annual Management Plans for enhanced salmon production and harvest. Proposed hatcheries must complement the existing Comprehensive Salmon Plan to gain approval. Significant changes to hatchery production or operation are subject to mandatory review by ADFG through an annual Permit Alteration Request process, which, if approved, results in an amendment to an existing hatchery operation permit.

According to Alaska Statute 16.10.420 "The department shall require, in a permit issued to a hatchery operator, that

(1) salmon eggs procured by the hatchery must be from the department or a source approved by the department;
(2) salmon eggs or resulting fry may not be placed in waters of the state other than those specifically designated in the permit;
(3) salmon eggs or resulting fry, sold to a permit holder by the state or by another party approved by the department, may not be resold or otherwise transferred to another person;
(4) salmon may not be released by the hatchery before department approval, and, for purposes of pathological examination and approval, the department shall be notified of the proposed release of salmon at least 15 days before the date of their proposed release by the hatchery;
(5) diseased salmon be destroyed in a specific manner and place designated by the department;
(6) adult salmon be harvested by hatchery operators only at specific locations as designated by the department;
(7) surplus eggs from salmon returning to the hatchery be made available for sale first to the department and then, after inspection and approval by the department, to operators of other hatcheries authorized by permit to operate under AS 16.10.400 - 16.10.470;
(8) if surplus salmon eggs are sold by a permit holder to another permit holder, a copy of the sales transaction be provided to the department;
(9) [Repealed, Sec. 5 ch 110 SLA 1980].
(10) 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."

Current status/Appropriateness/Effectiveness: *If studies have concluded that enhancement developments are ecologically sustainable in the interested unit of certification area, the enhancement developments allow the rational sharing of resources with other activities.*	☑

EVIDENCE:

As described in Supporting Clause 13.1.1, salmon hatchery planning in Alaska is the responsibility of Regional Planning Teams (RPTs), which produce and publish Comprehensive Salmon Plans[381] and Annual Management Plans[382]. These plans document enhancement efforts, set production goals, and identify potential for new projects, are reviewed by the public and ADFG and are required by law (AS 16.10.375).

Private non-profit hatcheries are required by law to produce annual reports[383] that document egg take, releases and adult returns. Any proposed alteration to hatchery production requires a Permit Alteration Request (PAR), which typically relate to an increase in production, new release site or stock used by the hatchery. Permit alteration requests are reviewed by regional planning teams, which make recommendations for their approval or denial. The commissioner may then consider their recommendations or other

[381] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.enhance
[382] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.annual
[383] https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.annual

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.

information to approve or deny the request. An approved PAR will result in a notice of permit alteration, which amends the hatchery permit, and may contain additional conditions or terms specified by the commissioner.

In addition to administrating the hatchery permitting process, ADFG prepares and publishes Annual Fisheries Enhancement Reports[384], as required by Alaska Statute 16.05.092. These reports are presented to the state legislature and describe annual levels of hatchery salmon production in Alaska, as well as harvest numbers of hatchery and wild stocks, and estimated values of commercially harvested salmon.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization produces and regularly updates fishery enhancement development strategies and plans, as required, to ensure that enhancement development is ecologically sustainable and to allow the rational use of resources shared by enhancement and other activities. Examples may include various regulations, data, and assessment reports.*	☑

EVIDENCE:
A variety of Alaska Statutes, reports and permit issuance requirements, cited above, provide clear evidence that ADFG regularly reviews and updates its hatchery management strategy to ensure that fishery enhancement is ecologically sustainable and promotes a rational use of the fishery resource.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x 3)**	**=**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							**0**

[384] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports

Supporting Clause 13.2.1.

13.2.1.	**The fishery management organization shall ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by enhanced fisheries developments.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the impacts of enhanced fisheries developments on local communities and access to fishing grounds are predicted and monitored. The outputs of this mechanism are used to define management objectives related to minimizing the negative impacts of enhanced fisheries developments.*	☑

EVIDENCE:

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

This foundational language codifies regulated access to enhanced fishery resources by community members in Alaska, safeguarding their livelihoods and welfare.

Current status/Appropriateness/Effectiveness: *Measures, regulations, and policies have been designed, are in place, and have succeeded in achieving the objectives described in the process parameter. The focus is to ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected (e.g. geographical displacement) by enhanced fisheries developments. There may be circumstances where economic tradeoffs may be required to improve overall community benefit.*	☑

EVIDENCE:

Hatchery production of salmon in Alaska is designed to serve common property fisheries, accessible to commercial, recreational, subsistence stakeholders, all of whom have opportunity to benefit from the enhanced fishery resource. Hatchery planning occurs through a public process that allows local community members to have a say in hatchery construction, expansion and operations. According to Alaska Statute 16.10.410[385], which describes the process of hearings before issuance of a hatchery permit,

a) At least 30 days before the issuance of a permit under AS 16.10.400, a public hearing shall be held in a central location in the vicinity of the proposed hatchery facility.
b) Notice of the hearing shall be published in a newspaper of general circulation once a week for three consecutive weeks, with completion of the notice at least 10 days before the hearing.
c) The hearing shall be conducted by the department. At a hearing for a permit under AS 16.10.400 (a)(1), the applicant shall present a plan for the proposed hatchery, describing the capacity of the hatchery and other relevant facts that may be of interest to the department or the public. Interested members of the public shall be afforded an opportunity to be heard.
d) The department shall record and consider objections and recommendations offered by the public at the hearing conducted under this section. It shall respond in writing, within 10 days after the hearing is held, to any specific objections offered by a member of the public at the hearing.

Alaska Statute 16.10.410 provides a legal foundation to safeguard the welfare of local communities where salmon hatcheries operate in Alaska. Following the public review process, the hatchery permit application is then forwarded to the ADFG Commissioner, who, by regulation 5 AAC 40.220, must consider (among other criteria) whether the hatchery would result in "significant alterations of traditional fisheries".

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization ensures that the livelihoods of local communities, and their access to fishing grounds, are positively affected by enhanced fisheries developments. Examples may include various regulations, data, and assessment reports.*	☑

[385] http://touchngo.com/lglcntr/akstats/Statutes/Title16/Chapter10/Section410.htm

13.2.1.	The fishery management organization shall ensure that the livelihoods of local communities, and their access to fishing grounds, are not negatively affected by enhanced fisheries developments.

EVIDENCE:
Language in Alaska's Constitution safeguards access to common property fishery resources, including enhanced salmon populations. State statute (AS 16.10.410) further ensures that community members have a voice in the planning and permitting process of salmon hatcheries, further providing protection over their traditional fishing practices and livelihoods.

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**– (**	**0**	**x**	**3**	**) =**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	**0**

Supporting Clause 13.3.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the potential environmental impacts of fisheries enhancement are predicted and monitored. This mechanism shall be used to develop management objectives related to the minimization of adverse ecological changes.*	☑

EVIDENCE:

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. See Supporting Clause 13.2 for this list of conditions.

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.

Discharge of wastewater from a hatchery facility requires an APDES permit[386] from the Alaska Department of Environmental Conservation's (DEC) Division of Water. In support of the U.S. Federal Clean Water Act, Alaska's Anti-degradation Policy (see Alaska Administrative Codes 18 AAC 70.015 – 18 AAC 70.016)[387] sets protections for water quality, with additional protections for water of exceptional ecological or recreational significance (Tier 3 waters). These protections are enforced through Alaska DEC[388].

Current status/Appropriateness/Effectiveness: *Management measures and regulations have been designed, are in place, and have succeeded in achieving the management objectives described in the process parameter.*	☑

EVIDENCE:

ADFG regularly inspects salmon hatcheries throughout the state to ensure compliance with permits, as well as Fish Health, genetic and other policies. ADFG's Fish Pathology Laboratory[389] provides invaluable support to PNP salmon hatcheries through disease testing, treatment, education and regular inspection services.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that effective procedures specific of fisheries enhancement are established to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes such as those caused by inputs (e.g., pollution, disease) from enhancement activities and their related economic and social consequences. Examples may include various regulations, data, and assessment reports.*	☑

EVIDENCE:

Evaluation reports of Alaska salmon hatcheries have been produced by ADFG and published to their website[390].

[386] https://dec.alaska.gov/water/wastewater/
[387] https://dec.alaska.gov/media/1046/18-aac-70.pdf
[388] https://dec.alaska.gov/water/water-quality/standards/antidegradation/
[389] https://www.adfg.alaska.gov/index.cfm?adfg=fishingpathologylab.main
[390] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports

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.
References:	

Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	**0**

Supporting Clause 13.4.

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.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *As appropriate, there is a mechanism for stock assessment of enhanced fisheries that considers the separate contributions from aquaculture and natural production.*	☑

EVIDENCE:

In Alaska, the vast majority of hatchery-produced salmon are marked via thermal- or other shock-induced otolith band alteration technique, generally following the methods described by Volk et al. (1999)[391]. This mass-marking procedure allows fisheries managers opportunity to analyze otoliths from commercially harvested salmon and determine the separate contributions from wild and hatchery production.

Current status/Appropriateness/Effectiveness: *There is evidence that stock assessment of enhanced fisheries considers the separate contributions from enhanced and natural production.*	☑

EVIDENCE:

Otolith marking provides the primary mechanism by which fisheries managers in Alaska can consider the separate contributions from hatchery and wild production to commercial harvest. Coded wire tags represent another. Data from these marks and tags are collected on a grand scale by ADFG's Mark, Tag and Age Laboratory (MTAL) [392]. The goals of the MTAL are to provide fisheries managers and researchers with timely, current, and historical biological data to help them manage, preserve, protect, and perpetuate Alaska's fishery resources. Otolith mark data collected by the MTAL is uploaded into a searchable database that can be used to generate summary reports[393]. This resource is, in turn, used by fisheries managers to evaluate hatchery and wild contributions to Alaska commercial salmon fisheries, as documented through annual reports[394]. According to the 2018 Alaska Fisheries Enhancement Report,

> "The Alaska state constitution, statutes, and regulations mandate that ADF&G manage salmon returns for wild stock conservation. This means that escapement goals are established for important salmon systems, and the fisheries are managed to meet these goals.
>
> Wild and hatchery returns are managed to meet wild stock escapement goals. In some cases, 1 species of hatchery fish returns at the same time as other, more predominant wild stock species, and the hatchery fish are harvested as incidental catch. For example, in Southeast Alaska, hatchery-produced chum salmon return across the timing of both sockeye and pink salmon and are caught during fisheries that are managed for sockeye or pink salmon. Chum salmon that are not harvested in the sockeye and pink salmon fisheries return to isolated release sites in bays where they can be harvested with minimal impact to wild stocks.
>
> For some fisheries, both hatchery and wild stocks of the same species return simultaneously. In Prince William Sound, hatchery stocks of pink salmon return at the same time as the wild pink salmon stocks they are derived from. All hatchery-produced pink salmon are otolith marked. Otoliths are read from samples of fish collected from the commercial fishery to apportion the catch between hatchery and wild stocks during the season so that managers can manage for the wild stock return.
>
> In the Kenai River, releases of hatchery sockeye salmon are limited to a small fraction of the wild populations so that they do not unduly influence management.
>
> In Southeast Alaska, a percentage of both hatchery and wild stocks of coho and Chinook salmon are coded-wire-tagged. Tags are collected and read during the season so that managers can assess the wild and hatchery components of the return to assess wild stock abundance. Hatchery stocks of pink and chum salmon are otolith marked as well.

[391] Volk et al., (1999) https://www.sciencedirect.com/science/article/abs/pii/S0165783699000739
[392] https://mtalab.adfg.alaska.gov/
[393] https://mtalab.adfg.alaska.gov/OTO/reports/MarkSummary.aspx
[394] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.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.

In Kodiak, hatchery chum and sockeye salmon stocks are otolith marked. Only a portion of hatchery-produced pink salmon are marked, but return to the release site on Afognak Island where there are no substantial wild pink salmon stocks in the area. All pink salmon fishery openings in this area target hatchery-produced salmon."

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that with due regard to the assessment approach employed, stock assessment of enhanced fisheries considers the separate contributions from enhancement and natural production. Examples may include various regulations, data, and assessment reports.*	☑

EVIDENCE:

As described above, salmon hatchery managers in Alaska mass mark the vast majority of salmon they produce, which are then detected through sampling of the commercial fisheries and subsequent analysis by ADFG. This approach provides robust accounting of hatchery and wild contributions to commercial salmon harvest in Alaska, which has been clearly documented by ADFG[395].

In past years, unmarked pink salmon produced and released by the Kitoi Bay Hatchery has represented a noteworthy exception to this standard practice. In their 2011 evaluation of Kitoi Bay Hatchery[396], ADFG noted that, "A better understanding of the stock composition of salmon caught in fisheries targeting KBH stocks, the degree and effects of straying, and the effectiveness of wild stock protection measures would improve the scientific defensibility of KBH programs. The most obvious tool to achieve that would be the use of marking and tagging".

Kitoi Bay Hatchery's practice of producing and releasing unmarked pink salmon resulted in a Minor Non-conformance during a previous RFM-based Assessment, as it precluded accounting of contribution from this facility to harvest. A Corrective Action Plan was developed in response to the Minor Non-conformance, and progress on this plan has been evaluated each year through annual Surveillances. As noted in Annual Surveillance Reports the Kodiak Regional Aquaculture Association (KRAA), which operates Kitoi Hatchery, has made significant progress toward completion of their Corrective Action Plan. Exceeding expectations, KRAA Executive Director Tina Fairbanks reported to this Assessment Team during a December 9, 2019 meeting in Anchorage, Alaska, that all salmon released from Kitoi Hatchery had been otolith marked. This action by KRAA represents a major step toward full compliance with Supporting Clause 13.4 of this Assessment.

However, subsequent conversations with ADFG Kodiak Regional Biologists indicated that ADFG does not currently sample otoliths from commercial salmon fisheries operating in the region, nor does ADFG have plans to do so in future years. Accordingly, information about hatchery and wild contributions to the pink salmon commercial harvest in the Kodiak Region is likely of poor quality and will remain so under current management practice (i.e. no otolith sampling). For this reason, and until the existing Corrective Action Plan for marking Kitoi Bay hatchery salmon has been approved as complete, a minor non-conformance for Evidence Basis is applied to Supporting Clause 13.4 of this Assessment.

References:	Volk, E. C., Schroder, S. L., & Grimm, J. J. (1999). Otolith thermal marking. Fish. Res., 43(1-3), 205-219.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**1**		**7**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Medium
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Minor NC
Non-conformance Number (if applicable):	**1**

[395] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[396] https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2011.01.pdf

Supporting Clause 13.5.

13.5.	**Regarding the enhanced components of the *stock under consideration*, when a natural reproductive stock component is maintained and fishery production is based primarily on natural biological production within the ecosystem of which the *stock under consideration* forms a part, enhanced fisheries shall meet the following criteria: (1) the species shall be native to the fishery's geographic area or introduced historically and have subsequently become established as part of the natural ecosystem, (2) there shall be natural reproductive components of the *stock under consideration*, and (3) the growth during the post-release phase shall be based upon food supply from the natural environment and the production system shall operate without supplemental feeding.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process in place by which enhanced fisheries are managed, and which includes consideration of the origin of enhanced species, the maintenance of naturally reproducing components, and the food supply during the post-release phase. The intent of this clause does not refer to net pen rearing after fish are removed from enhancement facilities, but to the time when fish are released in the wild for their ocean migration. Note that in Alaska the first principal of enhancing fisheries through hatchery production is that the fitness and productivity of wild stocks should be maintained. An important method to accomplish this is to direct separate fisheries onto wild stocks and hatchery stocks. It may occur that the fishery on enhanced stocks is larger and that the aggregate fishery predominately catches enhanced stocks, in which case the aggregate fishery is based primarily on enhanced production but it is not at variance with the first principal.*	☑

EVIDENCE:

By design and with oversight from ADFG, commercial salmon fisheries in Alaska harvest both hatchery- and natural origin fish[397]. Adult salmon used to contribute eggs for initial and continued hatchery production must be of local origin where significant wild populations co-occur. This practice is advocated by Alaska's Finfish Genetics Policy, which states that a "watershed with a significant wild stock can only be stocked with progeny from the indigenous stocks". This policy is enforced by ADFG with authority from Alaska Statute 16.10.420, which states that "salmon eggs procured by the hatchery [requesting a permit to operate] must be from the department or a source approved by the department". Article 8 of the Alaska State Constitution mandates that natural resources, including fish, be managed on the principle of sustained yield. This mandate ensures conservation of wild populations, even in context of ongoing harvest, and is reflected in Alaska's Policy for the Management of Sustainable Salmon Fisheries[398], which 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

Alaska Stature 16.40.210 prohibits "finfish farming", meaning that a "person may not grow or cultivate finfish in captivity or under positive control for commercial purposes", but allowing "the ability of 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". Of significant importance, here, is that sale of hatchery fish is permissible *after returning from the natural water of the state*, where supplemental feeding does not occur.

Current status/Appropriateness/Effectiveness:	
There is evidence to demonstrate that the species in the stock under consideration is native to the fishery's geographic area, or was introduced historically and has subsequently become established as part of the natural ecosystem.	☑

EVIDENCE:

[397] https://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[398] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf

13.5.	**Regarding the enhanced components of the *stock under consideration*, when a natural reproductive stock component is maintained and fishery production is based primarily on natural biological production within the ecosystem of which the *stock under consideration* forms a part, enhanced fisheries shall meet the following criteria: (1) the species shall be native to the fishery's geographic area or introduced historically and have subsequently become established as part of the natural ecosystem, (2) there shall be natural reproductive components of the *stock under consideration*, and (3) the growth during the post-release phase shall be based upon food supply from the natural environment and the production system shall operate without supplemental feeding.**

The salmon hatchery permitting process, administrated by ADFG, ensures that appropriate brood stocks are used to found hatchery populations, in accordance with the Finfish Genetics Policy. Evaluation reports for individual hatcheries, which document the source of eggs used in their salmon programs, have been developed and published by ADFG[399].

Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that there is a naturally reproductive component of the stock under consideration.*	☑

EVIDENCE:

Naturally reproductive components of salmon stocks subject to commercial harvest are monitored annually through adult escapement surveys and estimates, performed by ADFG. Escapement estimates are evaluated in context of escapement goals, and if a given stock chronically fails to meet escapement goals it is awarded additional protections through recognition as a "stock of concern"[400].

Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that the growth of the stocked component during the post-release phase is based upon food supply from the natural environment and the production system operates without supplemental feeding.*	☑

EVIDENCE:

As previously noted, Alaska Stature 16.40.210 prohibits "finfish farming", meaning that a "person may not grow or cultivate finfish in captivity or under positive control for commercial purposes". Enhancement of commercial salmon fisheries in Alaska occurs through production of hatchery fish that are released into natural waters of the state as juveniles, where they then feed on naturally available resources without artificial supplementation. In many cases, hatchery operators will assess the availability of zooplankton in the nearshore environment through "plankton tows" and other sampling methods. Information gained through these efforts is used to coordinate the timing of release for juvenile salmon to ensure adequate prey availability for high growth and survival, precluding any need for supplemental feeding after release.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that regarding the enhanced components of the stock under consideration, provided that a natural reproductive stock component is maintained and fishery production is based primarily on natural biological production within the ecosystem of which the stock under consideration forms a part, enhanced fisheries meet the following criteria: (1) the species is native to the fishery's geographic area or introduced historically and has subsequently become established as part of the natural ecosystem, 2) there are natural reproductive components of the stock under consideration, and (3) the growth during the post-release phase is based upon food supply from the natural environment and the production system operates without supplemental feeding. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:

The quality of evidence available to evaluate Supporting Clause 13.5 is strong and includes State statutes, policy statements, and agency reports, as cited above and elsewhere in this report.

References:						
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[399] https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports
[400] http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=123

Supporting Clause 13.6.

13.6.	**In the case of enhanced fisheries, the *stock under consideration* may comprise naturally reproductive components and components maintained by release from an enhancement facility. To avoid significant negative impacts of fishery enhancement activities on the natural reproductive components of the *stock under consideration*, the following shall apply: (1) naturally reproductive components of enhanced stocks shall not be overfished, and (2) naturally reproductive components of the stock under consideration shall not be displaced by enhanced components, and (3) in particular, displacement shall not result in a reduction of the stock under consideration below abundance-based target reference points (or their proxies) defined for the regulation of harvest.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process in place to manage the naturally reproductive and enhanced components of the stock under consideration, to avoid significant negative impacts of enhancement activities on the naturally reproductive components (e.g., overfishing or displacement).*	☑

EVIDENCE:

Alaska's Policy for Management of Sustainable Salmon Fisheries states that "salmon fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning". In concert with this overarching policy, Alaska's Policy for Statewide Salmon Escapement Goals (AS 16.05.251) tasks ADFG and the Board of Fisheries with the responsibility to conserve and develop Alaska's salmon fisheries on the sustained yield principle, codified in the State's Constitution, and to establish escapement goals for individual or aggregate populations, as can be reasonably enumerated by ADFG. Together, these policies provide a regulatory framework to ensure that naturally spawning population of salmon are not overharvested by commercial and other fisheries in Alaska.

Pacific salmon have a natural propensity to return to their natal waters as they approach reproductive maturity. In the case of hatchery-reared salmon, adult tend to return to their site of release (often the hatchery, itself) in preparation to spawn. By requiring hatcheries to be situated away from major wild salmon populations, regulatory policies in Alaska have harnessed the innate "homing" behavior of hatchery salmon in a manner that protects wild stocks from displacement on spawning grounds and allows fisheries managers to direct harvest effort toward "terminal fisheries" in the vicinity of hatchery release sites, where hatchery-origin fish comprise the majority of the catch.

Policies and regulations pertinent to protection of wild fish from overfishing or displacement by hatchery fish include:

5 Alaska Administrative Code 40.005, which states:

> "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."

13.6.	**In the case of enhanced fisheries, the *stock under consideration* may comprise naturally reproductive components and components maintained by release from an enhancement facility. To avoid significant negative impacts of fishery enhancement activities on the natural reproductive components of the *stock under consideration*, the following shall apply: (1) naturally reproductive components of enhanced stocks shall not be overfished, and (2) naturally reproductive components of the stock under consideration shall not be displaced by enhanced components, and (3) in particular, displacement shall not result in a reduction of the stock under consideration below abundance-based target reference points (or their proxies) defined for the regulation of harvest.**

Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that the naturally reproductive components of stock under consideration are not overfished*[401]*.*	☑

EVIDENCE:

In accordance with state policy, salmon fisheries in Alaska are managed to protect wild stocks and meet adult escapement goals. Hatchery and wild contributions to annual harvest in various commercial salmon fisheries are estimated and published by ADFG[402]. Annually-produced escapement estimates[403] provide the best measure of wild stock abundance in the face of harvest. Where stocks have chronically failed to meet escapement goals, they have been recognized as stocks of concern[404] and awarded protections from harvest. In most cases, currently recognized stocks of concern are wild Chinook salmon populations that are now significantly protected from harvest through major reductions on harvest, as with, for example, Chilkat and King Salmon River stocks[405].

Research, conducted by ADFG, non-governmental organizations and other partners, is applied to evaluate the contribution of hatchery salmon to adult escapement on many streams in Alaska. Findings from this research does not suggest that hatchery fish have displaced significant wild populations, though hatchery fish can be found in high abundance in some places, often in proximity to hatchery release sites.

Current status/Appropriateness/Effectiveness: *There is evidence to support that the naturally reproductive components of stock under consideration are not displaced (i.e. spatially and geographically) by enhanced components (and in particular, do not result in a reduction of the natural reproductive component of the stock under consideration below abundance-based target reference points or their proxies as defined for the regulation of harvest (e.g., escapement goals).*	☑

EVIDENCE:

ADFG has engaged in several research projects to evaluate the stray rates and abundance of hatchery-origin salmon on natural spawning grounds. These studies take advantage of the mass otolith marking practices used by most hatcheries in Alaska to discriminate between hatchery and wild fish on spawning grounds. A common finding among these studies has been that the proportion of hatchery fish on spawning grounds tends to decrease with distance from the nearest hatchery.

For example, in a study of chum salmon in Southeast Alaska, Piston and Heinl (2012) found that in 2011 the "mean proportion of hatchery strays in the 13 sampled streams located within 50 km of the nearest hatchery release site was 25.5% (range: 0.5–87.5%), and all samples of greater than 40% hatchery fish were from these streams. The mean proportion of hatchery strays in streams located 50–100 km from the nearest release site was 6.7% (range: 0.0–17.8%). For streams greater than 100 km from the nearest release site, the mean proportion of hatchery strays dropped to 3.1% (range: 0.0–16.6%)".

In their analysis of pink and chum salmon populations in Prince William Sound, Brenner et al. (2012) found that streams "Streams within 20 km of hatcheries generally contained the highest proportions of hatchery pink salmon strays; however, strays were also frequently found in streams outside the districts containing the release facility". Relationships between hatchery salmon proportions on streams and distance from hatchery release sites were less apparent for chum salmon in PWS.

[401] See overfishing definition for salmon *in* Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.
[402] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf
[403] http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf
[404] https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks
[405] http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2018.05.pdf

13.6.	**In the case of enhanced fisheries, the *stock under consideration* may comprise naturally reproductive components and components maintained by release from an enhancement facility. To avoid significant negative impacts of fishery enhancement activities on the natural reproductive components of the *stock under consideration*, the following shall apply: (1) naturally reproductive components of enhanced stocks shall not be overfished, and (2) naturally reproductive components of the stock under consideration shall not be displaced by enhanced components, and (3) in particular, displacement shall not result in a reduction of the stock under consideration below abundance-based target reference points (or their proxies) defined for the regulation of harvest.**

More recently, in an examination of hatchery proportion among naturally spawning populations of pink salmon in Lower Cook Inlet streams, Otis *et al.,* (2018)[406] again documented a pattern of "isolation by distance" between wild populations and hatcheries that might produce strays, stating,

> "The proportion of LCI hatchery fish identified in stream samples decreased with distance from release sites. Of the 17 streams sampled during 2014–2017, only Tutka Lagoon Creek (86.1–94.8%%), Tutka Head End Creek (35.0–77.1%), Port Graham River (1.1–45.8%) and Lou's Creek in Little Tutka Bay (13.7%) averaged double-digit percentages of LCI hatchery pink salmon in their respective samples (Figure 7). These were also the 4 streams closest in proximity to the Tutka Bay Lagoon and Port Graham hatcheries (approximately 0–6 miles from release site s; Figure 1). In the 13 streams occurring outside of SHAs, the average percentage of LCI-hatchery marked pink salmon in our samples ranged from 0.0% (Fritz Creek, Port Chatham) to 7.1% (Seldovia River) and the overall average was 2.6% during 2014–2017 (Table 6). This pattern of decreasing proportion of hatchery fish with increasing distance from release sites is similar to observations in PWS where Brenner et al. (2012) found higher proportions of hatchery fish on streams closest to the hatcheries".

Results from these studies, when taken in context with Alaska statutes and policies that direct siting of hatcheries away from streams with major natural salmon production, suggest that hatchery-produced salmon do not threaten to displace major wild-spawning salmon populations in Alaska. Moreover, difference in spawn-timing, fitness and other traits can serve to isolate and protect wild salmon populations from hatchery fish even amid relatively high stray rates (McConnell et al. 2018)[407].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of enhanced fisheries, the stock under consideration may comprise naturally reproductive and enhanced components. In the context of avoiding significant negative impacts of enhancement activities on the natural reproductive components of stock under consideration, the following apply: (1) naturally reproductive components of the stock under consideration are not overfished, (2) naturally reproductive components of the stock under consideration are not substantially displaced by enhanced components, and (3) in particular, displacement does not result in a reduction of the natural reproductive component of the stock under consideration below abundance-based target reference points (or their proxies) defined for the regulation of harvest. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:

State statutes and policy mandates ensure that wild salmon stocks that spawn in Alaska are not overfished. As cited above, escapement goals, estimates from population monitoring efforts and conservation measures to protect stocks of concern all provide sound and transparent evidence supporting an effective management strategy. Hatchery permitting requirements include stipulations that limit potentially detrimental ecological and genetic risk from hatchery salmon to wild populations, primarily through siting of facilities in areas without major natural production. These policies are publicly available and their implementation is transparent and subject to public hearings pursuant to Alaska Statute 16.10.410. A convenient overview of much information mentioned here is available at:
https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/mcgeebrochure.pdf

References:	Brenner R. E., S. D. Moffitt, W. S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes 94:179-195. McConnell, C. J., Westley, P. A., & McPhee, M. V. (2018). Differences in fitness-associated traits between hatchery and wild chum salmon despite long-term immigration by strays. Aquaculture Environment Interactions, 10, 99-113.

[406] https://www.adfg.state.ak.us/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-11.pdf
[407] McConnell *et al.,* (2018) https://www.int-res.com/articles/aei2018/10/q010p099.pdf

13.6.	**In the case of enhanced fisheries, the *stock under consideration* may comprise naturally reproductive components and components maintained by release from an enhancement facility. To avoid significant negative impacts of fishery enhancement activities on the natural reproductive components of the *stock under consideration*, the following shall apply: (1) naturally reproductive components of enhanced stocks shall not be overfished, and (2) naturally reproductive components of the stock under consideration shall not be displaced by enhanced components, and (3) in particular, displacement shall not result in a reduction of the stock under consideration below abundance-based target reference points (or their proxies) defined for the regulation of harvest.**							
	Piston, A. W., and S. C. Heinl. 2012. Hatchery chum salmon straying in Southeast Alaska, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-45, Anchorage.							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

Supporting Clause 13.7.

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.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a system that allows for the prevention or reversing of habitat modifications that may cause serious or irreversible harm to the natural ecosystem's structure and function.*	☑

EVIDENCE:

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 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".

Beyond construction, salmon hatcheries in Alaska are subject to regular inspections by ADFG and other regulatory agencies that ensure compliance with permit, policy, biological and environmental standards. Alaska Statute 16.10.460 states that,

(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 inspectors shall be permitted by the permit holder at any time the hatchery is operating. The inspection shall be conducted in a reasonable manner.

In cases where hatcheries have been constructed on U.S. federal lands, modifications to facilities may require additional environmental assessments performed by federal agencies.

Current status/Appropriateness/Effectiveness: *There is evidence that are none, or minimal habitat modifications and that these modifications to the habitat for enhancing the stock under consideration are reversible and cause none to insignificant harm to the natural ecosystem's structure and function. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

State, federal and private oversight of salmon hatcheries in Alaska serve to assess, prevent and mitigate potentially negative impacts to the structure and function of surrounding ecosystems.

Recent examples include an environmental assessment of proposed modifications to the Main Bay Hatchery facility, owned by ADFG and operated by PWSAC, where permit renewal and site improvements were deemed to have lesser environmental impacts than "no action" options[408]. Today, hatchery staff actively help to control invasive plant species near the facility, while continuing to produce Coghill Lake stock sockeye salmon to support commercial salmon fisheries.

Where hatcheries or other developments do impact natural ecosystems in Alaska, urgent mitigation, restoration and habitat improvement projects have been implemented in response. Such actions are typically undertaken by governmental and non-governmental organizations, alike. As example, in November of 2019, a cracked pipe at the Kitoi Bay Hatchery began to spill oil near a small creek and into the coastal water. Within hours, hatchery staff noticed the leak, repaired the pipe and began working with the Alaska Department of Environmental Conservation to clean up the spill[409]. Impacts from this spill are expected to be limited in scope and duration. In some cases, restoration projects are intended to increase salmon production in areas where they occur, but also serve to restore or otherwise improve ecosystem structure and function. ADFG actively promotes habitat restoration[410], in part through its collaborative Habitat Restoration and Protection Cost Share Program[411]. This program started in 1995, originally on the Kenai River, but expanded to include Fairbanks and the Matanuska-Susitna Valley in 2007, and Anchorage in 2011. Since its inception, more than 721 projects have been completed: 669 projects on the Kenai River, 28 projects in the Matanuska-Susitna Valley, 17

[408] https://www.fs.usda.gov/nfs/11558/www/nepa/91621_FSPLT3_3985722.pdf
[409] https://kmxt.org/2019/11/cleanup-in-progress-for-1200-gallon-oil-spill-at-kitoi-bay-hatchery/
[410] https://www.adfg.alaska.gov/index.cfm?adfg=habitatrestoration.main
[411] http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=743

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.**

projects in Fairbanks and seven projects in Anchorage. These projects have removed 5,586 feet of detrimental structures; conserved 47,054 feet of habitat through the installation of light penetrating gratewalks, cabled spruce trees and exclusion fencing; rehabilitated 16,273 feet of fragile riparian and bank habitats; for a grand total of 63,327 feet of improved fish friendly habitat in Alaska.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure and function. Examples may include various regulations, data, and assessment reports.*	☑

EVIDENCE:
Existing regulatory mechanisms and state authored hatchery evaluation reports provide compelling evidence that hatcheries in Alaska do not inflict irreversible harm to ecosystem structure and function.ADFG hatchery evaluation reports are available online at: https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–** **(**	**0**	**x**	**3**	**)** **=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

Supporting Clause 13.7.1.

13.7.1	**Efforts shall be undertaken to minimize the adverse impacts of introducing non-native species or genetically altered stocks used for aquaculture into waters.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process to manage introduction of non-native species or genetically altered stocks used for aquaculture. Please note that In Alaska no non-native species are permitted to enter into the state for any purpose, especially not for use in fish culture.*	☑

EVIDENCE:
The introduction of non-native species into Alaska is strictly regulated and generally prohibited.
According to ADFG[412]:

- Without a permit no person may transport, possess, export from the state, or release into the waters of the state, any live fish unless the person holds a fish transport permit. Ornamental fish may be possessed but may not be released into waters of the state.
- Without a permit no person may import any live fish into the state for purposes of stocking or rearing in the waters of the state.
- The Board of Fisheries may adopt regulations it considers advisable for prohibiting and regulating the live capture, possession, transport, or release of native or exotic fish or their eggs.

With respect to salmon, the State Finfish Genetics policy provides clear regulatory guidance by stating: Live salmonids, including gametes, will not be imported from sources outside the state. Exceptions may be allowed for transboundary rivers.

Current status/Appropriateness/Effectiveness: *Efforts are made to minimize recognized harmful issues or effects, and these efforts are considered effective. In terms of effective efforts to minimize the potential adverse impacts of genetically altered stocks on wild stocks, the assessment team shall ensure evaluation of the overall enhancement system including policies, plans, objectives, measures, and management practices.*	☑

EVIDENCE:
Policy and permitting processes generally prohibit the introduction of non-native species into Alaska, and no evidence suggests that non-native species are used in the production of hatchery salmon in the state.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that efforts are undertaken to minimize the harmful effects of introducing non-native species or genetically altered stocks used for aquaculture (including culture-based fisheries). Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
Clear regulatory mechanisms exist to prevent the introduction of non-native fish for the purposes of hatchery production in Alaska.

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								**0**

[412] https://www.adfg.alaska.gov/index.cfm?adfg=invasive.regulations

Supporting Clause 13.7.2

13.7.2	**Steps shall be taken to minimize adverse genetic, disease, and other effects of escaped farmed fish (aquaculture) on wild stocks.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process capable to deal with adverse genetic effects, disease, and other adverse impacts of farmed fish on wild stocks. Please note this clause addresses farmed fish originating from outside Alaska (e.g., Canada or Russia) and its potential effects on Alaska wild stocks.*	☑

EVIDENCE:
Full-lifecycle rearing of salmon (and other finfish) for commercial purposes is strictly prohibited in Alaska by statute 16.40.210, which states, "A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes", with exceptions provided by Department administrated rehabilitation projects, salmon hatcheries that mandatorily release fish into open waters ("sea ranching") and the ornamental aquarium fish trade.

With further regard to salmon hatcheries, ADFG's Finfish Genetic Policy directs that salmon produced by hatcheries in Alaska be derived from native stocks, not transplanted across great distances or state boundaries, produced in a manner that best conserves intra-population genetic diversity and managed to limit interactions with wild stocks.

Potentially negative effects from escaped farm fish that could originate outside of Alaska are managed by ADFG's Invasive Species Program[413]. This program promotes prevention and reporting of non-native species introductions, using public outreach, education and online reporting to limit harmful introductions.

Current status/Appropriateness/Effectiveness: *The management measures in place are effective in minimizing adverse genetic effects, disease, and other adverse impacts of escaped farmed fish on wild stocks.*	☑

EVIDENCE:
State law and policy prohibit full lifecycle aquaculture in Alaska, as cited above. These measures prevent, to the extent possible, negative impacts from farmed fish. Introductions of exotic and farmed fish stocks, intentional or inadvertent, is prohibited in Alaska and managed by ADFG's Invasive Species Program.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that steps are taken to minimize adverse genetic effects, disease, and other adverse impacts of escaped farmed fish on wild stocks. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
Alaska's Finfish Genetics Policy and Fish Health and Disease Control Policy serve as guiding management documents to minimize genetic, disease and other risks to wild salmon populations from fisheries enhancement activities (i.e. hatchery operations) which are not, by definition, "farmed fish". Escape of farmed fish from regions outside Alaska into state waters can be reported[414] through ADFG's Invasive Species Program, facilitating prompt recording and mitigation.

References:							
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3)	=	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[413] http://www.adfg.alaska.gov/index.cfm?adfg=invasive.main
[414] http://www.adfg.alaska.gov/index.cfm?adfg=invasive.report

Supporting Clause 13.7.3.

13.7.3	**Research shall be promoted to develop enhancement techniques for endangered species to protect, rehabilitate, and increase their stocks, taking into account the critical need to conserve their genetic diversity.**
Relevance:	Not relevant.
	No stocks of salmon propagated by hatcheries in Alaska are recognized as endangered or threatened.

Evaluation Parameters	**Met?**
Process: *There is a process in place to recognize if the fishery in question is composed of one or ETP species in need of rehabilitation.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *Research into rehabilitation techniques for ETP species and the conservation of genetic diversity is being promoted. The research has taken into account the critical need to conserve genetic diversity of ETP species.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that research is promoted to develop enhancement techniques for ETP species to protect, rehabilitate, and increase their stocks, taking into account the critical need to conserve genetic diversity of ETP species. Examples may include various regulations, data, and reports.*	☐
EVIDENCE:	

References:							
Numerical score:	**Starting score**		**Number of EPs NOT met**				**Overall score**
	10	**–** **(**		**x** **3** **)**	**=**		**NA**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							
Non-conformance Number (if applicable):							

Supporting Clause 13.8.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Management measures are in place to support sustainable enhanced fishery practices and these are in accord with international practices.*	☑

EVIDENCE:

The Pacific Salmon Treaty[415] has been in effect since 1985 and provides clear policy direction for the responsible management of salmon fisheries and related fishery enhancement activities along transboundaries rivers of Alaska and Canada.

Current status/Appropriateness/Effectiveness: *These measures are effective in promoting a States sustainable enhanced fishery practices.*	☑

EVIDENCE:

In 1985, the United States and Canada ratified the Pacific Salmon Treaty, of which Article VII states:

1. This Article applies to salmon originating in transboundary rivers.
2. Notwithstanding Article IV, paragraph 3(c), whenever salmon originate in the Canadian portion of a transboundary river, the appropriate Panel shall provide its views to the Commission on the spawning escapement to be provided for all the salmon stocks of the river if either section of the Panel so requests.
3. On the basis of the views provided by the Panel pursuant to paragraph 2, the Commission shall recommend spawning escapements to the Parties.
4. Whenever salmon originate in the Canadian portions of transboundary rivers, or would originate there as a result of enhancement projects, salmon enhancement projects on the transboundary river shall be undertaken co-operatively, provided, however, that either Party, with the consent of the Commission, may separately undertaken salmon enhancement projects on the transboundary rivers.

Chapter 1 of the Treaty continues, to say:

1. Recognizing the desirability of accurately determining exploitation rates and spawning escapement requirements of salmon originating in the Transboundary Rivers, the Parties shall maintain a joint Transboundary Technical Committee (the "Committee") reporting, unless otherwise agreed, to the Transboundary Panel and to the Commission. The Committee shall, inter alia:

(a) assemble and refine available information on migratory patterns, extent of exploitation and spawning escapement requirements of the stocks;

(b) examine past and current management regimes and recommend how they may be better suited to achieving escapement goals;

(c) 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

In accordance with these principles, the Treaty further identifies cooperative actions to be taken to promote responsible fisheries management and enhancement practices by both Canada and the United States (namely Alaska) on key transboundary rivers.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization protects transboundary aquatic ecosystems by supporting responsible enhanced fishery practices within the States jurisdiction and cooperating to promote sustainable enhanced fishery aquaculture practices. Examples may include various regulations, data, and reports.*	☑

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

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.**

EVIDENCE:

For thirty-five years, the Pacific Salmon Treaty has served as a foundation document and platform for international negotiations supporting the sustainable management of salmon, including stocks that inhabit transboundary waters. This accord continues to be increasingly relevant, as on May 3, 2019, the participating members implemented a new 10-year agreement for these fisheries that is now in force through 2028. In 2014, the Parties agreed to a revised approach for Fraser River sockeye and pink salmon that expires at the end of 2019. It is expected that the Fraser chapter will be renewed by January 1, 2020 for an extended period.

Testimonials from the negotiation process commented on the Treaty's focus on conservation and sustainability[416].

"It was gratifying to know throughout the negotiations that conservation of coastwide salmon stocks was the highest priority of every commissioner," said NOAA Fisheries' Bob Turner, U.S. Commissioner and current Chair of the Commission.

"I'm pleased the Commission was able to bring forward this recommendation, and that the Parties were able to reach an agreement that we feel will support the conservation and long-term sustainability of this important resource" said Rebecca Reid, Canadian Vice-Chair of the Commission and Regional Director General, Fisheries and Oceans Canada, Pacific Region.

The continued success of the Pacific Salmon Treaty as a means to negotiate sustainable salmon stocks across state and international borders provides strong evidence of full conformance for Supporting Clause 13.8.

References:							
Numerical score:	**Starting score**			**Number of EPs NOT met**			**Overall score**
	10	**–**	**(**	**0**	**x 3)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[416] https://archive.fisheries.noaa.gov/wcr/stories/2018/18_09172018_salmon_treaty_renewal.html

Supporting Clause 13.9.

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.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Management measures are in place ensuring responsible choice of species, siting, and management of enhanced fishery activities, which could affect transboundary aquatic ecosystems.*	☑
EVIDENCE: 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 (see Supporting Clause 13.8).	
Current status/Appropriateness/Effectiveness: *There is evidence for the responsible States choice of species, sites, and management procedures. This is considered effective in minimizing potential risks to transboundary aquatic ecosystems.*	☑
EVIDENCE: The successful re-negotiation of the Pacific Salmon Treaty in 2019 lends credence to effective international management of transboundary salmon stocks that inhabit or migrate through the waters of Canada, Alaska and other Pacific states. Fisheries enhancement and other management agreements are included within this international treaty.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization, with due respect to their neighboring States and in accordance with international law, ensures responsible choice of species, siting, and management of aquaculture activities which could affect transboundary aquatic ecosystems. Examples may include various regulations, data, and reports.*	☑
EVIDENCE: The Pacific Salmon Treaty is publicly available at: https://www.psc.org/download/45/miscellaneous/2337/pacific-salmon-treaty.pdf	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 13.10.

13.10.	**The fishery management organization shall consult with their neighboring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a policy in place dictating the procedure to be followed prior to the introduction of non-indigenous species.*	☑
EVIDENCE: The Alaska Finfish Genetics Policy prohibits the import on non-indigenous stocks, thereby precluding the release of non-indigenous salmon into transboundary waters. See Supporting Clause 13.7.1	
Current status/Appropriateness/Effectiveness: *This policy includes a requirement that neighboring States be consulted prior to the introduction of a non-indigenous species into a transboundary area. If there is evidence that such an introduction has occurred in the past, there shall also be evidence that the policy has been followed.*	☑
EVIDENCE: See Supporting Clause 13.7.1 and above	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization consults with their neighboring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems. Examples may include various regulations, data, and reports.*	☑
EVIDENCE: See Supporting Clause 13.7.1 and above. Also, no known reports of non-indigenous species release into transboundary waters.	
References:	

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3) =**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

Supporting Clause 13.11.

13.11.	**The fishery management organization shall establish appropriate mechanisms—such as databases and information networks to collect, share, and disseminate data related to their enhanced fishery activities—to facilitate cooperation on planning for enhanced fishery development at the States and international level.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *A publicly available database has been established.*	☑

EVIDENCE:

Throughout their range, Pacific salmon are perhaps the most intensively studied group of free-ranging fishes that contribute to commercial fisheries. For decades, massive amounts of data have been collected for Chinook, coho, pink, chum and sockeye salmon, and these data have contributed to a variety of databases. ADFG and NOAA Fisheries have either established or contributed to databases that are used to archive, share and disseminate information related to salmon tags, genetics, otoliths, catch, pathology and more.

By in large, these databases are freely accessible online, allowing researchers, managers and the general public access to valuable fisheries management information across much of the species' distribution, including Alaska. In some cases, such as for coded-wire tags, databases directly inform fisheries management and are used to satisfy international treaty obligations.

Current status/Appropriateness/Effectiveness: *The information is disseminated properly and the database is available for public access to facilitate international cooperation.*	☑

EVIDENCE:

Various databases have been developed to assist with the cooperative management of Pacific salmon throughout their range along the west coast of North America. These resources are used to store and disseminate data for:

1. **Coded-Wire Tags** - Information on coded-wire tagged (CWT) salmon, throughout the Pacific region, is available in an on-line coastwide database, known as the Regional Mark Information System (RMIS)[417]. This database is maintained by the Regional Mark Processing Center (RMPC)[418] of the Pacific States Marine Fisheries Commission to facilitate exchange of CWT data between release agencies, sampling/recovery agencies, and other data users. Information included in RMIS includes release information of hatchery salmon, such as date, location, and number of tagged fish released, as well as tag recovery information, such as recovery location, date, and fishery or method. This publicly accessible database is used widely by fisheries managers to estimate the performance and catch rate of various hatchery-produced salmon stocks throughout the Pacific Northwest, Canada and Alaska. ADFG's Tag Lab[419] also curates its own CWT database, which is accessible through the internet to registered users at https://mtalab.adfg.alaska.gov/CWT/Reports-My_Taglab.aspx
2. **Genetics** –ADFG and NOAA Fisheries have contributed to a number of genetic databases that have been developed for Pacific salmon stocks. These databases are widely shared among researchers, contributing to informed management of both hatchery- and naturally-produced salmon, which can often be assigned to stock of origin through genetic identification without a need for tags or marks. Genetic analyses are performed by ADFG primarily through their Gene Conservation Laboratory[420] in Anchorage, Alaska, while NOAA Fisheries conducts much of its genetic analyses of salmon in Alaska at its Auke Bay Laboratory[421]. Shedd *et al.* (2018)[422] recently reported on the development of an Alaskan sockeye salmon genetic baseline and its application in the management of mixed stock fisheries in the area surrounding Kodiak Island. Barclay et al. (2017)[423] reported on the development and application of a genetic baseline for coho salmon, and numerous sources[424]

[417] http://www.psmfc.org/rmpc/index.html
[418] https://www.rmpc.org/
[419] https://mtalab.adfg.alaska.gov/CWT/default.aspx
[420] https://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main
[421] https://www.fisheries.noaa.gov/about/auke-bay-laboratories
[422] https://www.adfg.alaska.gov/FedAidPDFs/FMS16-03.pdf
[423] https://www.adfg.alaska.gov/FedAidPDFs/FMS17-01.pdf
[424] http://www.akleg.gov/basis/get_documents.asp?session=29&docid=29664

13.11.	**The fishery management organization shall establish appropriate mechanisms—such as databases and information networks to collect, share, and disseminate data related to their enhanced fishery activities—to facilitate cooperation on planning for enhanced fishery development at the States and international level.**

[425] [426] have reported on the development of the latest Chinook salmon genetic baseline, which will allow managers to assign unmarked salmon to their region and, in some cases, river of origin.

3. **Otoliths** – ADFG's Mark, Tag and Age Laboratory collects, stores and disseminates otolith mark data through its searchable and publicly accessible online database at https://mtalab.adfg.alaska.gov/OTO/reports/VoucherSummary.aspx. Information provided through this database serves to support the lab's goals to "provide fisheries managers and researchers with timely, current, and historical biological data to help them manage, preserve, protect, and perpetuate Alaska's fishery resources".
4. **Catch** – Catch data are generated, in part through analyses of genetic, CWT and otolith data. ADFG maintains a database of statistics and commercial harvest data[427] that can be used to generate summary reports and other data-based information products.
5. **Pathology** – ADFG's Fish Pathology Laboratory[428] publishes resources on a wide range of maladies that can affect Pacific salmon, including diagnostic information for viruses, bacteria, helminths, arthropods and non-infectious diseases[429]. This laboratory also uses a variety of databases and other resources to conduct diagnostic testing for disease to support the safe operation of salmon hatcheries in Alaska.

Evidence Basis:	
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization has established appropriate mechanisms—such as databases and information networks to collect, share and disseminate data related to their enhanced fisheries activities—to facilitate cooperation on planning for enhanced fisheries development at the States international level. Examples may include various regulations, data, and reports.	☑

EVIDENCE:

Numerous databases are used, developed by and curated by state and federal salmon fisheries managers, as well as interstate and international councils. These databases are, in most cases, publicly accessible through online resources and widely used in the cooperative management of Pacific salmon, including those stocks harvested by commercial fisheries in Alaska. Many reports describing the development and application of genetic, CWT, otolith and other databases are of high quality and easily obtained.

References:							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3)**	**=**	**Overall score**
	10			**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[425] https://www.psc.org/fund-project/chinook-salmon-genetic-baseline-update-for-southeast-alaska-and-canadian-aabm-fisheries/
[426] http://comments.npfmc.org/CommentReview/DownloadFile?p=c15e8b5e-4814-4653-a4e7-bca521f9bc32.pdf&fileName=PRESENTATION%20C5%20Chinook%20Baseline%20Update%20-%20BTemplin.pdf
[427] https://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.statisticsanddata
[428] https://www.adfg.alaska.gov/index.cfm?adfg=fishingpathologylab.main
[429] https://www.adfg.alaska.gov/index.cfm?adfg=fishingpathologylab.pathology_management

Supporting Clause 13.12.

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.
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is an international code of practice developed (Turner 1988). Available online here: http://www.fao.org/docrep/009/ae989e/ae989e00.HTM.*	☑

EVIDENCE:

Turner (1988)[430] developed internationally recognized codes of practice for introductions and transfers of marine and freshwater organisms, which includes specific guidelines for salmonids (in Appendix).

In Alaska, introductions and transfers of salmon are further guided by the State's Finfish Genetics Policy[431], 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
    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.

Furthermore, Alaska Statute 16.10.445 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".

These documents and Statute provide explicit codes of practice for the transfer and introduction of salmon into and within Alaska, and demonstrate Alaska's involvement with the development of and commitment to said codes.

Current status/Appropriateness/Effectiveness: *The code of practice is being effectively observed by the State of interest.*	☑

EVIDENCE:

Hatchery permitting processes, administrated in Alaska by ADFG, ensure that salmon stock transfers and introductions abide by the State Finfish Genetics Policy. Consistent with and in support of the State's Finfish Genetics Policy, are the State's conditions for issuance of a Hatchery Permit:

(1) salmon eggs procured by the hatchery must be from the department or a source approved by the department;
(2) salmon eggs or resulting fry may not be placed in waters of the state other than those specifically designated in the permit;
(3) salmon eggs or resulting fry, sold to a permit holder by the state or by another party approved by the department, may not be resold or otherwise transferred to another person;
(4) salmon may not be released by the hatchery before department approval, and, for purposes of pathological examination and approval, the department shall be notified of the proposed release of salmon at least 15 days before the date of their proposed release by the hatchery;
(5) diseased salmon be destroyed in a specific manner and place designated by the department;
(6) adult salmon be harvested by hatchery operators only at specific locations as designated by the department;
(7) surplus eggs from salmon returning to the hatchery be made available for sale first to the department and then, after inspection and approval by the department, to operators of other hatcheries authorized by permit to operate under AS 16.10.400 - 16.10.470;

[430] http://www.fao.org/3/ae989e/ae989e00.htm
[431] https://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

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.

(8) if surplus salmon eggs are sold by a permit holder to another permit holder, a copy of the sales transaction be provided to the department;
(9) [Repealed, Sec. 5 ch 110 SLA 1980].
(10) 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.

Evenson *et al.,* (2018)[432] recently reviewed compliance by Alaska's salmon hatcheries with this policy, and individual hatchery evaluations of hatcheries, including descriptions of egg source and juvenile release sites, can be found here: https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesOtherInfo.reports

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization cooperates in the elaboration, adoption, and implementation of international codes of practice and procedures for introductions and transfers of enhanced fisheries. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
Both State and international policies guide the orderly practice of salmon transfers in Alaska. Introduction of salmon into Alaska is prohibited by the State Finfish Genetics Policy, which is implemented through the hatchery permitting process administrated by ADFG with clear conditions on the source and transfer of salmon and their eggs. These policies and processes provide strong evidence that ADFG has developed and abides responsible fish transfer and introduction codes of practice.

References:	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.

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[432] https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/SP18-12.pdf

Supporting Clause 13.13.

13.13.	**The fishery management organization shall, in order to minimize risks of disease transfer and other adverse impacts on wild and enhanced fishery stocks, encourage adoption and promote the use of appropriate practices and procedures for (1) the selection and genetic improvement of broodstock, (2) the introduction of non-native species, and (3) the production, sale and transport of eggs, larvae, fry, broodstock, or other live materials. The fishery management organization shall facilitate the preparation and implementation of appropriate States (or international) codes of practice and procedures to this effect.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place to assess and monitor the risks of disease transfer and other adverse effects on wild and enhanced fisheries, codified as management objectives in a code of practice or set of procedures.*	☑

EVIDENCE:

As previously described in detail (see Evidence for Supporting Clause 13.2), 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. In general, 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[433] and various state statutes. Finally, 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, which states "diseased salmon be destroyed in a specific manner and place designated by the department".

Current status/Appropriateness/Effectiveness: *Management measures shall be implemented to achieve the objectives described in the code of practice, and there is evidence of their success at doing so. Care is taken to avoid both movement of genotypes or species between catchment areas or river or lake systems, and contamination of local wild genotypes from enhanced animals of the same species. Appropriate practices have been adopted for the genetic improvement of broodstock to avoid impoverishment of their genetic pool. Appropriate procedures are being published for the selection, production, sale, and transport of brood stocks, eggs, larvae, and fry. There has been preparation and implementation of appropriate codes of practice and procedures to accomplish the abovementioned items.*	☑

EVIDENCE:

As described above and in Evidence of Supporting Clause 13.2, implementation of policies designed to limit the introduction, transfer and disease risk from salmon used for fisheries enhancement in Alaska occurs through ADFG administrated hatchery permitting processes and pathology screening.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization, in order to minimize risks of disease transfer and other adverse impacts on wild and enhanced stocks, encourages adoption of appropriate practices for (1) the genetic improvement of broodstock, (2) the introduction of non-native species, and (3) the production, sale, and transport of eggs, larvae, fry, broodstock, or other live materials. States facilitate the preparation and implementation of appropriate international codes of practice and procedures to this effect. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:

A strong body of evidence demonstrates that management of salmon fisheries in Alaska actively regulate stock transfers among areas and regions, thereby limiting genetic and disease risks from enhancement activities. Furthermore, State supported salmon disease testing and Alaska Statute 16.10.420 combine to limit risks from enhanced salmon fisheries in Alaska.

[433] https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/jointcommittee/5aac39.pdf

13.13.	**The fishery management organization shall, in order to minimize risks of disease transfer and other adverse impacts on wild and enhanced fishery stocks, encourage adoption and promote the use of appropriate practices and procedures for (1) the selection and genetic improvement of broodstock, (2) the introduction of non-native species, and (3) the production, sale and transport of eggs, larvae, fry, broodstock, or other live materials. The fishery management organization shall facilitate the preparation and implementation of appropriate States (or international) codes of practice and procedures to this effect.**							
References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

10 Non-conformances and Corrective Actions

10.1 Non-conformances and associated Corrective Actions

During the spring of 2016, SAI Global (then Global Trust) conducted the first reassessment of conformance to the Alaska Responsible Fisheries Management Program (RFM) by the Alaska commercial salmon fishery. As described in their reassessment report[434], SAI Global identified a single Minor Non-conformance with the RFM by the salmon fishery. This 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).

In response to the minor non-conformance, KRAA and the Alaska Fisheries Development Foundation (AFDF) developed a Corrective Action Plan (CAP) to evaluate and address measures necessary to achieve full RFM conformance. This Plan was appended to the 2016 RFM report and includes a timeline of actions to be taken by KRAA, beginning in 2017.
Progress on the NC was evaluated on the surveillance assessments following the re-assessment in March 2017.

As recognized in the current surveillance report (see Sub-clause 13.4), KRAA has made significant progress toward implementation of their CAP. With authorization from their Board of Directors, KRAA contracted a third party to perform a cost-benefit analysis of otolith marking pink salmon at their Kitoi Bay Hatchery facility. This work was completed in April of 2018, in accordance with the Plan timeline, and presented to the KRAA Board of Directors.

KRAA has also made noteworthy progress toward meeting RFM conformance through experimental otolith marking of pink salmon through a novel, saltwater shock methodology. Experimental marking of pink salmon at Kitoi Bay began in 2017, well in advance of scheduled mass marking of pink salmon at Kitoi Bay Hatchery (in 2023) per the Plan timeline.

The actions described above, taken by KRAA in accordance with the Corrective Action Plan, represent significant progress toward full conformance with ASMI RFM v1.3 Sub-clause 13.4. However, these actions are not yet sufficient to meet full RFM conformance. This Minor Non-conformance will remain open throughout the period of certificate (5 years) and will be carry over on the 2nd cycle of reassessment certification period under AKRFM 2.0 standard until the "medium" confidence rating transitions to "high" as the corrective actions take effect.

[434] https://www.alaskaseafood.org/wp-content/uploads/2017/03/ALASKA-RFM-SALMON-REASSESSMENT-Final-Report-March-2017.pdf

10.1.1 Non-conformance 1 (of 1)

Non-conformance 1 (of 1)	
Clause:	13.4
Non-conformance level:	**Minor**
Non-conformance:	
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 may constitute a plan of activities that the applicant confirms will be implemented within a specified timeframe in order for the non-conformities to be closed out. Corrective action plans should be described in sufficient details with key milestones and timelines for their implementation, so that subsequent surveillance audits can measure progress against stated goals that result in the fishery fully conforming to the identified clause (s). Of note, Alaska RFM procedure also requires that where, close-out requires the cooperation and support of the fisheries management organizations, these must be identified with specific tasks and activities to be undertaken.
Corrective Action Plan (CAP):	In response to the Non Conformance, the client undertook to provide a detailed submission that identifies a set of time bound actions that will be implemented to address the non-conformity. An initial submission was made within the required 28 day period to respond to non-conformities, followed by agreed extensions to provide the assessment team with additional information, clarifications and importantly, letters of confirmation from the Board of Directors at KRAA and support from ADFG on the implementation of the corrective action plan. Progress towards implementing the Action Plan will be assessed at annual surveillance audits based on the deliverables and milestones itemized in the Client Action Plan schedule of tasks and deliverables timeline. **The final submission of the corrective action plan was sent on 8th December 2016 and following a series of conference calls with the client and the executive director of the KRAA Hatchery Board, the assessment team accepted the Action Plan.** The acceptance of the corrective action plan takes the following into consideration: • That annual surveillance audits will be undertaken and form the basis of assessing and confirming progress on implementation of the Action Plan in accordance with the schedule set out. Where progress is deemed to fall behind schedule or an amendment to the plan is provided, the circumstances will be reviewed at that time and the surveillance team will determine if acceptance of the action plan or if further non conformity or changes to the certification status of the fishery are required. • Under ASMI RFM V1.3 Procedure, an extension to the normal 5 year period for addressing non conformity can be granted, in exceptional circumstances. • Exceptional circumstances that warrant an extension to the 5 year period have been reviewed by the assessment team as follows: • The activities that are required to implement the corrective action plan are substantial and require significant resource allocation from a number of disciplines (scientific, management policy, economic, engineering, fiscal). • The implementation of each aspect of the action plan is dependent on several processes and activities, not all of which are under the direct control of the client and hatchery.

Non-conformance 1 (of 1)	
	• Financial support is necessary to implement the corrective action plan as documented. Funding options will be investigated and it is understood that the nature of funding mechanisms (grant aid) require grant submission, review and also have their own time bound cycles for administering funds. • The action plan contains a series of milestones that the assessment team has accepted as demonstration of implementation that occur within the new certification period (March 2021) including the Board Decision on securing and proceeding with the funding option and RFP for installation of the otolith marking equipment (2019-21). • SAI Global also notes that due to the delay in re-certification, the next certification period will in effect, be a 4 year period rather than 5 years (due to the 12 month extension of existing certificate to facilitate V1.3 adoption and due to initial delays in commencing the re-assessment). This is an ISO17065 accredited program requirement
Assessment Team evaluation of CAP	This is a pre-existing CAP which was evaluated at the time it was originally implemented.
Status:	**Open** – Corrective Actions in place to be reviewed annually at surveillance audits.

10.1.2 Corrective Action Plan

The following Corrective Action Plan was submitted by the fishery client (AFDF).

Corrective Action Plan for the RFM Salmon
Minor Non-Conformance
Prepared for:
SAI Global Trust Assessment Team for the Responsible Fisheries Management Re-assessment of Alaska Salmon.

Prepared by:
Alaska Fisheries Development Foundation and Kodiak Regional Aquaculture Association

Introduction
In the spring of 2016, SAI Global Trust (GT) conducted the 1st Reassessment of the Alaska Salmon fishery for conformance with the Alaska Responsible Fisheries Management (RFM) Program. The owner of the RFM standard is the Alaska Seafood Marketing Institute (ASMI). ASMI sought to develop a third-party certification that incorporated the principles of the sustainable fisheries outlined of the United Nations' Food and Agriculture Organization. The Client of the RFM Salmon certification is the Alaska Fisheries Development Foundation (AFDF).

The GT Assessment Team identified a single infraction consisting of a medium confidence rating and a consequent minor non-conformance with the Alaska Commercial Salmon Fishery.

Fundamental clause 13:
Where fisheries enhancement is utilized, environmental assessment and monitoring shall consider genetic diversity and ecosystem integrity.

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

- *No evidence available to demonstrate that evaluation of straying pink salmon has been conducted in Kodiak region since the 1980's. At this time 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.*

This document, the Corrective Action Plan for the RFM Certification of Alaska Salmon, is the result of collaboration between AFDF, the Client for the MSC Certification of Alaska Salmon (Pacific Seafood Processors Association – PSPA), the Kodiak Regional Aquaculture Association (KRAA), and the Alaska Department of Fish and Game (ADF&G). The work culminated at a meeting of the KRAA Board of Directors on September 23, 2016, during which a presentation was made by AFDF and PSPA followed by an in-depth discussion of the issues, and a motion was passed by the Board authorizing the KRAA Executive Director and staff to continue investigations into final costs, benefits and sources of funding for marking of all species of salmon. A subsequent meeting between the KRAA Executive Director and AFDF on Sept. 24 was held to develop a draft document and proposed corrective action plan, which was submitted on Sept. 24. During subsequent meetings between the interested parties, the draft document was further refined to include a timeline and list of tasks, which is included in this final version.

The proposed Corrective Action Plan (Plan), which is outlined in Table 1, is discussed in further detail directly following Table 1. This information is accompanied by supporting documents, including letters of commitment from KRAA and ADF&G, and other appendices.

In consideration of this Action Plan, it is essential to draw your attention to the following:

- Although marking is not required for pink salmon at Kitoi Bay at this time, ADF&G has stipulated that increases in production for all salmon hatcheries state-wide will only be approved if marking is a component of the proposal for the increase.
- Over the past 5 years, KRAA has invested staff time and cash funds toward implementation of marking for several species of salmon at both of its facilities.
- KRAA has also invested approximately $55,000 toward preliminary engineering designs for equipment required to thermally mark pink salmon at its Kitoi facility – which is the focus of the minor non-conformance. KRAA is also committed to investing additional cash next year in order to produce final engineering designs.
- The timeline associated with Action Item 3, which allows KRAA and AFDF to develop a funding plan, may be shortened should funding be secured ahead of the stated target dates. It is the goal of all the parties to see this action item completed ahead of the stated schedule.
- In 2016, pink salmon returns across Alaska, including in Kodiak, were significantly below predictions, which reduces subsequent funding to KRAA which is based on an enhancement tax on the resource. The returns were so poor that Governor Walker declared it a disaster and has requested federal disaster relief funds. This may also open up some opportunity for funding for KRAA, but disaster relief usually takes time.
- In 2016, as a result of pink salmon shortfalls and unprecedented environmental conditions, Kitoi Bay Hatchery fell short of its annual goal of 215 million pink salmon eggs and was able to collect only 94.6 million eggs (44% of the stated goal). This shortfall will impact returns and potential revenue in 2018 and beyond. These circumstances make the creation of a funding plan even more critical to the success of the Corrective Action Plan.
- KRAA's pursuit of alternate marking strategies for other species and commitment to the final engineering and cost estimates of a marking system that would allow for thermal marking of pink salmon (as well as other species as necessary) demonstrates good faith, and, in combination with the Corrective Action Plan, represents a reasonable and attainable path to marking pink salmon at Kitoi Bay Hatchery.

Alaska Fisheries Development Foundation
Proposed Corrective Action Plan for RFM Certification of Alaska Salmon (**Accepted by the Assessment Team**).

Schedule of Tasks and Deliverables timeline FINAL - December 8, 2016:

Actions & Auditable Tasks	Beginning of Audit Year									Entity Responsible
	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Action 1 - Descriptive Document										
Task 1-1: Compile draft document with requested info RE egg take, etc.	X									AFDF, KRAA
Task 1-2: Finalize document after receiving Assessment Team input	X									AFDF, KRAA
Action 2: Cost - Benefit Analysis										
Task 2-1: Identify parameters, scope & cost estimate of cost-benefit analysis	X									AFDF, KRAA, PSPA
Task 2-2: Complete final engineering and estimate capital and operational costs	X									KRAA
Task 2-3: Hire firm to complete cost-benefit analysis	X									AFDF, KRAA, PSPA
Task 2-4: Conduct cost-benefit analysis	X	X								economics firm
Task 2-5: Present results to KRAA Board		X								economics firm
Action 3: Create Funding Plan										
Task 3-1: Identify and investigate potential funding sources	X	X	X							AFDF, KRAA
Task 3-2: Analyze best options for funding			X	X						KRAA
Task 3-3: Board decision to secure funds			X	X						KRAA
Task 3-4: Secure best funding options, as directed by Board				X	X					KRAA
Action 4: Implementation										
Task 4-1: Write & issue RFP for construction/installation of equipment					X					KRAA
Task 4-2: Construction & installation of equipment						X				KRAA
Task 4-3: Begin marking Kitoi pinks							X	X	X	KRAA
Action 5: Evaluation										
Task 5-1: Develop draft plan & costs	X									KRAA, ADF&G
Task 5-2: Finalize plan & costs		X								KRAA, ADF&G
Task 5-3: Begin sampling & monitoring Kitoi pinks									X	KRAA, ADF&G

Corrective Action Plan
The following is the proposed corrective action plan for Sub-clause 13.4.

Action 1: A Descriptive Document
Task 1-1: Compile draft document (2017) [AFDF, KRAA]
A draft document as outlined in the Alaska Salmon Fishery draft 1st Reassessment, providing egg takes, juvenile release numbers and mark type for all salmon species raised at Kitoi Bay and Pillar Creek hatcheries since 2010 is included in Appendix Table 1. In 2017 and beyond, KRAA plans to continue marking these species as identified in Appendix Table 1. Additional information is also included in KRAA's annual management plans (see evaluation sections and appendices), and also in KRAA's annual reports.

Task 1-2: Finalize document (2017) [AFDF, KRAA]

The document will be finalized in 2017 once comments are received from the RFM Alaska Salmon Fishery Assessment Team.

Action 2: Cost-benefit analysis

Task 2-1: Identify parameters, scope and cost estimate of cost-benefit analysis (2017) [AFDF, KRAA, PSPA]

AFDF, KRAA and PSPA will develop a list of parameters and scope of work for a cost-benefit analysis of marking and evaluating pink salmon produced at Kitoi Bay. This information is expected to encourage potential funding sources. Once the scope of work is completed, a cost estimate will be solicited from an economics firm. Final engineering will be completed as a part of this action in order to have complete and accurate cost estimates.

Task 2-2*:* Complete final engineering and estimate capital and operational costs (2017) [KRAA, ADF&G]

The KRAA has identified preliminary costs associated with the capital and operational costs for marking salmon at Kitoi Bay and sampling and evaluation costs (Table 3). At its Sept. 23rd, 2016 meeting, the KRAA Board of Directors authorized continued investigations into developing final costs, benefits and sources of funding for marking of all species of salmon.

Table 11. Preliminary costs associated with purchase and installation of thermal marking equipment, and evaluation

	KBH
Planning and Engineering	$33,010
Construction Oversight	$18,020
Equipment	$108,000
Materials	$143,700

Task 2-3: Hire firm to complete cost benefit analysis (2017) [AFDF, KRAA, PSPA AFDF], KRAA and PSPA will develop an RFP and distribute to firms with expertise in conducting cost benefit analyses and select one. AFDF (Clients for RFM Salmon Certification) will cover the cost of this analysis.

Task 2-4: Conduct cost-benefit analysis (2017 and 2018) Selected Economics Firm

The selected economics firm will use updated data similar to Table 3, other costs information provided by KRAA, and market information obtained from discussions with processors to develop a cost / benefit analysis (or other info, as modified based on recommendations from the firm).

Task 2-5: Present results to KRAA board (2018) Selected Economics Firm

The selected economics firm will present the results of the cost-benefit analysis to the KRAA Board and staff, AFDF and PSPA.

Action 3: Create Funding Plan

Task 3-1: Identify and investigate potential funding sources (2017, 2018 and 2019) [AFDF, KRAA]

AFDF will work with KRAA to identify and investigate potential public and private funding sources for the construction, operation and maintenance at Kitoi Bay for costs as provided in Table 3. AFDF is reviewing alternative energy grant and loan funds that may help reduce capital costs and operating costs by utilizing alternative energy to diesel fuel at the remote KBH site. Potential sources for alternative energy or energy efficiency grants/loans are listed below. Others may also be available.

USDA Rural Development:

- Rural Community Development Initiative

- Rural Energy for America Program
- Rural Business Development Grants
- Business and Industry Loan Guarantees
- Rural Economic Development Loans & Grants

Alaska Energy Authority's Renewable Energy:

- Alternative Energy & Efficiency Program
- Renewable Energy Fund
- Power Project Loan Fund
- Energy Efficiency Finance Seminars

The Governor of Alaska has declared a disaster for the pink salmon fishery in four areas of Alaska (including Kodiak) due to extremely poor returns in 2016. This will continue to restrict KRAA funds available for additional marking activities, however, it may also make additional new sources of funds available for this project, or a portion of it. AFDF and KRAA will explore all potential funding opportunities.

Task 3-2: Analyze best options for funding (2019-2020) [KRAA]
KRAA Board and staff will analyze the available funding options, requirements, cost/benefit analysis, and organization's financial projections to determine which funding option is the best.

Task 3-3: Board decision to secure funds (2019-2020) [KRAA]
The KRAA Board will meet to decide to secure the funds as identified in Task 3-2. This task may be completed earlier, and all parties will strive toward implementation as quickly as possible. However, given limited organizational capacity for a small organization like KRAA to investigate grants and/or loan packages, especially given additional operational challenges that were presented this year in terms of survival and returns, this is a more realistic and conservative timeline.

Task 3-4: Secure best funding options as directed by KRAA Board (2020-2021) [KRAA]
Given the Board decision in Task 3-3, KRAA staff will work to secure the funding including any source requirements. Again, this task may be completed earlier, however, given limited organizational capacity for a small organization like KRAA to work on grants and/or loan packages, this is a more realistic and conservative timeline.

Action 4: Implementation
Task 4-1: Write and issue a RFP for construction/installation of equipment (2021) [KRAA]
Once funds are secured, KRAA will enter into a RFP process for final construction and modifications at Kitoi Bay Hatchery. Hatchery infrastructure will be constructed or modified in accordance with ADF&G approved plans to allow otolith marking of salmon produced at Kitoi Bay Hatchery.

Task 4-2: Begin construction and installation of equipment (2022) [KRAA]
KRAA will review the proposal received in Task 4-1 and contract with best alternative to begin and complete construction and installation.

Task 4-3: Begin marking Kitoi Bay pink salmon (2023, 2024 and 2025) [KRAA]
KRAA will begin marking Kitoi Bay pink salmon in 2023 and continue marking into the future.

Action 5: Evaluation
Task 5-1: Develop draft plan and costs (2017) [KRAA, ADF&G]

KRAA will work with ADFG staff to develop a multi-year study to document the degree of straying of hatchery pink and chum salmon in appropriate Kodiak wild pink and chum salmon spawning streams and the contribution of these hatchery fish to commercial fisheries catch. ADF&G and KRAA have developed a preliminary plan to sample streams nearby the KBH and PCH facilities for straying (see Appendix 1). The stream sampling program will be similar to that conducted by the ADF&G Hatchery Wild Interaction Study. The duration to determine the Proportion of Hatchery Origin (PHOs) will be three years. The catch sampling program will be similar to that used in Prince William Sound. The duration for the commercial catch sampling program will be determined based on the first three years data. KRAA has provided preliminary costs for evaluation and to build capacity at the otolith lab will also be developed.

Task 5-2: Finalize plan and costs (2018) [KRAA, ADF&G]
After review from ADF&G biometricians, plans for the number of otoliths collected for PHOs and commercial catch sampling will be finalized along with sampling locations and protocols.

Task 5-3: Begin sampling and monitoring Kitoi Bay pinks (2025) KRAA, ADF&G Stream sampling for PHOs and commercial catch composition will begin the first year that marked pink salmon return to the Kodiak area, presumably 2025.

References

Chaffee, C., G. Ruggerone, R. Beamesderfer, L. W. Botsford. 2007. The commercial Alaska salmon fisheries managed by the Alaska Department of Fish and Game, a 5-year re-assessment based on the Marine Stewardship Council program. Final draft assessment report, October 30, 2007 (IHP-05-069), Emeryville, CA. Prepared by Scientific Certification Systems, Inc., for the Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau.

Musslewhite, J. 2011. An evaluation of the Kitoi Bay salmon hatchery for consistency with state-wide policies and prescribed management practices . Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J11-01, Anchorage.

10.2 Recommendations

Assessment Teams may also make Recommendations in areas where conformity to the AK RFM Standard could be improved. While Recommendations do not require Corrective Action Plans, the issues highlighted in these recommendations will be reviewed at subsequent assessment audits. In the course of this assessment, the assessment team has also included two (2) non-binding recommendations as follows.

10.2.1 Recommendation 1 (of 2)

Recommendation 1 (of 2)	
Clause:	**13.1.1. In the case of enhanced fisheries, the fishery management organization should take into account natural production, and shall take appropriate actions for conserving genetic diversity and biodiversity, protecting ETP species, maintaining aquatic ecosystems, minimizing adverse impacts on ecosystem structure and function, controlling disease, and maintaining the quality of enhanced stock. Enhanced fisheries may be supported in part by stocking organisms produced in aquaculture facilities or removed from wild stocks other than the stock under consideration.**
Recommendation:	The Assessment Team recommends that hatchery and wild components of escapement for chum salmon in Southeast Alaska, and pink and chum salmon in PWS be monitored and reported according to a regular schedule. Where annual stock-specific estimates are not available, the estimated annual percent of wild and hatchery fish may be used to develop proxy estimates, taking into consideration annual run strengths and other factors as appropriate.
Rationale:	The Assessment Team gathered new information during the 2nd reassessment regarding the straying of Chum Salmon from a hatchery release site in Crawfish Inlet, Southeast Alaska. The Crawfish Inlet chum program is a satellite program (remote release) from the Medvejie Hatchery. The program has a permit for production of 30 million eggs. The program aims to produce 700,000 adult chum salmon for common property harvest. Given its location and other factors, Crawfish Inlet was identified as a suitable release site for hatchery Chum salmon, and managers expected it would provide both adequate spatiotemporal separation from wild populations while significantly enhancing the common property fishery. However, large numbers of Crawfish Inlet hatchery fish were observed returning via West Crawfish Inlet, which is connected to Crawfish Inlet by a small channel. There are numerous chum spawning streams located in West Crawfish Inlet and there have been observations of an increased number of hatchery chum salmon straying into these streams. Even though the local wild salmon population runs occur in summer, and the Medvejie hatchery salmon population runs occur in fall, reducing the likelihood of interbreeding, redd superimposition could serve to supplant the wild population with hatchery-stock fish. It is uncertain whether the recent migration and straying patterns observed are a typical condition or product of recent drought conditions and a significantly larger-than-average run size last year. The overall impact of Crawfish Inlet hatcheries salmon straying is likely minimal relative to the large scale of wild production of chum salmon. Currently, NSRAA and ADFG are collaborating on implementation appropriate measures to mitigate this straying situation. However, the team believes there is need for a more transparent and timely response to this and similar straying issues, and that managers adopt practices aligned with a precautionary approach that would provide timely assessments and protection for wild salmon populations.

10.2.2 Recommendation 2 (of 2)

Recommendation 2 (of 2)	
Clause:	**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.**
Recommendation:	The Assessment Team recommends that hatchery and wild components of harvest be regularly and systematically estimated. Such estimates are made periodically is some areas, but the Assessment Team learned through site visits and literature reviews that wild and hatchery contributions to harvest are seldom, if ever, estimated in other areas (e.g. Kodiak), despite ubiquitous mass marking efforts that could facilitate such estimates and generate valuable information.
Rationale:	Commercial harvest of salmon is enhanced through hatchery production in Alaska. Mass marking of hatchery salmon allows for the discrimination of hatchery and wild fish in catch, which can and, in some cases, does allow for evaluations of both program effectiveness and harvest impacts on wild stocks. The separate contributions of hatchery and wild salmon to commercial harvest is periodically estimated by ADFG in some cases, but sampling across regions does not appear to be systematic or entirely representative. Incompleteness of sampling impacts the information quality associated with assessment of Supporting Clause 13.4. Accordingly, the Assessment Team recommends that a plan be developed to systematically estimate hatchery and wild contributions to harvest across the full scope of commercial salmon fisheries in Alaska.

11 References

Adams, J., Kaplan, I. C., Chasco, B., Marshall, K. N., Acevedo-Gutiérrez, A., & Ward, E. J. (2016). A century of Chinook salmon consumption by marine mammal predators in the Northeast Pacific Ocean. Ecological informatics, 34, 44-51.

ADF&G. 2004. Escapement goal review of select AYK Region salmon stocks. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A04-01, Anchorage. http://www.sf.adfg.state.ak.us/FedAidpdfs/RIR.3A.2004.01.pdf

ADF&G-SF. 2015. Alaska Dept. Fish and Game Division of Sport Fish strategic plan 2015-20120. ADFG. Juneau.

ADF&G-SF. 2015. Alaska Dept. Fish and Game Division of Sport Fish strategic plan 2015-20120. ADFG. Juneau. https://www.adfg.alaska.gov/static/fishing/PDFs/sport/StrategicPlan2015Final.pdf

Adkison, M. . 2010. Models of the effects of marine-derived nutrients on salmon (Oncorhynchus spp.) population dynamics Canadian Journal of Fisheries and Aquatic Sciences. 67(1).

Akenhead, S., N. Bendriem, and J. Par [eds]. 2019. Report of the proceedings for the IYS workshop - first international year of the salmon data laboratory (ISDL) workshop. Technical Report 14. NPAFC. Vancouver, B.C. Canada. https://npafc.org/technical-report/

Anchorage Advisory Committee. Minutes from November 18, 2014. Available from Div. of Boards, AK Dept. Fish and Game, Anchorage.

Anderson, J. L., C. M. Anderson, J. Chu, J. Meredith, F. Aschu, G. Sylvia, M. D. Smith, D. Anggraeni, R. Arthur, A. Guttormsen, J. K. McCluney, T. Ward, W. Akpalu, H. Eggert, J. Flores, M. A. Freeman, D. S. Holland, G. Knapp, M. Kobayashi, S. Larkin, K. MacLauchlin, K. Schnier, M. Soboil, S. Tveteras, H. Uchida, D. Valderrama. Fishery performance indicators: A management tool for triple bottom line outcomes. Plos ONE 10(15):e0122809

Barclay, A. 2017. Annual genetic stock composition estimates for the Upper Cook Inlet Sockeye Salmon commercial fishery, 2005–2016. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J17-05, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2017.05.pdf

Beamish, R., B. Riddell, K. Lang, E. Farley Jr., S. Kang, T. Nagasawa, V. Radchenco, O. Temnykh and S. Urawa. 2009. A long –term research and monitoring plan (LRMP) for Pacific salmon (Onchorynchus spp.) in the North Pacific Ocean. N. Pac. Anad. Fish. Comm. Special. Pub No. 1. NPAFC Suite 502. West Pender St, Vancouver, B.C. VC 3B2 Canada. 48 pp.

Ben-David, M., T. A. Hanley, D. R. Klein, D. M. Schell. 1997. Seasonal changes in diets of coastal and riverine mink: the role of spawning Pacific salmon. Canadian Journal of Zoology 75(5): 803-811

Bernard, D. R. and E. L. Jones III. 2010. Optimum escapement goals for Chinook salmon in the transboundary Alsek River. Alaska Department of Fish and Game, Fishery Manuscript Series No. 10-02, Anchorage.

Bernard, D. R., J. J. Hasbrouck, B. G. Bue and R. A. Clark. 2009. Estimating risk of management error from precautionary reference points (PRPs) for non-targeted salmon stocks. Alaska Department of Fish and Game, Special Publication No. 09-09, Anchorage.

Bidlack, A., and E. M. Valentine. 2009. Assessment of Gulkana hatchery sockeye straying into upper Copper River Tributaries. Ecotrust Copper River technical report. Available (June 2016) at: http://www.crks.org/wp/wp-content/uploads/Upriver-Sockeye-Straying-Report-10-13-09.pdf

Brenner R. E., S. D. Moffitt, W. S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes 94:179-195.

Brenner, R. E., and A. R. Munro, editors. 2016. Run forecasts and harvest projections for 2016 Alaska salmon fisheries and review of the 2015 season. Alaska Department of Fish and Game, Special Publication No. 16-07, Anchorage.

Brenner, R. E., S.D. Moffitt, W. S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes 94:179-195

Brewster, B.P. 2016. Aquatic studies at the Kensington Gold Mine, 2015. ADFG Tech Rept. 16-03. Douglas Ak. http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/16_03.pdf

Brodeur RD (1990) A synthesis of the food habits and feeding ecology of salmonids in marine waters of the north Pacific. FRI-UW-9016, Fisheries Research Institute, University of Washington, Seattle, USA, pp 38

Brodeur, R. D., and D. M. Ware, 1992: Interannual and interdecadal changes in zooplankton biomass in the subarctic Pacific Ocean. Fish. Oceanogr.,1, 32–38

Bronwyn, J, and M. Kukkonen. 2017. Local and traditional knowledge of abundance of Chinook Salmon in the Kenai River. ADF&G Division of Subsistence, Technical Paper No. 431. http://www.adfg.alaska.gov/techpap/TP431.pdf

Burgner, R. L., C. J. D. Costanzo, R. J. Ellis, G. Y. Harry, Jr., W. L. Hartman, O. E. Kerns, Jr., O. A. Mathison and W. F. Royce. 1969. Biological studies and estimates of optimum escapements of sockeye salmon in the major river systems of Southwestern Alaska. Fishery Bulletin 67: 405–459.

Burwen, D. L., S. J. Fleischman and J. D. Miller. 2010. Accuracy and precision of manual fish length measurements from DIDSON sonar images. Transactions of the American Fisheries Society, 139:1306-1314.

Carlson, S. R., K. E. Tarbox and B. G. Bue. 1999. The Kenai sockeye salmon simulation model: A tool for evaluating escapement and harvest Levels. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A99-08, Anchorage.

Chapell, R. S. and S. J. H. Power. 2015. Haines marine boat sport fishery creel survey and Skagway marine boat sport fishery harvest sampling, 2015. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan No. SF.1J.2015.10, Anchorage.

Chasco, B. E., Kaplan, I. C., Thomas, A. C., Acevedo-Gutiérrez, A., Noren, D. P., Ford, M. J., ... & Shelton, A. O. (2017). Competing tradeoffs between increasing marine mammal predation and fisheries harvest of Chinook salmon. Scientific Reports, 7(1), 1-14.

Christie, M. R., M. J. Ford, M. S. Blouin. 2014. on the reproductive success of early-generation hatchery fish in the wild. Evolutionary Applications 7(8):883-896

Clark, R. A. 2005. Stock status and recommended escapement goals for coho salmon in selected waters along the Juneau road system, 1981-2004. Alaska Department of Fish and Game, Special Publication No. 05-21, Anchorage.

Clark, R. A. 2009. An evaluation of estimates of sport fish harvest from the Alaska state-wide harvest survey, 1996-2006. Alaska Department of Fish and Game, Special Publication No. 09-12, Anchorage.

Clark, R. A., D. M. Eggers, A. R. Munro, S. J. Fleischman, B. G. Bue and J. J. Hasbrouck. 2014. An evaluation of the percentile approach for establishing sustainable escapement goals in lieu of stock productivity information. Alaska Department of Fish and Game, Fishery Manuscript No. 14-06, Anchorage.

Clark, S.C., T.L. Tanner, S.A. Sethi, K.T. Bentley and D.E. Schindler. 2015. Migration timing of adult Chinook Salmon into the Togiak River, Alaska, watershed: is there evidence for stock structure? Transactions of the American Fisheries Society 144: 829-836. https://www.tandfonline.com/doi/abs/10.1080/00028487.2015.1031281

Conitz, J. M., K. G. Howard and M. J. Evenson. 2015. Escapement goal recommendations for select Arctic-Yukon--Kuskokwim Region salmon stocks, 2016. Alaska Department of Fish and Game, Fishery Manuscript No. 15-08, Anchorage.

Dann, T. H., C. Habicht, S. D. Rogers Olive, H. L. Liller, E .K .C. Fox, J. R. Jasper, A. R. Munro, M. J. Witteveen, T. T. Baker, K. G. Howard, E. C. Volk, and W. D. Templin. 2012. Stock composition of Sockeye Salmon harvests in fisheries of the Western Alaska salmon stock identification program (WASSIP), 2006-2008. Alaska Department of Fish and Game, Special Pub. No. 12-22, Anchorage. https://www.arlis.org/docs/vol1/G/896520208.pdf.

DeCovich, N and B. Borba. 2014. Genetic stock identification of fall chum salmon in commercial harvests, Yukon River, 2014. AK. Dept. Fish Game Rpt. to the Yukon Panel: Proj. No. URE-01-14N, Anchorage.

Echave, K., M. Eagleton, E. Farley and J Orsi. 2012. A refined Description of Essential Fish Habitat for Pacific Salmon within the U.S. Exclusive Economic Zone in Alaska. NOAA Technical Memorandum NMFS-AFSC-236. U.S. Dept. of Commerce.

Eckert, C., Baker, T., & Cherry, D. (2018). Chronic Health Risks in Commercial Fishermen: A Cross

Elison, T., P. Salomone, T. Sands, M. Jones, C. Brazil, G. Buck, F. West, T. Krieg and T. Lemons. 2015. 2014 Bristol Bay area annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 15-24, Anchorage.

Elkington, J. 1997. Cannibals with Forks: The Triple Bottom Line of 21st Century Business. Capstone, Oxford. 402 pp. ISB 1-900961-27-X.

Elliot, K. H., J. E. Elliott, L. K. Wilson, I. Jones, K. Stenerson. 2011. Density-dependence in the survival and reproduction of bald eagles: Linkages to chum salmon. Journal of Wildlife Management 75(8):1688-1699

Elliott, B. W. and S. J. H. Power. 2015. Production and harvest of Chilkat River Chinook and coho salmon, 2015–2016. Alaska Department of Fish and Game, Regional Operational Plan No SF.1J.2015.17, Anchorage.

Erickson, J.,C. Brazil, X. Zhang, T. McKinley and R. Clark. 2015. Review of salmon escapement goals in Bristol Bay, Alaska. 2015. ADFG. Fishery Manuscript Series15-06, Anchorage.

Eskelin, A., and A. W. Barclay. 2018. Eastside set gillnet Chinook salmon harvest composition in Upper Cook Inlet, Alaska, 2017. Alaska Department of Fish and Game, Fishery Data Series No. 18-30, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-30.pdf

Estensen, J. L., H. C. Carroll, S. D. Larson, C. M. Gleason, B. M. Borba, D. M. Jallen, A. J. Padilla, and K. M. Hilton. 2018. Annual management report Yukon Area, 2017. Alaska Department of Fish and Game, Fishery Management Report No. 18-28, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMR18-14.pdf

Estes, J. A. (2014). Salmon, seabirds, and ecosystem dynamics. Proceedings of the National Academy of Sciences, 111(18), 6534-6535.

Faber, T., P. Bechtel, D. Hernot, Parsons, K. Swanson, S. Smiley and G. Fahey. 2010. Protein digestibility evaluations of meat and fish substrates using laboratory, avian, and illegally cannulated dog assays. Journal Animal Science. 88: 1421-1432.

Fall, J., A. Godduhn, G. Halas. L.Hutchinson-Scarbrough, B. Jones, B. McDavid, E. Mikow, L. Sill, A. Wiita, T. Lemons. 2019. Alaska subsistence and personal use salmon fisheries 2016 annual report. ADF&G Division of Subsistence, Technical Paper No. 446. Juneau. http://www.adfg.alaska.gov/techpap/TP446.pdf

Farley Jr., E. , T. Azumaya, R. Beamish, M. Koval, K. Meyers, K.B. Seong and S. Urawa. 2009. Climate change, production trends, and carrying capacity of Pacific Salmon in the Bering Sea and adjacent waters. N. Pac. Anad. Fish Comm. Bull. 5. NPAFC Suite 502. West Pender St, Vancouver , B.C. VC 3B2 Canada

Farrow, K., A. Brinson, K. Wallimo and D. K. Lew. 2016. Environmental attitudes in the aftermath of the Gulf Oil Spill. Ocean Coastal Manage. 119: 128-134: http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1535&context=usdeptcommercepub

Feddern, M., Bassett, H. R., McElroy, K. N., Ree, M., Gho, M., & Hilborn, R. (2019). A novel method for modeling age and length selectivity of sockeye salmon as applied to the Bristol Bay Port Moller test fishery. Canadian Journal of Fisheries and Aquatic Sciences, 76(6), 989-997.

Gray, D., D. Gordon, D. Harris, S. Conrad, J. Bednarski, R. Bachman, A. Piston, S. Walker and T. Thynes. 2014. Annual management report of the 2013 Southeast Alaska commercial purse seine and drift gillnet fisheries. Alaska Department of Fish and Game, Fishery Management Report No 15-08, Anchorage.

Guthrie, C. M. III, HV. T. Nguyen and J. R. Guyon. 2016. Genetic stock composition analysis of the Chinook salmon bycatch samples from the 2014 Gulf of Alaska trawl fisheries. U.S. dep. Commer., NOAA TM-AFSC-311, 31 p.

Habicht, C., C. T. Smith, A. Barclay, H. Hoyt, K. Turnquist and W. A. Larson. 2019. Discriminating among Pacific salmon, Rainbow Trout, and Atlantic Salmon species using commonly available genetic screening methods. Journal of Fish and Wildlife Management. https://www.fwspubs.org/doi/pdf/10.3996/052018-JFWM-038

Hagen, P., K. Munk, B. Van Alen, B. White (1995) Thermal mark technology for inseason fisheries management: A case study. Alaska Fishery Research Bulletin 2(2):143-155

Hagerman, G., and R. Ehresmann. 2019. 2019 Summer troll fishery management plan. Alaska Department of Fish and Game, Regional Information Report No. 1J19-08, Douglas, Alaska. https://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2019.08.pdf

Heard, W.R. 1998. Do hatchery salmon affect the North Pacific Ocean ecosystem? NPAFC Bulletin 1:405-411

Heard, W.R. 2012. Overview of salmon stock enhancement in southeast Alaska and compatibility with maintenance of hatchery and wild stocks. Environmental Biology of Fishes 94:273-283

Heinl, S., E. Jones, W. Piston, P. Richards and L. Shaul. 2014. Review of salmon escapement goals in Southeast Alaska, 2014. AK. Dept. Fish and Game Fish. Manuscript Series 14-07, Anchorage.

Helfield, J. M., & Naiman, R. J. (2006). Keystone interactions: salmon and bear in riparian forests of Alaska. Ecosystems, 9(2), 167-180.

Helle, J. H., E. C. Martinson, D. M. Eggers, O. Gritsenko. 2007. Influence of salmon abundance and ocean conditions on body size of Pacific Salmon. North Pacific Anadromous Fish Commission Bulletin 4: 289-298.

Hertz, E., M. Trudel, R. D. Brodeur , E. A. Daly, L. Eisner, E. V. Farley Jr., J. A. Harding , R. B. MacFatlane, S. Mazumder, J. H. Moss, J. M. Murphy and A. Mazumder. 2015. Continental-scale variability in the feeding ecology of juvenile Chinook salmon along the coastal northeast Pacific Ocean. Mar. Ecol. Prog. Ser. 537:247-263.

Hilborn, R., and C. J. Walters. 1992. Quantitative fisheries stock assessment: Choice, dynamics and uncertainty. Chapman and Hall, New York.

Hiroko,I., A. Brenner and A. Godduhn. 2013. Socioeconomic patterns in subsistence salmon fisheries: historical and contemporary trends in five Kuskokwim River communities and overview of the 2012 season. ADF&G Division of Subsistence, Technical Paper No. 382.

Ikuta, H. , A. Brenner and A. Godduhn. 2013. Socioeconomic patterns in subsistence salmon fisheries: historical and contemporary trends in five Kuskokwim River communities and overview of the 2012 season. ADF&G Division of Subsistence, Technical Paper No. 382.

Jasper, J., C. Habicht, S. Moffitt, R. Brenner, J. Marsh, B. Lewis, E. Fox, Z. Grauvogel, S. Rogers, and W.S. Grant. 2013. Source-sink estimates of genetic introgression show influence of hatchery strays on wild chum salmon populations in Prince Williams Sound, Alaska. PLOS One 8(12):e81916

Johnson, R. H., and R. L. Murphy. 2019. North Alaska Peninsula commercial salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 19-03, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/AR4_FMR19-03.pdf

Johnson, S. P., D. E. Schindler. 2009. Trophic ecology of Pacific salmon (Oncorhynchus spp.) in the ocean: a synthesis of stable isotope research. Ecological Research 24:855-863.

Kaeriyama, M. M. Nakamura, R. Edpalina, J. R. Bower, H. Yamaguchi, R. V. Walker & K. W. Myers. 2004. Change in feeding ecology and trophic dynamics of Pacific salmon (Oncorhynchus spp.) in the central Gulf of Alaska in relation to climate events. Fisheries Oceanography 13(3):197-207.

Kerkvliet, C. M., and M. D. Booz. 2018. Anchor River Chinook Salmon escapement, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 18-32, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS18-05.pdf

Key, B. H., J. D. Miller, D. L. Burwen, and S. J. Fleischman. 2016. Estimates of Chinook salmon passage in the Kenai River at river mile 8.6 using dual-frequency identification sonar, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 16-13, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS16-13.pdf

Knapp, G. 2011. Local permit ownership in Alaska salmon fisheries. Marine Policy 35(5) pgs. 658-666.

Knudsen, E., M. Buckhorn, K. Gorman, D. Crowther, K. Froning, M. Roberts. 2015. Interactions of wild and hatchery pink salmon and chum salmon in Prince William Sound and Southeast Alaska: Progress Report for 2014 by PWSSC and SSSC to ADF&G

Koenings, J. P. and G. B. Kyle. 1997. Consequences to juvenile sockeye salmon and the zooplankton community resulting from intense predation. Alaska Fishery Research Bulletin 4(2): 120–135.

Koenings, J. P. and R. D. Burkett. 1987. Population characteristics of sockeye salmon Oncorhynchus nerka smolts relative to temperature regimes, euphotic volume, fry density, and forage base within Alaskan lakes. Pages

216– 234 [In] H. D. Smith, L. Margolis and C. C. Wood, editors. Sockeye salmon Oncorhynchus nerka population biology and future management. Canadian Special Publications of Fisheries and Aquatic Science No. 96, Ottawa.

Kondzela, C. M., J. A. Whittle, D. Yates, S. C. Vulstek, H. T. Nguyen and J. R. Guyon. 2016. Genetic stock composition analysis of chum salmon from the prohibited species catch of the 2014 Bering Sea walleye pollock trawl fishery and Gulf of Alaska groundfish fisheries. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-314, 49 p. U.S. Dep. Commer., NOAA-TM-AFSC-314, 49 p.

Kostow, K. 2009. Factors that contribute to the ecological risks of salmon and steelhead hatchery programs and some mitigating strategies. Reviews in Fish Biology and Fisheries 19(1):9-31

Leon, J. M. 2018. Norton Sound Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) king salmon stock status and action plan, 2019: a report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 18-17. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ayk/3_SP18-17.pdf

Liller, Z. W., and J. W. Savereide. 2018. Escapement goal recommendations for select Arctic-Yukon-Kuskokwim Region salmon stocks, 2019. Alaska Department of Fish and Game, Fishery Manuscript No. 18-08, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ayk/1_FMS18-08.pdf

Loewen, M., and N. Baechler. 2014. The 2014 Chignik River Sockeye Salmon smolt outmigration: an analysis of the population and lake rearing conditions. Alaska Department of Fish and Game, Fishery Data Series No. 15-02, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS15-02.pdf

Loring, P. A. 2016. Toward a theory of coexistence in shared social-ecological systems: The case of Cook Inlet salmon fisheries. Journal of Human Ecology 44:153-165.

Mantua, N. J., S. J. Hare, Y. Zhang, J. M. Wallace, R. C. Francis. 1997. A Pacific interdecadal climate oscillation with impacts on salmon production. Bulletin of the American Meteorological Society 78(6): 1069-1079

Marchioni, M., E. Mikow, J. Ream, L. Sill and T. Lemons. 2015. Alaska subsistence and personal use salmon fisheries 2013 Annual Report. ADF&G Division of Subsistence, Technical Paper No. 413. Anchorage.

Marshall, S., D. Bernard, R. Conrad, B. Cross, D. McBride, A McGregor, S. McPherson, G. Oliver, S. Sharr and B. Van Allen. 1987. Application of scale patterns analysis to the management of Alaska's sockeye salmon (Oncorhynchus nerka) fisheries. Can. Spec. Publ. Fish. Aquat. Sci. 307-326.

Matkin, C. O., Ward Testa, J., Ellis, G. M., & Saulitis, E. L. (2014). Life history and population dynamics of southern Alaska resident killer whales (Orcinus orca). Marine Mammal Science, 30(2), 460-479.

Matter, A. N., and M. Tyers. 2019. Chinook Salmon escapement in the Chena and Salcha Rivers and Coho salmon escapement in the Delta Clearwater River, 2019-2023. Alaska Department of Fish and Game, Regional Operational Plan ROP.SF.3F.2019.03. http://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.3F.2016.07.pdf

McConnell, C. J., Westley, P. A., & McPhee, M. V. (2018). Differences in fitness-associated traits between hatchery and wild chum salmon despite long-term immigration by strays. Aquaculture Environment Interactions, 10, 99-113.

McDowell Group 2018. The economic impact of Alaska's Salmon hatcheries. Mc Dowell Group. 3960 Glacier Hwy. Suite 201. Juneau Ak. http://www.mcdowellgroup.net/wp-content/uploads/2018/10/economic-impact-of-alaskas-salmon-hatcheries.pdf

McDowell Group. 2015. The economic impact of the seafood industry in South Central Alaska. Mc Dowell Group. Glacier Hwy. Suite 201. Juneau Ak. https://www.mcdowellgroup.net/portfolio-posts/economic-impact-of-the-seafood-industry-in-southcentral-alaska/

Meyer, S. and B. Powers. 2009. Evaluation of Alaska charter logbook data for 2006-2008. A report to the North Pacific Fishery Management Council, October 2009. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Meyers, T. 2014. Policies and guidelines for Alaska fish and shellfish health and disease control. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J14-04, Anchorage. Available at http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2014.04.pdf

Munro , A. R. and E. C. Volk. 2016. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2007 to 2015. Alaska Department of Fish and Game, Fishery Manuscript Series No. 16-04, Anchorage.

Munro, A. R. 2018. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2009 to 2017. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-04, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FMS18-04.pdf

Munro, A. R. and E. C. Volk. 2015. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2006 to 2014. Alaska Department of Fish and Game, Fishery Manuscript Series No. 15- 34, Anchorage.

Murphy, J., K. Howard, J. Gann, K. Cieciel, W. Templin and C. Gutherie III. 2017. Juvenile Chinook Salmon abundance inn the Nkrthern Bering Sea: Implications for future returns and fisheries in the Yukon River. Deep Sea research Par II: Topical Studies in Oceanography. Vol 135 Pgs 156-167. https://www.sciencedirect.com/science/article/abs/pii/S0967064516301618

Musslewhite, J. 2011a. An evaluation of the Pillar Creek Salmon Hatchery for consistency with state-wide policies and prescribed management practices. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J11-02, Anchorage

Musslewhite, J. 2011b. An evaluation of the Kitoi Bay Salmon Hatchery for consistency with state-wide policies and prescribed management practices. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J11-01, Anchorage

Naish, K. A., J. E. Taylor III, P. S. Levin, T. P. Quinn, J. R. Winton, D. Huppert and R. Hilborn. 2008. An evaluation of the effects of conservation and fishery enhancement hatcheries on wild populations of salmon. Advances in Marine Biology 53:61-194

Nelson P. A., M. J. Witteveen, S. G. Honnold, I. Vining and J. J. Hasbrouck. 2005. Review of salmon escapement goals in the Kodiak Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 05-05, Anchorage.

Nelson, P. A., J. J. Hasbrouck, M. J. Witteveen, K. A. Bouwens and I. Vining. 2006. Review of salmon escapement goals in the Alaska Peninsula and Aleutian Islands Management Areas. Report to the Alaska Board of Fisheries, 2004. Alaska Department of Fish and Game, Fishery Manuscript No. 06-03, Anchorage.

Nettleton, Joyce . 2009. Are fish and plant omega-3s the same? ASMI. Juneau, AK

NOAA. 2013. Biological characterization : An overview of Bristol, Nushagak, Kvichak Bays; essential fish habitat, process and species assemblages. NOAA, AK Region. Anchorage, AK.

NOAA. 2013. Biological characterization : An overview of Bristol, Nushagak, Kvichak Bays; essential fish habitat, process and species assemblages. https://www.fisheries.noaa.gov/resource/document/biological-characterization-overview-bristol-nushagak-and-kvichak-bays-essential

North Pacific Anadromous Fish Commission 2010. NPAFC science plan 2011 – 2015. NNPAFC Doc 1255. 34 pp. Committee of Scientific Research and Statistics (CSRS) NPAFC Suite 502. West Pender St, Vancouver , B.C. VC 3B2 Canada.

NPAFC. 2016. Pacific Salmon and Steelhead Production in a Changing Climate: Past, Present, and Future.Proceedings of the 2015 NPAFC International Symposium on Pacific Salmon and Steelhead Production in a Changing Climate: Past, Present, and Future, May 17–19, 2015. Kobe, Japan. Bulletin No 6. https://npafc.org/bulletin/

NPAFC. 2018. NPAFC Pacific salmonid catch statistics (updated 31 July 2019). North Pacific Anadromous Fish Commission, Vancouver. Accessed Month, Year. Available: https://npafc.org. PSC-JCTC. 2019. Annual report of

catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/

NPFMC. 2014. Reducing bycatch in Alaska. North Pacific Management Council flyer. Anchorage.

Oliveira, A., C. Crapo, B. Himelbloom, C. Vorholt and J. Hoffert. 2005. Headspace gas chromatography-mass spectrometry and electronic nose analysis of volatile compounds in canned Alaska pink salmon having various grades of watermarking.J. Food Sci. 70(7): S419-426.

Pacific Salmon Commission Chinook Salmon Joint Technical Committee. 2015. Annual report of catch and escapement for 2014. PSC report TCCHINOOK (15)-2. Vancouver B.C. Canada. 244 pgs.

Pacific Salmon Commission Joint Technical Committee on Data Sharing. 1989. Information content and standards for a coastwide coded-wire tag database. PSC Report TCDS (89) – 1. Vancouver, B.C. Canada. 183p.

Pacific Salmon Commission Joint Transboundary Technical Committee. 2015. Final estimates of Transboundary River salmon production, harvest and escapement and a review of enhancement activities in 2013. PSC Report TCTR (15)-5. Vancouver B.C. Canada.

Pearcy W.G., J. M. Brodeur, J. M. Shenker, W. W. Smoker, Y. Endo. 1988. Food habits of Pacific salmon and steelhead trout, midwater trawl catches and oceanographic conditions in the Gulf of Alaska 1980–1985. Bull Oceanogr Res Inst 26:29–78

Perschbacher, J. 2015. Chinook salmon creel survey and in-river gillnetting study, lower Kenai River, Alaska, 2013. Alaska Department of Fish and Game, Fishery Data Series No. 15-46, Anchorage.

Peterson, W.T. and J.E.Keister. 2003. Interannual variability in copepod community composition at a coastal station in the northern California Current: a multivariate approach. Deep-Sea Res. 50:2499-2517.

Piston, A. W., and S. C. Heinl. 2012. Hatchery chum salmon straying in Southeast Alaska, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-45, Anchorage.

Piston, A. W., and S. C. Heinl. 2012a. Hatchery Chum Salmon Straying Studies in Southeast Alaska, 2008–2010. Alaska Department of Fish and Game, Fishery Manuscript Series No. 12-01, Anchorage.

Piston, A. W., and S. C. Heinl. 2012b. Hatchery chum salmon straying in Southeast Alaska, 2011. Alaska Department of Fish and Game, Fishery Data Series No. 12-45, Anchorage.

Powers, B. and D. Sigurdsson. 2016. Participation, effort, and harvest in the sport fish business/guide licensing and logbook programs, 2014. Alaska Department of Fish and Game, Fishery Data Series No. 16-02, Anchorage.

Prucha, R., J. Leppi, S. McAfee and W. Loya. 2013. Development and application of an integrated hydrological model to study the effects of climate change on the Chutina watershed, Alaska. US https://www.arlis.org/docs/vol1/D/794294243.pdf. FWS. Contract report by Integrated Hydro Systems and the Wilderness Society. USFWS Anchorage Ak.

PSC-JCTC. 2019. Annual report of catch and escapement. Report TCCHINOOK (19)-01 Pacific Salmon Commission., Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/chinook/

PSC-TCTR. 2019. Final estimates of Transboundary River salmon production, harvest and escapement and a review of joint enhancement activities in 2017.Report TCTR (19)-2 PSC. Vancouver, B.C. Canada. https://www.psc.org/publications/technical-reports/technical-committee-reports/transboundary/

Purcell, M., R. Powers, J. Evered, J. Kerwin, TR. Meyers, B. Stewart and JR. Winton. 2018. Molecular testing of adult Pacific salmon and trout (Oncorhynchus spp.) for several RNA viruses demonstrates widespread distribution of piscine orthoreovirus in Alaska and Washington. J Fish Dis. 41: 347-355.

Ream, J. and J. Merriam. 2017. Local and traditional knowledge of Stikine River Chinook Salmon: A local perspective on a vital commercial, sport, and subsistence fish. ADF&G Division of Subsistence, Technical Paper No. 430. http://www.adfg.alaska.gov/techpap/TP430.pdf

Regnart, J. and C. O. Swanton. 2012. Operational planning–policies and procedures for ADF&G fisheries research and data collection projects. Alaska Department of Fish and Game, Special Publication No. 12-13, Anchorage.

Richards, P., T. Jaecks and P. Etherton. 2013. Estimation of smolt production and harvest of Stikine River Chinook Salmon, 2013. Alaska Department of Fish and Game, Regional Operational Plan No. SF.1J.2013.08, Anchorage

Romberg, W., I. Rafferty, and M. Martz. 2018. Alaska statewide sport fish harvest survey, 2018. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan ROP.SF.4A.2018.07, Anchorage. http://www.adfg.alaska.gov/sf/Publications/index.cfm?ADFG=main.mainSearchSubmit

Rowse, M. and S. Marshall. 1988. Estimates of catch and mortality of Chinook salmon in the 1987 Southeast Alaska purse seine fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-18, Juneau.

Rowse, M. and S. Marshall. 1988. Estimates of catch and mortality of Chinook salmon in the 1987 Southeast Alaska purse seine fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J88-18, Juneau. http://www.adfg.alaska.gov/FedAidPDFs/rir.1j.1988.18.pdf

Ruggerone G. T. and B. M. Connors. 2012. Productivity and life history of sockeye salmon in relation to competition with pink and sockeye salmon in the North Pacific Ocean. Canadian Journal of Fisheries and Aquatic Sciences 72(6):818-833.

Ruggerone, G. T., B. A. Agler, J. L. Nielsen. 2012. Evidence for competition at sea between Norton Sound chum salmon and Asian hatchery chum salmon. Environmental Biology of Fishes 94(1):149-163.

Ruggerone, G. T., J. L. Nielsen, J. Bumgarner. 2007. Linkages between Alaskan sockeye salmon abundance, growth at sea, and climate, 1955-2002. Deep-Sea Research II 54:2776-2793.

Ruggerone, G. T., Springer, A. M., Shaul, L. D., & van Vliet, G. B. (2019). Unprecedented biennial pattern of birth and mortality in an endangered apex predator, the southern resident killer whale, in the eastern North Pacific Ocean. Marine Ecology Progress Series, 608, 291-296.

Ruggerone, G.T., M. Zimmermann, K. W. Myers, J. L. Nielsen, and D. E. Rogers. 2003. Competition between Asian pink salmon (Oncorhynchus gorbuscha) and Alaskan sockeye salmon (O. nerka) in the North Pacific Ocean. Fisheries Oceanography 12(3):209-219

Ruzicka, J. J., E. A. Daly, R. D. Brodeur. 2016. Evidence that summer jellyfish blooms impact Pacific Northwest salmon production. Ecosphere 7(4)

Salomone, P., T. Elison, T. Sands, J. Head, and T. Lemons. 2019. 2018 Bristol Bay annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 19-12, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR19-12.pdf

Savereide, J. W., M. Tyers, and S. J. Fleischman. 2018. Run reconstruction, spawner-recruit analysis, and escapement goal recommendation for Chinook Salmon in the Copper River. Alaska Department of Fish and Game, Fishery Manuscript Series No. 18-07, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/FMS13-03.pdf

Schaberg, K, T. McKinley and A. St.Saviour. 2019 Review of salmon escapement goals in the Alaska Peninsula/ Aleutian Islands and Chignik management Area. Oral Report to the Alaska Board of Fisheries 2019. Oral Report: RC 3, Tab 1. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/rc3_or1.pdf

Schaberg, K. L., H. Finkle, M. B. Foster, D. L. Tracy and M. L. Wattum. 2015. Review of salmon escapement goals in the Alaska Peninsula and Aleutian Islands Management Areas, 2015. Alaska Department of Fish and Game, Fishery Manuscript No. 15-03, Anchorage.

Schaberg, K. L., M. B. Foster, and A. St. Saviour. 2019. Review of salmon escapement goals in the Chignik Management Area, 2018. Alaska Department of Fish and Game, Fishery Manuscript Series No. 19-02, Anchorage. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/akpen/AR7_FMS19-02.pdf

Schelle, K., K. Iverson, N. Free-Sloan and S. Carlson. 2004. Bristol Bay salmon drift gillnet fishery optimum number report. CFEC Report 04-3N. Juneau Ak. https://www.cfec.state.ak.us/RESEARCH/04_3N.htm

Schindler, D. E., M. D. Scheuerell, J. W. Moore, S. M. Gende, T. B. Francis and W. J. Palen. Pacific salmon and the ecology of coastal ecosystems. Frontiers in Ecology and the Environment 1(1):31-37

Sebb, I., W. Seeb, A. Antonovich, M. A. Banks, T. D. Beacham, M. R. Bellinger, S. M. Blankenship, M. R. Campbell, N. A. Decovich, J. C. Garza, C. M. Guthrie III, T. A. Lundrigan, P. Moran, S. R. Narum, J. J. Stephenson, K. J. Supernault, D. J. Teel, W. D. Templin, J. K. Wenburg, S. F. Young & C. T. Smith. 2007. Development of a Standardized DNA Database for Chinook salmon. Fisheries 32(11): 540-552

Seibel, M., A. Davis, A., J. Kelly and J. E. Clark. 1989. Observations on Chinook salmon hook and release in the 1988 Southeast Alaska troll fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J89-41, Juneau.

Sethi, S., M. Reimer, And G. KnAPP. 2014. Alaskan fishing community revenues and the stabilizing role of fishing portfolios Marine Policy 48 (2014) 134–141: https://pdfs.semanticscholar.org/ed6a/dc3bc8d9bbff628544b553d4b04c9d3c30dc.pdf

Shields, P. and A. Dupuis. 2015. Upper Cook Inlet commercial fisheries annual management report, 2014. Alaska Department of Fish and Game, Fishery Management Report No. 15-20, Anchorage.

Sill, L., G. Halas, D. Koster. 2019. Copper River Chinook salmon: the intersection of commercial fisheries and the subsistence way of life in Cordova, Alaska. ADF&G Division of Subsistence, Technical Paper No. 444. Juneau. http://www.adfg.alaska.gov/techpap/TP444.pdf

Simeone, W. and J. Kari. 2002. Traditional knowledge and fishing practices of the Ahtna of the Copper River, Alaska. ADF&G Division of Subsistence, Technical Paper No. 270.

Skannes, P., and G. Hagerman. 2016a. 2016 Spring Troll Fishery Management Plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J16-04, Douglas.

Southwick Associates Inc. and W. J. Romberg, A. E. Bingham, G. B. Jennings and R. A. Clark. 2008. Economic impacts and contributions of sport fishing in Alaska, 2007. Alaska Department of Fish and Game, Professional Paper No. 08-01, Anchorage

Springer, A. M., and G. B. van Vliet. 2014. Climate change, pink salmon, and the nexus between bottom-up and top-down forcing in the subarctic Pacific Ocean and Bering Sea. Proceedings of the National Academy of Sciences 111(18):1880-1888.

Springer, A. M., van Vliet, G. B., Bool, N., Crowley, M., Fullagar, P., Lea, M. A., ... & Woehler, E. J. (2018). Transhemispheric ecosystem disservices of pink salmon in a Pacific Ocean macrosystem. Proceedings of the National Academy of Sciences, 115(22), E5038-E5045.

Stopha, M. 2016. Alaska fisheries enhancement annual report 2015. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J16-03, Anchorage.

Sturdevant, M. V., E. Fergusson, N. Hillgruber, C. Reese, J. Orsi, R. Focht, A. Wertheimer, B. Smoker. 2012. Lack of trophic competition among wild and hatchery juvenile chum salmon during early marine residence in Taku Inlet, Southeast Alaska Environmental Biology of Fishes 94:101-116

Tanner,T. and S. Sethi. 2014. Estimation of Chinook salmon escapement, distribution and run Timing in the Togiak River watershed using radio telemetry, Togiak National Wildlife Refuge, Alaska, 2012. Alaska Fisheries Data Series Number 2014-11, October 2014 U.S. Fish and Wildlife Service.

Trainor, A. B.M. McDavid, L.A. Sill, L.S. Naaktgeboren. 2019. Local traditional knowledge of the freshwater life stages of Yukon River Chinook and Chum Salmon in Anvik http://www.adfg.alaska.gov/techpap/TP%20447.pdf, Huslia, Allakaket, and Fort Yukon. ADF&G Division of Subsistence, Technical Paper No. 447. Juneau

U.S. Canada Technical Committee Northern Boundary Area. 2016. U.S. /Canada Northern Boundary Area 2015 salmon fisheries management report and 2016 preliminary expectations. PSC TCNB (16)-1. Vancouver B.C., Canada.

Volk, E. C., Schroder, S. L., & Grimm, J. J. (1999). Otolith thermal marking. Fisheries Research, 43(1-3), 205-219.

Weiland, K. 2003. Summary of Bristol Bay Sockeye Salmon catches by gear type, 1965-2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 2A03-25, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/RIR.2A.2003.25.pdf

Wendler, G. , K. Galloway and M. Stuefer. 2015. on the climate and climate change of Sitka, Southeast Alaska. Theor. Appl. Clim. 1-8.

Wiese, A., T. Sheridan, J. Botz, S. Moffitt and R. Brenner. 2015. 2014 Prince William Sound area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 15-34, Anchorage.

Wilburn, D. M. and L. K. Stumpf. 2016. Chignik Management Area salmon annual management report, 2015. Alaska Department of Fish and Game, Fishery Management Report No. 16-01, Anchorage

Wilburn, D. M., and R. L. Renick. 2018. Chignik management Area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/FMR18-32.pdf.

Willson, M. F., & Halupka, K. C. (1995). Anadromous fish as keystone species in vertebrate communities. Conservation Biology, 9(3), 489-497.

Wynne, K, D. Hicks and N. Munro. 1991. 1990 Salmon gillnet fisheries observer programs in Prince William Sound and South Unimak Alaska. Final report to NOAA. Saltwater Inc. Anchorage Ak. https://www.fisheries.noaa.gov/resource/document/1990-salmon-gillnet-fisheries-observer-programs-prince-william-sound-and-south.

12 Appendices

12.1 Appendix 1. External Peer Review

The Alaska programme requires that reports be subjected to review by a reviewers external to the Certification Body. Based on the technical expertise required, a team of Peer Reviewers was selected. Peer Reviewers were asked to focus on specific parts of the assessment depending on their particular areas of expertise but were also asked to provide comments elsewhere where they saw fit to do so. The team of Peer Reviewers for this assessment was made up of:

- Dr. Bruce Suzumoto (Independent Consultant)
- Dr. Steve Fried, (Independent Consultant)

Note. Peer reviewer information has been removed and peer reviews are unattributed in this report so the order of the below reviews is not necessarily reflective of the order in which the reviewers are presented above.

12.1.1 Peer Reviewer 1

12.1.1.1 General comments – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
General Comments	
I concur with the Assessment Team's overall finding that U.S. Alaska salmon fisheries should be awarded continuing certification by the Alaska Responsible Fisheries Management Certification Program. A great deal of supporting information has been included in this report, including many references and website links, and I appreciate the amount of effort that went into producing and updating the assessment. The evidence presented to support Conformance Criteria for Fundamental and Supporting Clauses was in most cases consistent and sufficient to support Assessment Team ratings and recommendations. However, I did note a few instances for which I thought 1) additional information was needed to support a rating, 2) information did not seem to address a supporting clause, or 3) information for a supporting clause did not seem relevant to the fishery being assessed. Although there is no specific place in this Peer Review document to comment on assessment outcomes for topics that trigger immediate assessment failure, I was very surprised that no supporting evidence is provided for any of the conclusions for these topics, even though the Assessment Team was highly confident none of these were occurring. Documentation of evidence might be as simple as stating that interviews conducted with appropriate agencies, which should be named, did not uncover any evidence of these activities occurring in the fishery.	Additional information and revision of the rationale on many sections of the report were included to address specific supporting clause . All of these revisions were done accordingly with the reviewer comments on specific supporting clauses below.

12.1.1.2 Non-conformances raised – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
Background Section	
Overall, I think the Background section provides the reader with sufficient information on most topics, but there are a few instances where I think additional information would be beneficial: The State and Federal Management Regimes subsection should include information on: 1) Federal Subsistence Management - The Federal Government assumed subsistence fishery management authority for federal public lands and waters in Alaska (about 60% of total land in the state) in 1999. This has directly affected management of Alaska commercial fisheries, particularly in times of poor salmon runs since subsistence is the priority use. (The federal subsistence program also provides funding to ADFG to continue various salmon monitoring projects that would otherwise have been discontinued under declining state annual budgets.) 2) Coastal area management frameworks - This is the basis of Fundamental Clause 2, and the assessors not only found these frameworks relevant to Alaska salmon fisheries, but also were highly confident that Alaska salmon fisheries were in full conformance to this clause. 3) Salmon enhancement - Hatchery production is mentioned in several areas in the Background section and Fundamental Clause 13 is dedicated to enhancement. It seems appropriate to include information on the history and current status of enhancement programs and activities in the Background section. I have some suggestions for the Alaska Administrative Regions subsection: 1) Remove all mention of fisheries other than salmon fisheries, unless these fisheries affect salmon sustainability; 2) There seems to be no need for a separate subsection titled “Southeast/Yakutat” under the subsection “Region 1: SE/Yakutat;” 3) Catch information is not presented similarly for each region or the areas within the regions (e.g. “Southeast/Yakutat” contains comparisons between 2018 and 2017 catches as well as 10-year average catches, Prince William Sound just reports data from 2018, Bristol Bay reports 2018 catches and comparisons between 2018 and 20-year average catches, etc.); 4) Information on the number of limited entry permits is only provided for Upper Cook Inlet; 5) Information on the number of fishing districts is not provided for all areas discussed in the text, although districts are shown in maps provided in Appendix 5. Since districts (as well as sub-districts and other smaller district subdivisions), are used to focus harvest effort on specific salmon stocks (or stock	The team appreciate the peer reviewer suggestions to improve the document on the background section. On this revised document, new information on Federal Subsistence,anagement Program, Coastal area management frameworks and brief description of the AK enhancement activities were added. Information on fishery districts for Salmon areas were included on the report. Some contents,of Table 5 were modified and Figure 6 was replaced with a new updated one. Catch data was examined again for consistency.

groupings), it would be helpful to provide some information in the text for each area.

Finally, I have suggestions to improve Table 5 and Figure 6:

Table 5 - Under the species column, I suggest the accepted common name be listed first for each species, so instead of "King/Chinook", use "Chinook/King"; and instead of "Keta/chum", use "Chum/Keta." (I also thought dog salmon was a more commonly used alternate name in Alaska for Chum salmon than Keta salmon.)

1) Figure 6 - I suggest:
    - Adding data points for 2016-2018 (2019, if available);
    - Omitting the "value" label (that incorrectly, I think, points at the bars) and, instead, including either a key on the graph or a sentence in the table caption stating that blue bars represent number of salmon and red line represents ex-vessel value;
    - Using "ex-vessel value " in the graph title rather than just "value"; including dates in parentheses for the other labels since it is otherwise difficult to determine this; (d) changing y-axis labels to something like "Number of Salmon (millions)" and "Ex-Vessel Dollar Value (millions)".

12.1.1.3 Scoring element review – Peer Reviewer 1

12.1.1.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.2.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.3.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.3.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.4.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.4.1	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.5.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.6.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.6.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.7.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.8.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
1.9.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2. Coastal area management frameworks		
2.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.1.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.1.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.3.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.4.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.5.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.6.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
2.7.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3. Management objectives and plan		
3.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.1.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.1.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.1.3.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.2.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.2.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.2.3.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
3.2.4.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.1.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.1.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.2.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.2.1.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.3.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.4.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.5.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary

Clause	Peer Reviewer comment	Assessment team response
4.6.	I think many Alaskans, particularly Native and rural Alaskans, would take exception to the first sentence that states "Essentially all stock assessments used for commercially harvested salmon runs are based on modern fishery science, as such this clause is not particularly applicable. " I think traditional fisher knowledge is applicable to Alaska salmon management, as shown by the evidence citing the Kuskokwim Working Group as well as the existence of ADFG's Subsistence Division. Commercial, as well as subsistence, fishers use their traditional knowledge to ply their trade and share this knowledge with friends and family members within their fishing community. While traditional fisher knowledge is subjective and qualitative, in contract to fishery science that strives to be objective and quantitative, traditional knowledge is based on long-term empirical observations and environmental interactions and can be useful to management agencies. I suggest the Evidence text be rewritten to better support the assessors' high confidence there is full conformance with this Supporting Clause, and I provide the following as an example of how this might be done: Although agency stock assessments used for commercially harvested salmon runs are based on fishery science, which is objective and quantitative, traditional fisher knowledge, while subjective and qualitative, plays an important role in management decisions and efforts to sustain salmon runs. Tradition knowledge is useful because it is based on long-term empirical observations and environmental interactions. Recognising the importance of local knowledge for fisheries management, Advisory Committees comprised of local residents were established by statute in 1959 to work with the Alaska boards of Fish and Game. There are 84 of these committees throughout the state that provide a local forum to discuss fish and wildlife issues and to work with the boards in developing, modifying, and evaluating regulations as well as on related issues. During the fishing season, ADFG commercial fishery managers routinely interact with fishers and local advisory committees to obtain their assessment of the run and fishing conditions, and, in some areas, local fishers are contracted to conduct test fishing during fishery closures to collect information on salmon runs. Structured collaborations with stakeholders have been developed in some fisheries to provide local fishing communities a more active role in management and to provide managers with qualitative information on salmon runs and fishing conditions. Two examples of structured collaborations are the Kuskokwim Salmon Management (KSM) Working Group, formed by the	In regard to clause 4.6, we agree that local knowledge is an important part of the Alaska management program and appreciate the expanded text provided. We have included it in our report with minor changes and the additional references. We also note the clause emphasizes the use of such information in "small scale" fisheries and since we concur that there are no "small scale or low value" commercial salmon fisheries in Alaska (see clause 5.5.1) we believe this clause is not particularly relevant

Clause	Peer Reviewer comment	Assessment team response
	Alaska Board of Fisheries in 1998, and the Yukon River Drainage Fisheries Association's (YRDFA; a non-profit group) In-Season Weekly Teleconferences, begun in 1994, and YRDFA's Yukon River Pre-Season Summer Preparedness Planning Meetings, begun in 2010. The KSM Working Group is made up of 14-members, with seats provided for elders, subsistence fishermen, a processor, a commercial fisherman, a sport fisherman, the Kuskokwim River Inter-Tribal Fish Commission, a member at large, a federal subsistence regional advisory committee member, and the ADFG. The goal is for all parties to work together to reach a consensus on management of the fishery, although final emergency order authority rests with ADFG. YRDFA's In-Season Weekly Teleconferences involve fishers from 16 villages and locations (including one in Canada) and managers from ADFG, USFWS, and DFO Canada. Managers get information from local fishers about current and past conditions as well as input and buy-in on potential management actions. Local fishers get to share their knowledge with and obtain information from managers as well as provide input to management decisions. I recommend including more references under Current status/Appropriateness/ Effectiveness in addition to the one for the KSM Working Group. For example, if something like my above suggested Evidence text rewrite is adopted, at least two more references can be included: A reference for Fish and Game Advisory Committees (e.g. http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory), and A reference for YRDFA's In-Season Weekly Teleconferences. (I couldn't find a recent reference, but found a summary report for 2016 teleconferences - Jenkins, W. 2017. Yukon River In-Season Salmon Management Teleconferences Final Report for Project CC-01-16. 6p, and weekly summaries for 2015 teleconferences - http://www.yukonsalmon.org/?s=in-season+weekly+teleconference. However, these are still occurring since they were mentioned in a 2019 ADFG news release - http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/911602562.pdf).	
4.7.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.8.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary
4.9.	I concur with the findings and ratings of this section.	Assessment Team Response: No response necessary

Clause	Peer Reviewer comment	Assessment team response
4.10.	For Supporting Clause 4.10, under Relevance, consider editing the sentence to read - "Not relevant because all Alaska salmon fisheries are fully developed."	We agree with the minor edit of the sentence in clause 4.10 and have made the change.
4.11.	For Supporting Clause 4.11, under Relevance, consider editing the sentence to read – "This clause is not relevant because there is no international management component of Alaska salmon fisheries occurring within a developing country." I think that sentence better addresses what the supporting clause is about	We agree with the edit of the sentence in clause 4.11 and have made the change
5. Stock assessment		
5.1.		Assessment Team Response: No response necessary
5.1.1.	I do not agree that Supporting Clause 5.5.1 is relevant, and, therefore, disagree with the relevance finding (relevant), score (10), confidence rating (high), and conformance level (full) assigned to Supporting Clause 5.5.I. No evidence is provided to support these findings except for the statement under the Relevance section, which only responds to the last sentence of the supporting clause ("A record of good management performance may be considered as supporting evidence of the adequacy of the management system."). However, this does not take into account the preceding sentences that focus the supporting clause on "small-scale or low-value" fisheries. While there are existing provisions for use of a precautionary approach for managing Alaska salmon fisheries, which are discussed under Fundamental Clause 7, I am not aware of any commercial salmon fisheries in Alaska that can be classified as small-scale or low-value. If such commercial salmon fisheries, they should be identified in the appropriate Evidence areas, along with evidence that either sufficient information is available or that a precautionary approach is being taken	We agree that there is no low value or small scale commercial salmon fisheries in Alaska and have made the recommended change
5.1.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
5.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
5.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
5.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
5.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
6. Biological reference points and harvest control rule		
6.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
6.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
6.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
6.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
6.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
7. Precautionary approach		
7.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
7.1.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
7.1.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
7.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.1.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.1.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.4.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.5.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.6.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.7.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.8.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.9.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.10.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
8.11.	The Evidence text for the Current status/Appropriateness/Effectiveness section of Supporting Clause 8.11 needs to be totally re-written to support this section by including text (and some references) that document current efforts in international research cooperation. Currently, the Evidence text for this section is word-for-word the same as the Evidence text for the Process section, except for the last sentence that directs readers to US-Canada collaboration on trans-boundary stock management and research discussion	New text was added on the rationale for Current status/Appropriateness/Effectiveness section of Supporting Clause 8.11
8.12.	The Evidence text for the Process section of Supporting Clause 8.12 needs to be expanded. In addition to referencing international cooperative research efforts documented in the corresponding section of Support Clause 8.11, this section needs to document collaborative research involving the "fishery management organization and relevant institutions involved in the fishery" (i.e. research conducted by ADFG in cooperation with federal agencies, fishing organizations, academic institutions, tribes, etc.) The Evidence text for the Current status/Appropriateness/Effectiveness section of Supporting Clause 8.12 needs to be totally re-written to support this section by not only referencing international cooperative research efforts documented in the re-written corresponding section of Support Clause 8.11, but also by documenting how cooperative research efforts involving ADFG, federal agencies, fishing organizations, academic institutions, tribes, etc. are being applied in managing salmon fisheries. The current text only speaks to gear descriptions and regulations, which is not what this evidence is supposed	New text was added regarding collaborative research involving the "fishery management organization and relevant institutions involved in the fishery" on supporting clause 8.12. New text was added on the rationale for Current status/Appropriateness/Effectiveness section on 8.12 regarding evidence of cooperative research and application of results.

Clause	Peer Reviewer comment	Assessment team response
	to address (i.e. evidence of cooperative research and application of results).	
8.13.	I agree that Supporting Clause 8.13 does not seem relevant to Alaska salmon fisheries, but the Note included under the Relevance section, at least in my opinion, does more to confuse the issue rather than to explain why this supporting clause is not relevant. I recommend removing the note as well as the text under the Process section (which seem to have nothing to do with salmon fisheries). I suppose freshwater artificial in-stream structures that create feeding habitat or shelter for rearing salmon (e.g. placement of current deflectors, addition of large woody debris) or spawning habitat for adult salmon (e.g. spawning channels) might fall under this supporting clause, but I am not aware of their use in Alaska.	The note and text under the Process section in supporting clause 8.13 were removed
9. Appropriate standards of fishers' competence		
9.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
9.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
9.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
10. Effective legal and administrative framework		
10.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
10.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
10.3.	I concur with the findings and ratings of this section	Corrected
10.3.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
10.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
10.4.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
11. Framework for sanctions		
11.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
11.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
11.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
11.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.6.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.7.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.8.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.9.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.2.10.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary

Clause	Peer Reviewer comment	Assessment team response
12.2.11.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.6.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
12.7.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13. Fisheries enhancement activities (remove if not applicable)		
13.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.1.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.2.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.2.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.4.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.5.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.6.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.7.	I recommend several changes for the Evidence sections of Supporting Clause 13.7 – • The second paragraph of Evidence text for the Process section should be moved to the Current status/ Appropriateness/Effectiveness section since it provides information on habitat modification that have been done rather than the system in place to oversee modifications and ecosystem effects. • All existing Evidence text for the Current status/Appropriateness/Effectiveness section should be moved to the Process section since it provides information on the system in place rather than habitat modifications and ecosystem effects • Some additional information concerning effects, reversibility and ecosystem effects of habitat modifications should be included in the Current status/Appropriateness/Effectiveness section along with the paragraph describing the modifications that have been done.	We have restructured the evidence of this section as suggested, and added additional examples of environmental assessment and impact mitigation associated with salmon hatchery operations.
13.7.1.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.7.2	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.7.3.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.8.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.9.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.10.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.11.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.12.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary
13.13.	I concur with the findings and ratings of this section	Assessment Team Response: No response necessary

12.1.1.4 Conclusion – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
General Comments	
I agree with the Assessment Team's conclusion, based on provided evidence, that Alaska commercial salmon fisheries should be awarded continuing certification under the Alaska Responsible Fisheries Management Certification Program. Their findings are based on a large body of information in support of this conclusion. While I did note some instances for which 1) additional information was needed to support a rating, 2) information did not seem to address the supporting clause, or 3) information for a supporting clause did not seem relevant to the fishery being assessed, these are relatively few, minor, and easily rectified. I agree with the Assessment Team's medium rating for Supporting Clause 13.4 (concerning assessment of contributions from enhanced and natural production) because of a minor non-conformance: Kitoi Bay Hatchery was not marking pink salmon production, and ADFG did not have a plan in place to sample commercial harvests or spawning escapements to determine Kitoi Bay Hatchery contributions. The Corrective Action Plan is appropriate and sets a very reasonable timeframe for Kitoi Bay Hatchery to begin otolith marking (2023) and for ADFG to begin sampling the commercial harvest to determine hatchery contributions (2025, which is, I assume, the first year in which all Kitoi Hatchery returns will be marked). It appears both parties are on track to meet this timeframe, which will address the identified non-conformance	Additional information and revision of the rationale on many sections of the report were included to address specific supporting clause . All of these revisions were done accordingly with the reviewer comments on specific supporting clauses .

12.1.2 Peer Reviewer 2

12.1.2.1 General comments – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
General Comments	
I found the report to be an extensive and informed review of the Alaska commercial salmon fishery. The Assessment Team did a good job of consolidating a very large amount of information that dealt with many salmon stocks, various regional fisheries and the regulatory and management structures supporting them. I also believe the Assessment Team appropriately evaluated the management systems of the US Alaska Commercial Salmon Fisheries against the conformance criteria of the RFM Fishery Standard. Therefore in my opinion, the information, data and analysis presented in the Full Assessment Report gives well-founded support to the Assessment Team's recommendation that the US Alaska Pacific Salmon Commercial Fishery be certified against Alaska RFM Certification Program Fisheries Standard Version 2.0. In general, Alaska's salmon resource management should be considered a biological success particularly when compared to other areas outside Alaska where commercial salmon harvests have dramatically declined. The report reinforces the fact that Alaska has an integrated and legally binding fisheries management structure that is coordinated at the local, state and international level. My overall impression is that Alaska has been able to achieve long-term sustainable salmon harvests because there is an institutional commitment to clear biological escapement goals and habitat protection. Also, the responsibility and authority for achieving sustainable harvests is clear and there are adequate resources devoted to managing the fisheries and carrying out necessary research. As highlighted in the report, the primary risk to the US Alaska Salmon Commercial Fishery is with the interaction between salmon hatchery production and wild stock management. The presence of hatchery fish within a fishery and their potential impact on wild stocks remains a concern. Alaska's salmon hatchery production is quite significant and contributes a great deal to the commercial catch. Unfortunately, competition between stocks, potential over harvest of weaker populations in mixed stock fisheries, and hatchery fish straying into natural spawning areas could impact the productivity, diversity and viability of wild stocks over the long term. A better understanding of how hatchery production may impact wild salmon populations is important to the sustainability of the fishery. This can be achieved by better research, monitoring and evaluation of wild and hatchery stocks. The recommendations made by the Assessment Team in Section 10.2 help address this issue	The team appreciates the reviewers comments and wholeheartily agree that a better understanding of how hatchery production may impact wild salmon populations is paramount for the AK salmon fishery sustainability

12.1.2.2 Non-conformances raised – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
Background Section	
The background section of the document provides a reasonable overview for the report. Information in the evaluation section of the report later expands on each topic in greater detail. I believe two additional topics should be considered for inclusion in the background section: 1. An overview on the Alaskan salmon hatchery system. The state of Alaska has a unique hatchery system which includes private non-profit programs. In contrast to other state and federal hatchery programs, the operations of private non-profit programs are funded through fishery enhancement taxes and cost-recovery harvests. Hatchery programs in Alaska contribute significantly to the commercial catch but also create additional challenges for wild stock management. Considering its large impact, a section on the Alaska hatchery system would be helpful in the background section. 2. Data on the estimated cost and required resources to manage the commercial salmon fishery. The background section goes into detail on the number, species and commercial value of the salmon caught in the fishery but it left me asking how much does it cost to manage such a large program. This information would help the reader better understand the relative cost-benefit of managing a commercial fishery that harvests over 100 million salmon and generates $600 million annually. <u>Minor non-conformance issue in Supporting Clause 13.4</u> I concur with the Assessment Team's rating of a minor non-conformance for the KRAA pink salmon program. I also believe the CAP submitted by KRAA and AFDF represents a reasonable approach towards meeting full RFM conformance. In the 2017 AFRM report, Supporting Clause 13.4 received a minor non-conformance rating due to Kodiak Regional Aquaculture Association's (KRAA) release of unmarked hatchery pink salmon. The draft 2020 AFRM report recognizes that KRAA has made significant progress toward implementing their Corrective Action Plan (CAP) by otolith marking all Kitoi Hatchery juvenile pink salmon in 2019. This marking of hatchery fish is well ahead of their CAP implementation schedule that calls for marking juveniles to begin in 2023. KRAA should be commended for obtaining funding and accelerating their marking program. What is troubling is the ADF&G regional biologists' assertion that they do not currently sample salmon otoliths from the commercial fishery nor do they intend to do so in the future. Their statement seems to be in conflict with other areas of the state where the majority of hatchery salmon are marked and the commercial catch is sampled by ADF&G to determine hatchery and wild	[1]An overview of the AK salmon hatcheries was included on this revised version. [2]Regarding the peer review comment from the RFM Alaska Salmon 2nd Reassessment Report on calculating a cost/benefit ratio for the Alaska Salmon Fishery we can provide the following comments. Data on the Ex-Vessel Price of the Salmon Fishery comes from the McDowell Group report, a highly regarded natural resource economics consulting firm in Juneau, Alaska. Their recent publication gives an estimated Ex-Vessel value for the Alaska Seafood industry averaged for 2017 and 2018 to be $ 1,994 million.[435] Also in the document they state that salmon represent 37% of the total or $ 737.8 million Ex-Vessel value. The cost of the fishery management system can be approximated based upon a reference table from ADFG which was presented as a reference in the publication, Alaska Salmon Enhancement report by Mark Stopha for 2018 on page 27.[436] This value is $ 72 million. It is important to note that the estimate of $72 million is for the whole Commercial Fish Division management cost. The budget for salmon management alone would be a smaller value that is not available at the present time. However using the total management cost can give us a rough approximation of a cost/benefit ratio which is clearly very conservative and underestimates the true return on investment. Given these qualifications the cost/benefit ratio is 10 to 1 which represents an outstanding investment for the management of a very large fishery resource. Another way to scale the above estimate is to independently calculate the cost/benefit ratio for the Alaska Salmon PNP hatchery program. The cost estimate was reported on page 27 of the ADFG Alaska Salmon Enhancement Report for 2018 [2] (Stopha *et al.*, 2019). The value on the management cosst of the Alaskan PNP Salmon Hatcheries was $42 million. This estimate comes from an informal survey of all the PNP hatchery organizations regarding their annual management cost which can be found again on page 27 of the previously mentioned report.

[435] http://www.mcdowellgroup.net/wp-content/uploads/2018/10/economic-impact-of-alaskas-salmon-hatcheries.pdf
[436] http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2019.01.pdf

contributions. This issue should be explored further with local and regional ADF&G authorities to determine whether there are difficulties or constraints of using marked hatchery fish as a management tool.	The Ex-Vessel value for the PNP hatchery salmon program can be calculated by using the same estimate used previously, $737.8 million total salmon and reducing it by the fraction of hatchery fish only. The ADFG Salmon Enhancement Report for 2018 states that 34% of the total Salmon Ex-Vessel value is attributed to hatchery salmon[2]. This value would be $251 million. Based upon those figures the cost/benefit ratio would be 6 to 1. These two rough estimates of the cost versus the economic benefit show the return on investment is noteworthy even only using the Ex-Vessel value of the salmon fishery. Clearly it would be even more positive if the total economic benefits were used. Of course, it is well documented that truly determining the value of the sport fishery is difficult because quantifying the value of the experience is illusive so only using the cost of services and expenses is an underestimate.Most importantly trying to place an economic value on the subsistence fishery is inappropriate as you cannot put a price on a cultural way of life. Finally, a more formal estimate of the cost to benefit ratio for the Alaskan Salmon fishery could be initiated by respectfully requesting that ADFG provide more specific data on the cost to manage the Alaska Salmon Fishery as well as an estimate of the Ex vessel value based upon final harvest data from the commercial fishery. This current effort should only be considered as a first approximation of a cost/benefit ratio for the Alaska Salmon Fishery. We would request an opportunity for a more formal estimate to be undertaken which would require more time to accomplish. Therefore it is requested that this effort be presented more formally in the next assessment in 2021 [3] On the comments about AKDF&G Kodiak staff remarks, the team had many discussions with the AKDFG regional biologists about this matter. The team felt also that if the new technique of marking otoliths shows that is very efficient and cost effective, it is likely that a mass marking program could be developed with the support of ADF&G.

12.1.2.3 Scoring element review – Peer Reviewer 2

12.1.2.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	Concur with finding.	Assessment Team Response: No response necessary
1.2.	Concur with finding.	Assessment Team Response: No response necessary
1.2.1.	Concur with finding. Typo in supporting clause: "in the same region is region"	Corrected
1.3.	Concur with finding.	Assessment Team Response: No response necessary
1.3.1.	Concur with finding.	Assessment Team Response: No response necessary
1.4.	N/A	Assessment Team Response: No response necessary
1.4.1	Concur with finding.	Assessment Team Response: No response necessary
1.5.	Concur with finding.	Assessment Team Response: No response necessary
1.6.	Concur with finding.	Assessment Team Response: No response necessary
1.6.1.	N/A	Assessment Team Response: No response necessary
1.7.	Concur with finding.	Assessment Team Response: No response necessary
1.8.	Concur with finding.	Assessment Team Response: No response necessary
1.9.	N/A	Assessment Team Response: No response necessary
2. Coastal area management frameworks		
2.1.	Concur with finding.	Assessment Team Response: No response necessary
2.1.1.	Concur with finding.	Assessment Team Response: No response necessary
2.1.2.	Concur with finding.	Assessment Team Response: No response necessary
2.2.	Concur with finding.	Assessment Team Response: No response necessary
2.3.	Concur with finding.	Assessment Team Response: No response necessary
2.4.	Concur with finding.	Assessment Team Response: No response necessary
2.5.	Concur with finding.	Assessment Team Response: No response necessary
2.6.	Concur with finding. NPAFC, North Pacific Anadromous Fish Commission is not in the glossary.	Included in the glossary
2.7.	Not sure how the evidence supports the N/A finding. I don't understand how only the lack of artificial reefs and fish aggregation devices justify a not relevant designation. It seems this sub-clause relates to real time notifications needed for events like oil spills or other emergencies.	New text was added reflecting the requirements for this supporting clause
3. Management objectives and plan		
3.1.	Concur with finding.	Assessment Team Response: No response necessary
3.1.1.	N/A. Concur with finding. ETP, Endangered, Threatened or Protected, not in glossary.	Corrected
3.1.2.	Concur with finding.	Assessment Team Response: No response necessary
3.1.3.	Concur with finding.	Assessment Team Response: No response necessary
3.2.	Concur with finding.	Assessment Team Response: No response necessary
3.2.1.	Concur with finding.	Assessment Team Response: No response necessary
3.2.2.	Concur with finding.	Assessment Team Response: No response necessary
3.2.3.	Concur with finding.	Assessment Team Response: No response necessary
3.2.4.	Concur with finding.	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	Concur with finding.	Assessment Team Response: No response necessary
4.1.1.	Concur with finding.	Assessment Team Response: No response necessary
4.1.2.	Concur with finding. Good supporting evidence.	Assessment Team Response: No response necessary
4.2.	Concur with finding.	Assessment Team Response: No response necessary
4.2.1.	Concur with finding. Typo in numerical score.	Corrected
4.3.	Concur with finding.	Assessment Team Response: No response necessary
4.4.	Concur with finding.	Assessment Team Response: No response necessary
4.5.	Concur with finding.	Assessment Team Response: No response necessary
4.6.	Concur with finding. Could the fish wheel and trap that was used by the Metlakatla Tribe in SEAK be considered here? Tribes in the Columbia River Basin are considering returning to more historic fishing techniques that selectively segregate wild and hatchery fish. Very few individuals still know how to construct traps and fish wheels so it would be smart to memorialize their knowledge	The Metlakatla tribe's commercial fishing operations is not covered under this assessment. It is however covered under a separate MSC assessment, where the gear they use is documented. We concur that it is worthwhile to memorialize the construction and use of non-traditional fishing gear. Fish wheels are still used in the upper Yukon River for harvest and in several rivers for stock assessment via mark recapture experiments. We believe that the construction and operation of this gear type is reasonably well documented. Traps are outlawed for use in Alaska's fisheries. They may still be used in Metlakatla and are used elsewhere in the world, most notably in Russia. Several Russian salmon fisheries that use traps are certified by MSC where descriptions of their use can be found
4.7.	Concur with finding.	Assessment Team Response: No response necessary
4.8.	Concur with finding.	Assessment Team Response: No response necessary
4.9.	N/A, Concur with finding.	Assessment Team Response: No response necessary
4.10.	N/A, Concur with finding.	Assessment Team Response: No response necessary
4.11.	N/A, Concur with finding.	Assessment Team Response: No response necessary
5. Stock assessment		
5.1.	Concur with finding.	Assessment Team Response: No response necessary
5.1.1.	Concur with finding.	Assessment Team Response: No response necessary
5.1.2.	Concur with finding.	Assessment Team Response: No response necessary
5.2.	Concur with finding.	Assessment Team Response: No response necessary
5.3.	Concur with finding.	Assessment Team Response: No response necessary
5.4.	Concur with finding.	Assessment Team Response: No response necessary
5.5.	Concur with finding.	Assessment Team Response: No response necessary
6. Biological reference points and harvest control rule		
6.1.	Concur with finding. Comprehensive evidence support.	Assessment Team Response: No response necessary
6.2.	Concur with finding.	Assessment Team Response: No response necessary
6.3.	Concur with finding.	Assessment Team Response: No response necessary
6.4.	Concur with finding. In season management of stream escapements is a powerful tool that the AK commercial fishery uses to ensure adequate returns. In most cases, fisheries in other areas cannot monitor in season escapements at the spawning stream level. It is one of the reasons that AK has been successful at maintaining its natural runs.	We concur that in-season assessment of escapements is a key component contributing to the success of the Alaska salmon fishery management program

Clause	Peer Reviewer comment	Assessment team response
6.5.	Concur with finding.	Assessment Team Response: No response necessary
7. Precautionary approach		
7.1.	Concur with finding. Comprehensive evidence and examples.	Assessment Team Response: No response necessary
7.1.1.	Concur with finding.	Assessment Team Response: No response necessary
7.1.2.	Concur with finding.	Assessment Team Response: No response necessary
7.2.	N/A, Concur with finding.	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.	Concur with finding. Conservation and management measures are strong in fishery.	Assessment Team Response: No response necessary
8.1.1.	Concur with finding.	Assessment Team Response: No response necessary
8.1.2.	Concur with finding.	Assessment Team Response: No response necessary
8.2.	Concur with finding.	Assessment Team Response: No response necessary
8.3.	Concur with finding. Typo “strickly” (strictly)	Corrected
8.4.	Concur with finding.	Assessment Team Response: No response necessary
8.4.1.	Concur with finding. Good detail in evidence sections.	Assessment Team Response: No response necessary
8.5.	Concur with finding.	Assessment Team Response: No response necessary
8.5.1.	Concur with finding.	Assessment Team Response: No response necessary
8.6.	Concur with finding.	Assessment Team Response: No response necessary
8.7.	Concur with finding.	Assessment Team Response: No response necessary
8.8.	Concur with finding.	Assessment Team Response: No response necessary
8.9.	Concur with finding.	Assessment Team Response: No response necessary
8.10.	N/A, Concur with finding.	Assessment Team Response: No response necessary
8.11.	Concur with finding.	Assessment Team Response: No response necessary
8.12.	Concur with finding.	Assessment Team Response: No response necessary
8.13.	N/A, Concur with finding.	Assessment Team Response: No response necessary
9. Appropriate standards of fishers’ competence		
9.1.	Concur with finding.	Assessment Team Response: No response necessary
9.2.	Concur with finding.	Assessment Team Response: No response necessary
9.3.	Concur with finding. Typo? Evidence statement missing for evidence basis.	Statement of evidence added
10. Effective legal and administrative framework		
10.1.	Concur with finding. AK conducts robust enforcement of fishery.	Assessment Team Response: No response necessary
10.2.	Concur with finding.	Assessment Team Response: No response necessary
10.3.	N/A, Concur with finding.	Assessment Team Response: No response necessary
10.3.1.	N/A, Concur with finding.	Assessment Team Response: No response necessary
10.4.	N/A, Concur with finding.	Assessment Team Response: No response necessary
10.4.1.	N/A, Concur with finding.	Assessment Team Response: No response necessary
11. Framework for sanctions		
11.1.	Concur with finding.	Assessment Team Response: No response necessary
11.2.	Concur with finding.	Assessment Team Response: No response necessary
11.3.	Concur with finding. IUU fishing, Illegal, Unreported, and Unregulated fishing not found in glossary.	Assessment Team Response: No response necessary
11.4.	N/A, Concur with finding.	Assessment Team Response: No response necessary

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

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	Concur with finding. Substantial evidence.	Assessment Team Response: No response necessary
12.2.		Assessment Team Response: No response necessary
12.2.1.	Concur with finding.	Assessment Team Response: No response necessary
12.2.2.	Concur with finding.	Assessment Team Response: No response necessary
12.2.3.	Concur with finding.	Assessment Team Response: No response necessary
12.2.4.	Concur with finding.	Assessment Team Response: No response necessary
12.2.5.	Concur with finding.	Assessment Team Response: No response necessary
12.2.6.	Concur with finding.	Assessment Team Response: No response necessary
12.2.7.	Concur with finding.	Assessment Team Response: No response necessary
12.2.8.	Concur with finding.	Assessment Team Response: No response necessary
12.2.9.	Concur with finding.	Assessment Team Response: No response necessary
12.2.10.	Concur with finding.	Assessment Team Response: No response necessary
12.2.11.	Concur with finding.	Assessment Team Response: No response necessary
12.3.	Concur with finding. Salmon carcasses also help drive food web productivity by bringing marine nutrients into streams and rivers.	Agreed. This role of salmon in riparian and terrestrial environments is mentioned and cited in the last paragraph of this section
12.4.	Concur with finding.	Assessment Team Response: No response necessary
12.5.	Concur with finding.	Assessment Team Response: No response necessary
12.6.	Concur with finding.	Assessment Team Response: No response necessary
12.7.	Concur with finding.	Assessment Team Response: No response necessary
13. Fisheries enhancement activities (remove if not applicable)		
13.1.	Concur with finding.	Assessment Team Response: No response necessary
13.1.1.	Concur with finding.	Assessment Team Response: No response necessary
13.2.	Concur with finding.	Assessment Team Response: No response necessary
13.2.1.	Concur with finding.	Assessment Team Response: No response necessary
13.3.	Concur with finding.	Assessment Team Response: No response necessary
13.4.	Concur with finding. Minor non-conformance. Please see comments in concluding remarks.	Noted; additional remarks reviewed.
13.5.	Concur with finding. In some hatchery programs, operators time the release of pink and chum salmon to coincide with the annual nearshore zooplankton bloom to allow juveniles to feed on a natural food source and increase their overall survival.	Additional language has been added to Current status/appropriateness/effectiveness section to highlight applications of zooplankton sampling by hatchery operators
13.6.	Concur with finding. Very good justification and evidence.	Assessment Team Response: No response necessary
13.7.	Concur with finding.	Assessment Team Response: No response necessary
13.7.1.	Concur with finding.	Assessment Team Response: No response necessary
13.7.2	Concur with finding.	Assessment Team Response: No response necessary
13.7.3.	N/A, Concur with finding.	Assessment Team Response: No response necessary
13.8.	Concur with finding.	Assessment Team Response: No response necessary
13.9.	Concur with finding.	Assessment Team Response: No response necessary
13.10.	Concur with finding.	Assessment Team Response: No response necessary
13.11.	Concur with finding. Substantial evidence.	Assessment Team Response: No response necessary
13.12.	Concur with finding.	Assessment Team Response: No response necessary
13.13.	Concur with finding.	Assessment Team Response: No response necessary

12.1.2.4 Conclusion – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
General Comments	
Conclusion I concur with the Assessment Team's recommendation that the US Alaska Pacific Salmon Commercial Fishery be certified against Alaska RFM Certification Program Fisheries Standard Version 2.0. From the information presented it is clear that the fishery has a comprehensive and legally binding management structure for salmon fisheries that is coordinated at the local, state and international level. Over time, this system has functioned very well as demonstrated by the long-term productivity of natural salmon populations and the many years of successful harvests by the commercial salmon fishery. I felt that the Assessment Team was able to compile a large amount of pertinent information relating to the fishery. The report was updated with recent research, operational and regulatory information relevant to the review. The Team increased the validity of the process by vetting data via a series of direct meetings with individuals from the relevant fishery agencies and organizations. In general, I believe they used the acquired information to appropriately evaluate the commercial fishery against the evaluation parameters for each clause. Section 10.1. Non-Conformance and Associated Corrective Actions. In 2016, the Team highlighted sub-clause 13.4 as a minor non-conformance issue because the Kodiak Regional Aquaculture Association (KRAA) was releasing unmarked hatchery pink salmon. The Team recommended corrective action and stated that "corrective action may constitute a plan of activities that the applicant confirms will be implemented within a specified timeframe in order for the non-conformities to be closed out." In response, in late 2016 KRAA and the Alaska Fisheries Development Foundation (AFDF) took corrective action by developing a Corrective Action Plan (CAP) that outlined a schedule of actions to implement a marking and evaluation program. KRAA made notable progress implementing the CAP by otolith marking all Kitoi Hatchery juvenile pink in 2019. I believe that KRAA should be commended for their action. This is a major accomplishment and well ahead of schedule. I agree with the Assessment Team's appraisal that KRAA's actions represent significant progress toward full conformance with Sub-clause 13.4. I concur with the Assessment Team's rating of a minor non-conformance for the KRAA pink salmon program. I also believe the CAP submitted by KRAA and AFDF represents a reasonable approach towards meeting full RFM conformance. I recognize that although much progress has been made, it is still not yet enough to meet full conformance. Therefore I concur that the minor non-	As mentioned above the team had many discussions with the ADF&G Kodiak regional biologists about this matter. The team felt also that if the new technique of marking otoliths shows that is very efficient and cost effective, it is likely that a mass marking program could be developed with the support of ADF&G on a date very earlier than scheduled on the plan.The team will forward the peer reviewer comments for subsequent discussion on the possibility of modifying the action plan on the next surveillance of the new re certification cycle.

conformance should carry forward into the next cycle of reassessment.

What I find surprising is the ADF&G Kodiak regional office assertion that they do not currently sample salmon otoliths from the commercial fishery nor do they intend to do so in the future. The CAP was reportedly developed in collaboration with ADF&G. The regional office statement conflicts with other areas of the state where hatchery salmon are marked and the commercial catch is sampled to determine hatchery and wild contributions. KRAA and AFDF should explore this issue further with area, regional and if necessary state level ADF&G authorities as to why they do not anticipate using marked hatchery fish as a management tool. After these discussions are held, I recommend that the CAP be modified to include greater detail about how the sampling, monitoring and evaluation of Kitoi pink salmon (CAP Action 5) will be implemented and when it will take place.

In the KRAA CAP, marking Kitoi pink salmon was to begin in 2023. I believe because KRAA has accelerated the marking program, there are many opportunities to hone logistical and technical issues before full-scale sampling begins in 2025. Among other things KRAA and ADF&G can examine the hatchery returns and commercial catch to:

- Determine whether the otolith mark in returning adults can be distinctly identified
- Determine whether the marking protocol should be modified or improved
- Develop workable fishery and hatchery sampling protocols
- Test preliminary plans to sample local streams for hatchery strays
- Solve logistical issues on extracting and reading otoliths
- Develop more accurate budgets on costs for a full scale sampling program
- Develop real-time, in season fishery communications and management to optimize harvest and protect wild populations
- Determine whether full-scale sampling can begin sooner than 2025

These actions and others should be incorporated now into a revised and more detailed KRAA CAP timeline to ensure that the plan remains on schedule and the sampling and monitoring of Kitoi pinks begins in 2025

12.2 Appendix 2. Stakeholder submissions and Assessment Team Responses

No stakeholders registered on the ASMI website for public consulation of the draft report.

12.3 Appendix 3. Assessment Team and Peer Reviewer Bios

12.3.1 Assessment Team Bios

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd., is pleased to confirm the Full Assessment team members for the fishery as follows.

Dr. Ivan Mateo, 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 He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Dr. Mateo worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modelling of Alaska sablefish and early life history/recruitment dynamics Pacific ocean perch .

Brian Allee, Ph.D. (Assessor)

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 he 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)

B.S. Fisheries Science Oregon State University, M.S. Fisheries Science University of Washington 1974 - 1980 Fisheries Scientist and Project Leader at the Fisheries Research Institute, University of Washington. Mr. Marshall's 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 PhD (Assessor)
Marc's studied at Oregon Department of Fish and Wildlife Corvallis Research Laboratory, Oregon State University Department of Fisheries and Wildlife. Scott 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

12.3.2 Peer Reviewer Bios

Based on the technical expertise required to carry out this assessment, SAI Global selected a team of external Peer Reviewers Team as follows.

Bruce Suzumoto

Bruce Suzumoto is a former Senior Policy Advisor for the West Coast Region of the National Oceanic and Atmospheric Administration's Fisheries office (NOAA Fisheries). For the last 39 years, Mr. Suzumoto has worked in Oregon, Washington, Alaska and Chile on fisheries projects and salmon related issues. His duties included representing NOAA Fisheries in broad scale water negotiations (Columbia River Treaty), Endangered Species Act (ESA) consultations in the Columbia River Basin and salmon and steelhead goal setting discussions with regional sovereigns and stakeholders (Columbia River Partnership). Before the aforementioned position, he served as NOAA Fisheries' Assistant Regional Administrator for Hydropower working on salmon passage and survival issues associated with hydroelectric projects. Prior to coming to NOAA Fisheries, Mr. Suzumoto was employed as a manager with the Northwest Power and Conservation Council focusing on hatchery, harvest and hydropower issues. In Alaska, Mr. Suzumoto served as President/CEO of the Prince William Sound Aquaculture Corporation a large scale private non-profit salmon hatchery program. Mr. Suzumoto also worked as a salmon scientist with Weyerhaeuser Research and Development in Springfield, Oregon and as a fisheries professor at the Universidad Tecnica del Estado in Puerto Montt, Chile. Mr. Suzumoto received his undergraduate degree in biology from the University of California at San Diego and his master's degree in fisheries from Oregon State University.

Stephen Fried

Stephen M Fried obtained a BS degree in Biology from City College of the City University of New York (1971) and an MS (1973) and PhD (1977) in Zoology from University of Maine Orono. His MS thesis involved estuarine fish seasonal distribution and abundance as part of pre-operational atomic power plant studies, while his PhD thesis concerned Atlantic salmon smolt migratory behavior using ultrasonic telemetry. During his time at University of Maine he also served as part of the scientific crew aboard the R/V Hero during a National Science Foundation research cruise along the Antarctic Peninsula (1973), for which he was awarded a U.S. Antarctic Service Medal. After receiving his Ph.D., he moved to Oregon where he briefly worked as a temporary biologist for Oregon Department of Fish and Wildlife as well as a volunteer for fishery related work at Oregon State University, including a short research cruise aboard the R/V Wacoma. He moved to Alaska when he was hired by the Alaska Power Trollers Association to oversee their Logbook Program. After a year with that association (1977/1978), he went on to work for Alaska Department of Fish and Game (ADFG) for 22 years (1978-2000), and for U.S. Fish and Wildlife Service (USFWS) for 13 years (1979-2013). During his time with ADFG, he served as Bristol Bay Area Biologist for Fisheries Rehabilitation, Enhancement and Development Division, and then went to Commercial Fisheries Division where he served as Bering Sea Herring Lead Project Biologist, Bristol Bay Salmon Area Research Biologist, Exxon Valdez Oil Spill Study Coordinator, and Central Regional Research Supervisor (Prince William Sound/Copper River, Upper Cook Inlet, Lower Cook Inlet, and Bristol Bay management areas). During his time with USFWS, he worked in the Federal Subsistence Management Program as a Regional Fish Biologist (Southcentral, Bristol Bay, Kodiak/Aleutians, Seward Peninsula, North Slope, and Northwest Arctic), and then as Fisheries Division Chief responsible for coordinating subsistence fishery responsibilities among five federal agencies (Bureau of Indian Affairs, Bureau of Land Management, Forest Service, National Parks Service, USFWS), overseeing the Fisheries Resource Monitoring and Partners for Fisheries Monitoring Programs, and supporting Regional Advisory Councils and the Federal Subsistence Board. Since retiring, he has continued to serve as a Science Editor for Fisheries Magazine, a publication of the American Fisheries Society.

12.4 Appendix 4. Statewide Alaska salmon fishery locations

Maps available at http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/maps/map_home.php.

Region 1. Southeast/Yakutat area

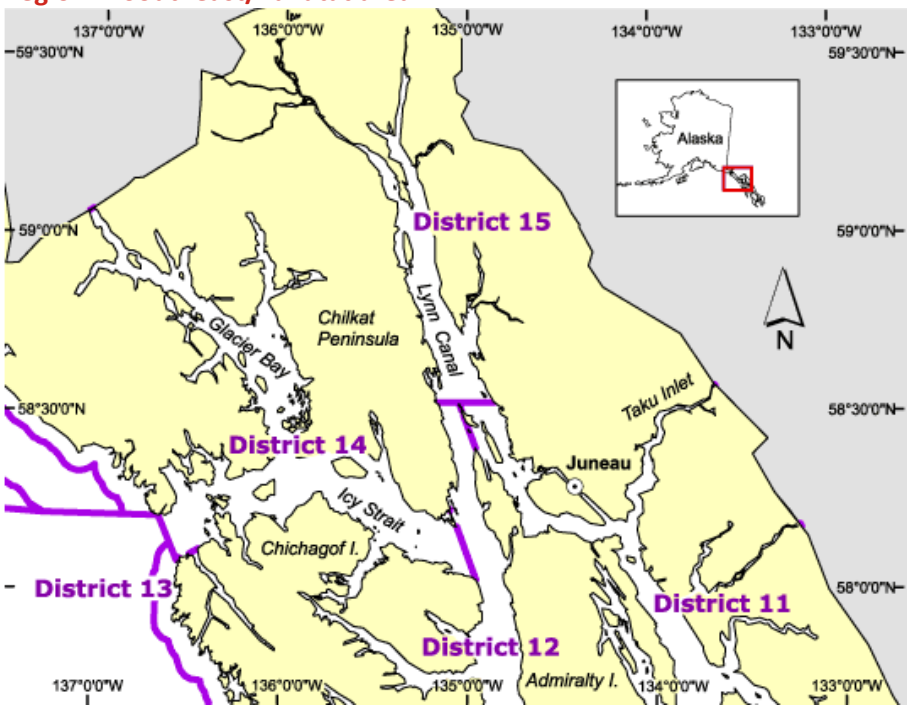

Figure 1. Juneau & Northern Southeast Alaska Salmon Districts.

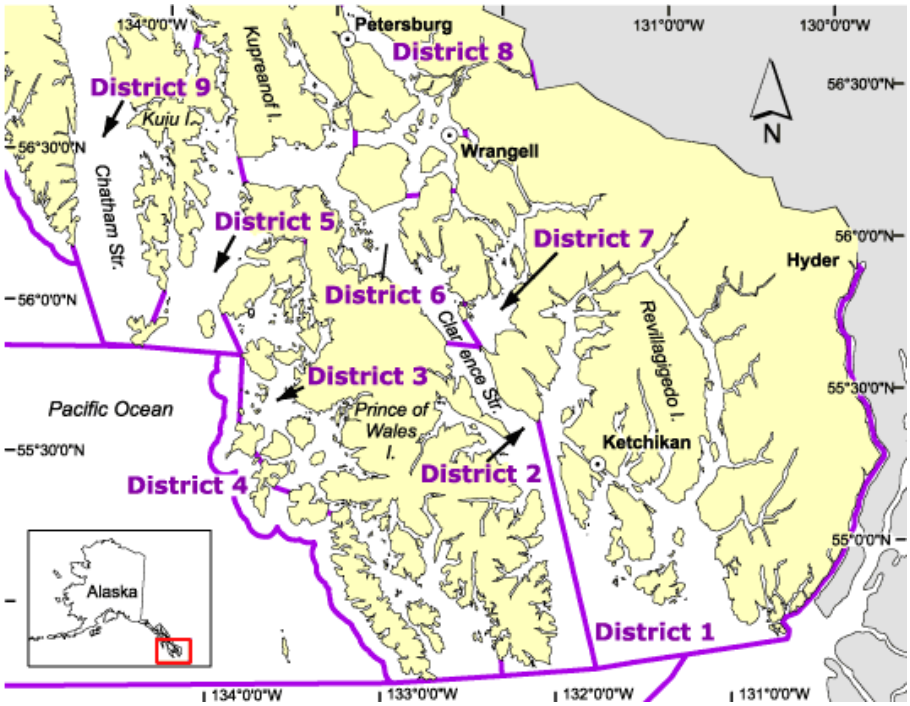

Figure 2. Ketchikan & Southern Southeast Alaska Salmon Districts.

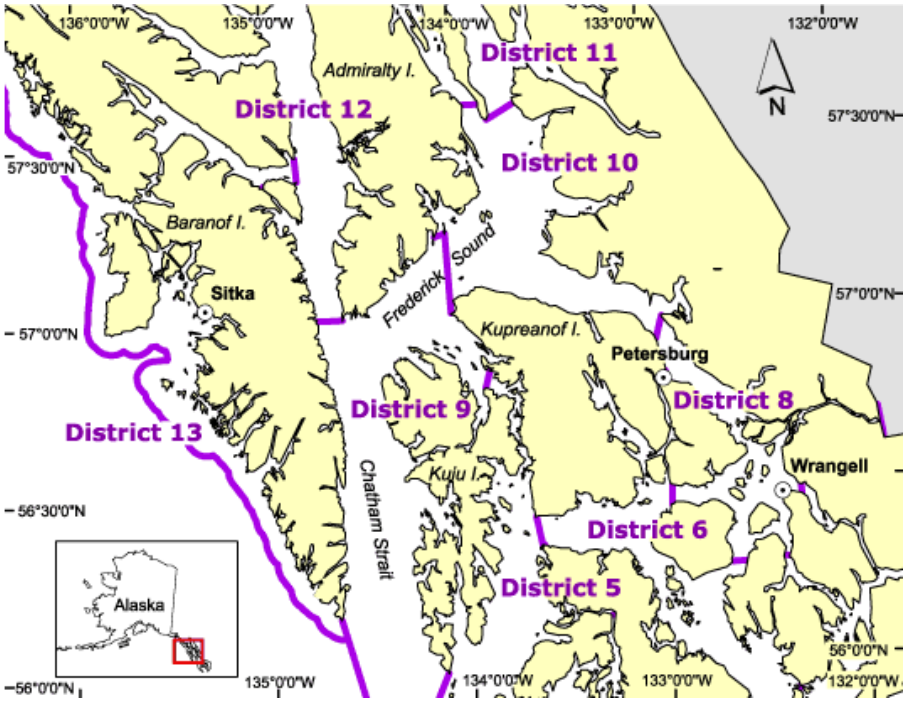

Figure 3. Sitka and Central Southeast Alaska Salmon Districts.

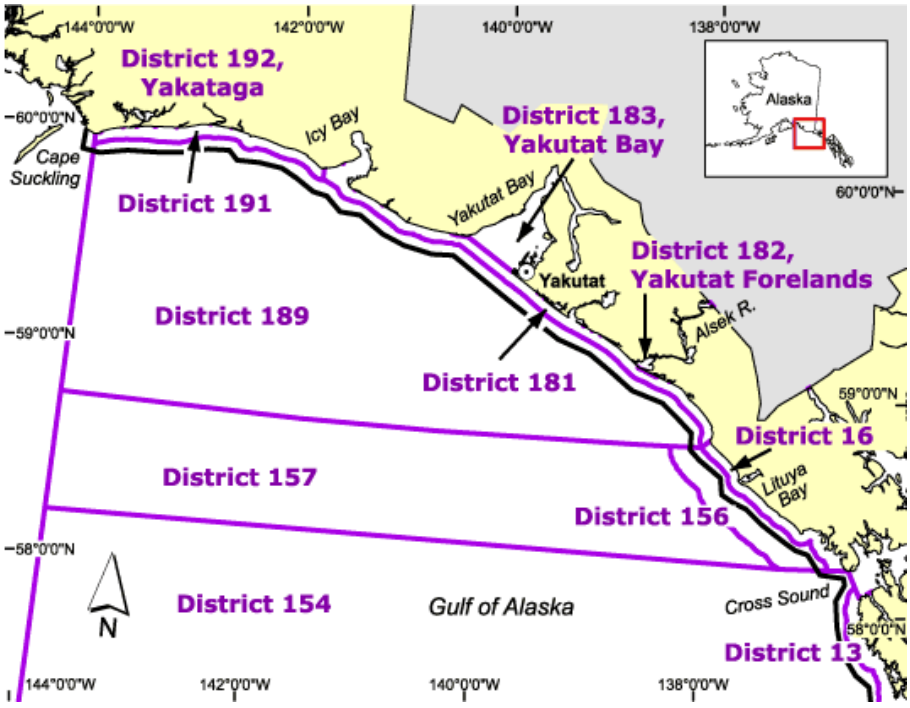

Figure 4. Yakutat and NW Southeast Alaska Salmon Districts.

Region 2. Central : Prince William Sound, Cook Inlet and Bristol Bay area

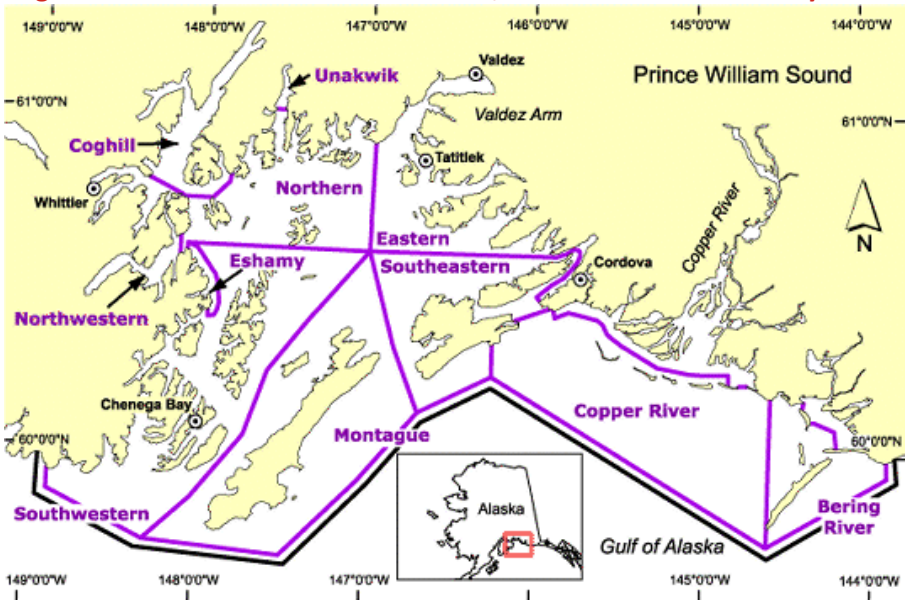

Figure 5. Prince William Sound Salmon Districts.

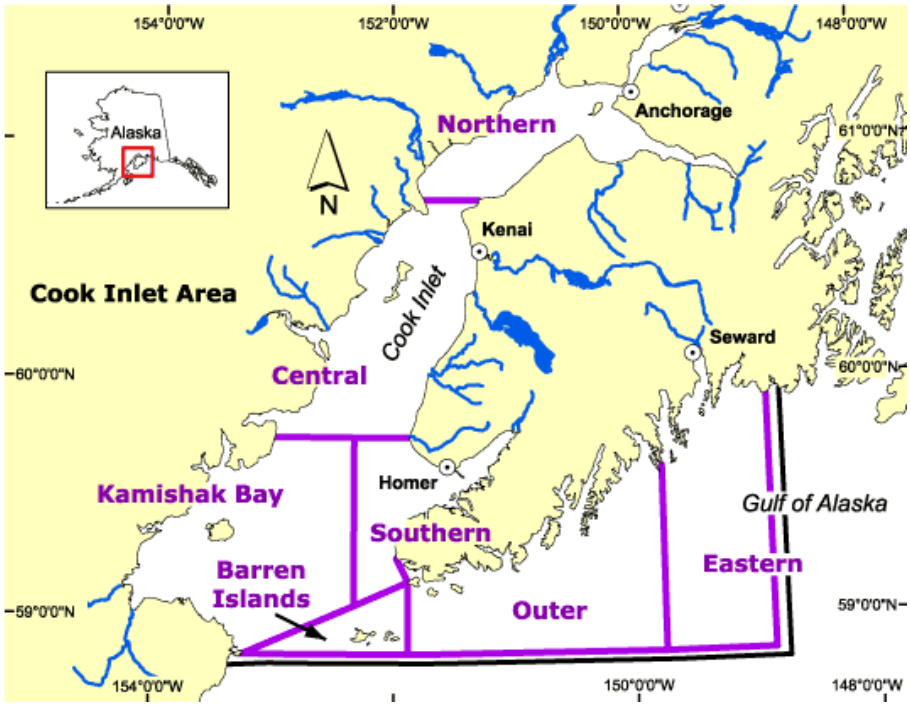

Figure 6. Cook Inlet Salmon District.

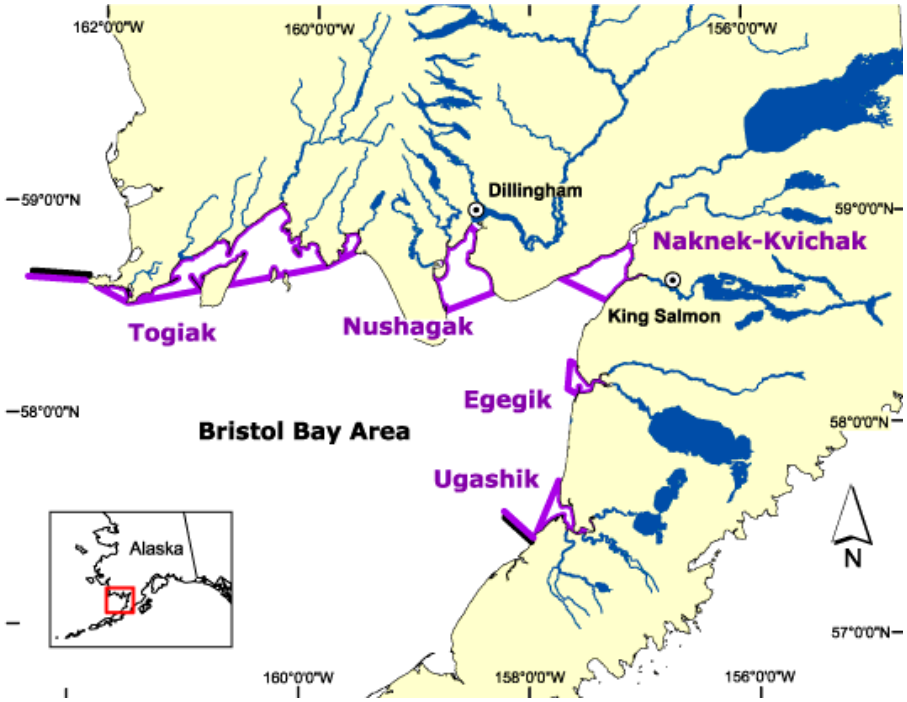

Figure 7. Bristol Bay Salmon Districts.

Region 3. Arctic-Yukon-Kuskokwim area.

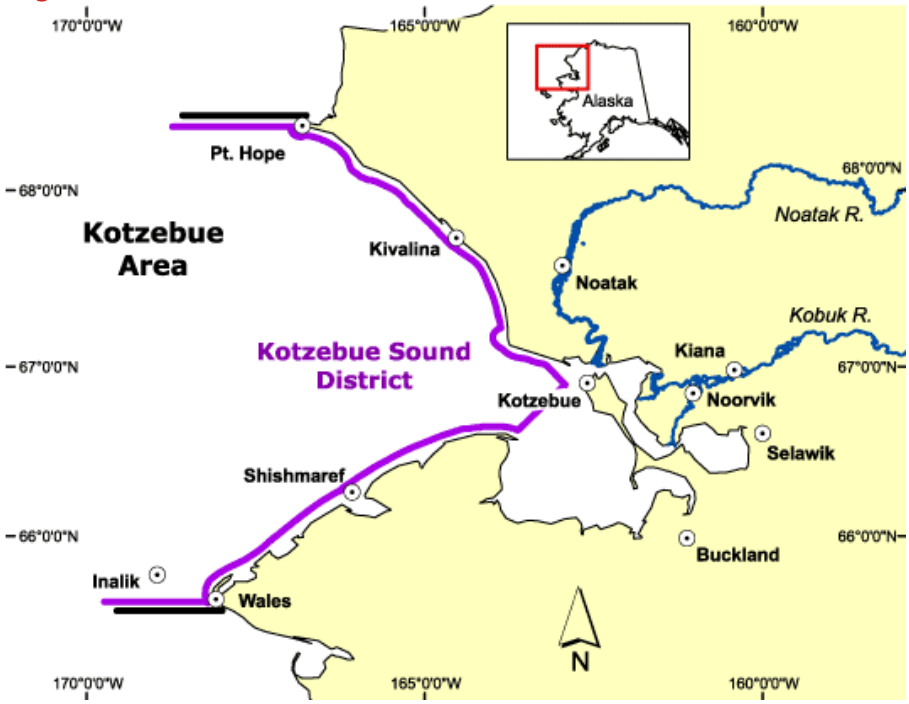

Figure 8. Kotzebue Area Salmon District.

Figure 9. Norton Sound-Port Clarence Area Salmon Districts.

Figure 10. Yukon-Northern Area Salmon District.

Figure 11. Upper-Yukon Area Salmon Districts.

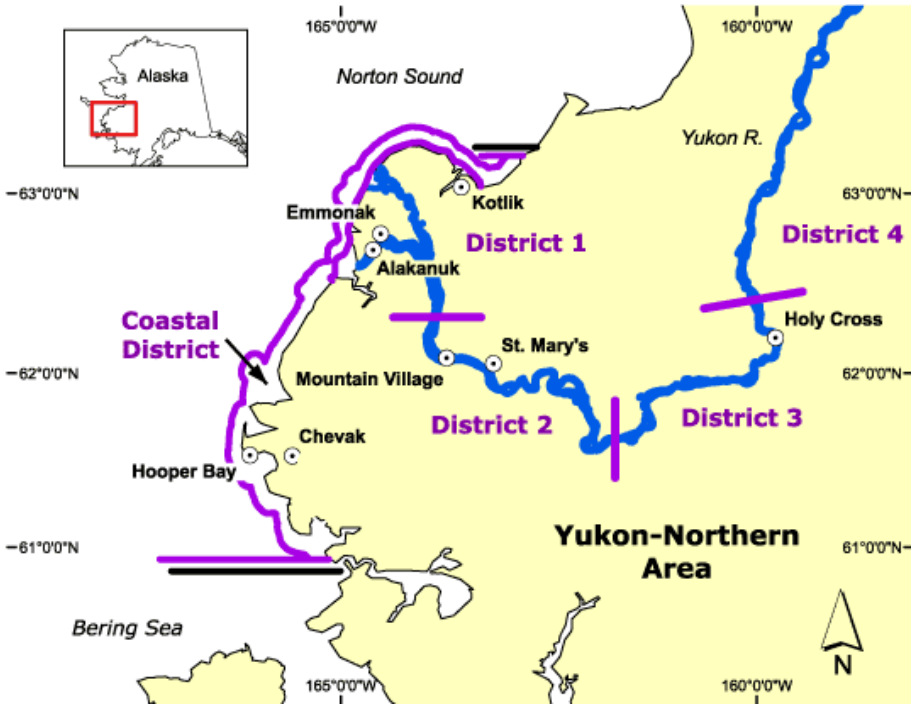

Figure 12. Lower-Yukon Salmon Districts.

Figure 13. Kuskokwim Area Salmon Districts.

Region 4. Westward: Kodiak, Aleutians and Chignik area

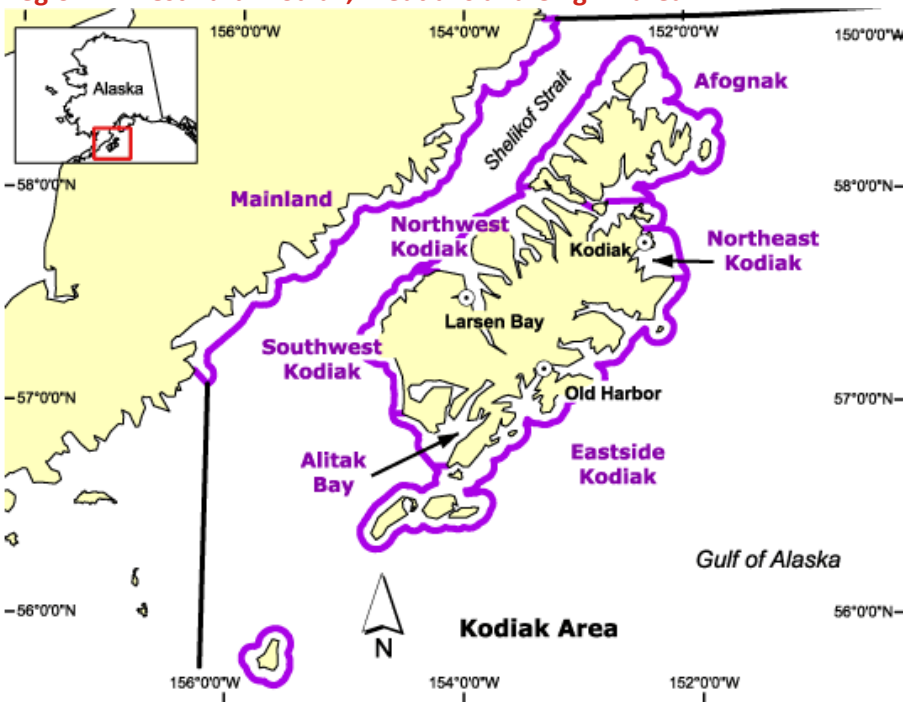

Figure 14. Kodiak Area Salmon District.

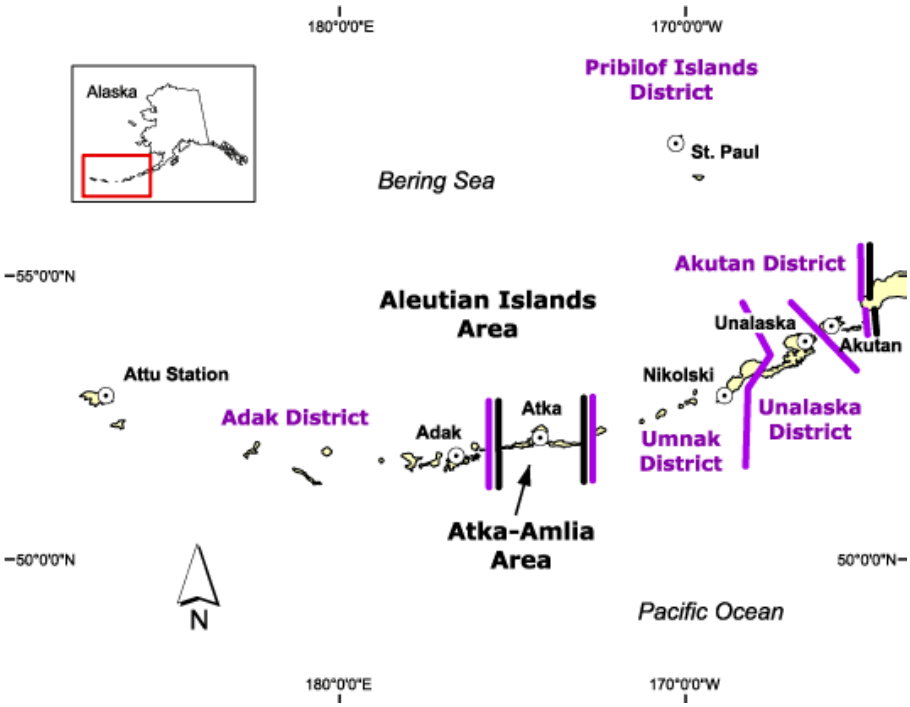

Figure 15. Aleutian Islands Area Salmon Districts.

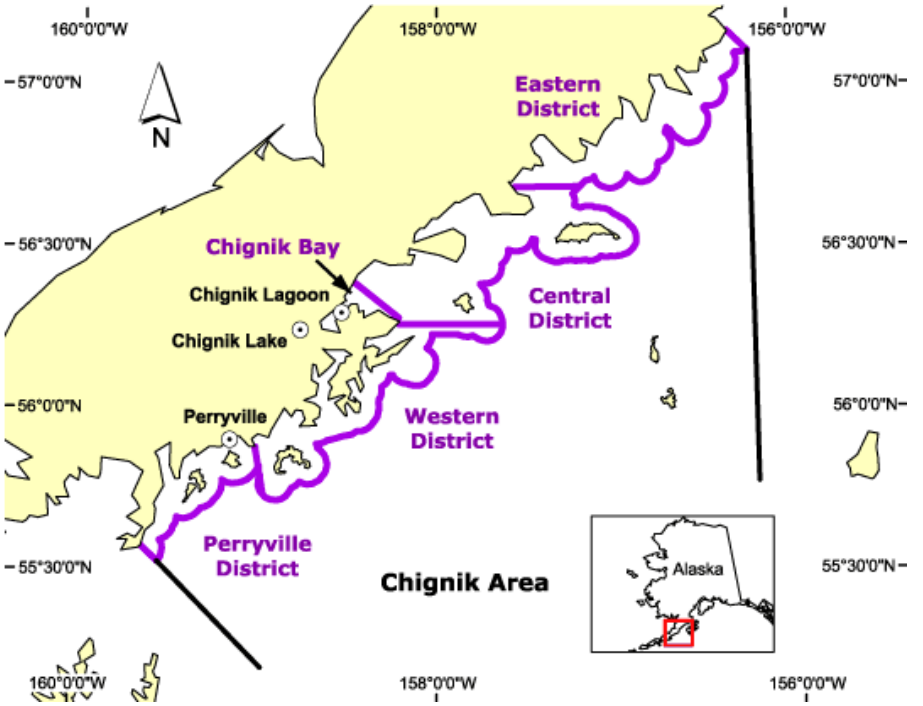

Figure 16. Chicknic Area.

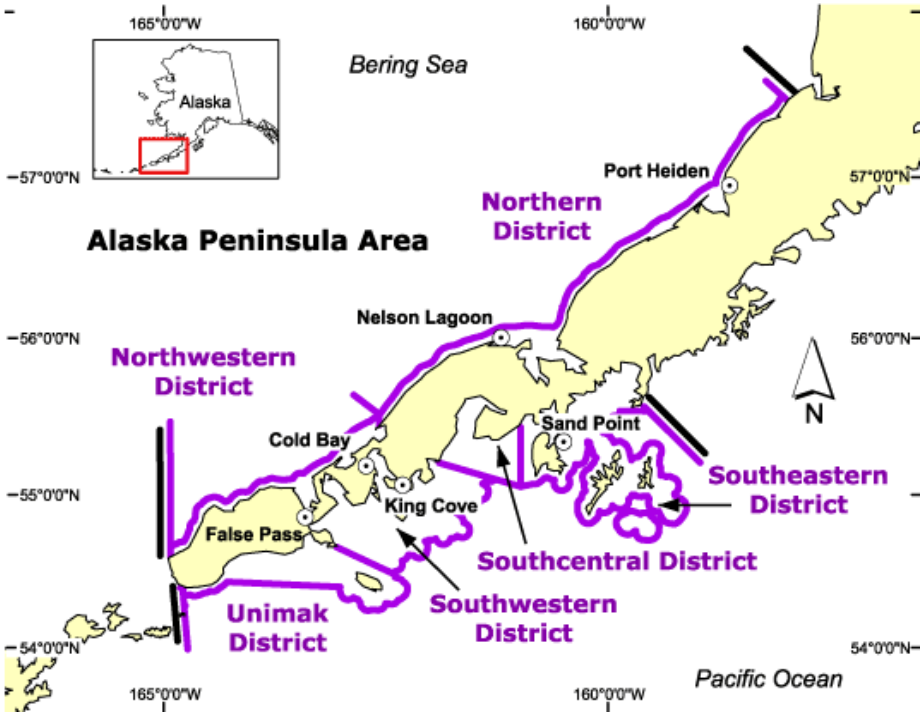

Figure 17. Alaska Peninsula Area.

12.5 Appendix 5. Stock status of Alaskan salmon stocks

Munro, 2018 §Table 6. Assessment of whether escapements met (Met), exceeded (Over), or did not meet (Under) the escapement goal in place at the time of enumeration for salmon stocks in Southeast Region.

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chinook Salmon	Blossom River	Under	Met	Under	Met[a]	Met	Met	Met	Under	Under
	Keta River	Under	Met	Under	Met[a]	Over	Over	Met	Over	Met
	Unuk River	Met[b]	Over	Met	Under	Under	Under	Met	Under	Under
	Chickamin River	Met	Over	Met	Under	Met	Met	Met	Under	Under
	Andrew Creek	Under	Met	Met	Under	Met	Met	Met	Under	Under
	Stikine River	Under	Met	Met	Met	Met	Met	Met	Under	Under
	King Salmon River	Under	Met	Met	Met	Under	Under	Under	Met	Under
	Taku River	Met[a]	Met	Met	Met	Under	Met	Met	Under	Under
	Chilkat River	Over	Met	Met	Under	Under	Under	Met	Under	Under
	Klukshu (Alsek) River	Met	Met	Met	Under	Over[a]	Met	Over	Under	Under
	Alsek River					Met	Under	Over	Under	Under
	Situk River	Met	NA	Under	Under	Met	Met	Under	Under	Over
Chum Salmon	Southern Southeast Summer	Under	Under	Met	Met[c]	Met	Under	Met[c]	Met	Met
	Northern Southeast Inside Summer	Under	Under	Under	Met[c]	Met	Under	Met	Under	Met
	Northern Southeast Outside Summer	Under	Met	Met	Met	Under	Met	Met[c]	Met	Met
	Cholmondeley Sound Fall	Met	Over	Over	Over	Under	Met	Over	Met	Over
	Port Camden Fall	Under	Met	Under	Met	Met	Met	Over	Met	Met
	Security Bay Fall	Met	Met	Met	Met	Under	Met	Over	Met	Over
	Excursion River Fall	Under	Met	Under	Under	Met	Met	Met	Under	Met
	Chilkat River Fall	Over	Met	Over	Over	Met	Met	Met[d]	Met	Met
Coho Salmon	Hugh Smith Lake	Over[a]	Over	Over	Over	Over	Over	Met	Met	Met
	Klawock					Met	Met	Over	Over	Met
	Taku River	Met	Met	Met	Met	Under[e]	Met	Met[f]	Met	Met
	Auke Creek	Met	Met	Over	Over	Over	Over	Over	Met	Met
	Montana Creek	Met	Met	Met	Under	Under	Met	Over	Met	Met
	Peterson Creek	Met	Over	Met	Met	Met	Over	Met	Under	Under
	Ketchikan Survey Index	Over	Met	Met	Over	Over	Over	Over	Over	Over
	Sitka Survey Index	Over	Over	Over	Over	Over	Over	Over	Over	Over
	Ford Arm Creek	Met	Met	Met	Met	Met	Over	Over	NA	NA
	Berners River	Met	Met	Met	Met	Met	Over	Over	Met	Met
	Chilkat River	Met	Over	Met	Met	Met	Over	Met	Under	Met
	Lost River	Met[g]	Met	Under	Met	Met	Met	eliminated		
	Tawah Creek (Lost River)							Met	Under	Met
	Situk River	Met	Over	Met	Under	Over	Met	Met	Met	Met
	Tsiu/Tsivat Rivers	Met	Met	Met	Met	Over	Met	Met	Over	Over

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Pink Salmon	Southern Southeast	Met[h]	Met	Met	Met	Over	Over	Met	Met	Met
	Northern Southeast Inside	Met[h]	Met	Over	Under	Met	Under	Met	Under	Met
	Northern Southeast Outside	Met[h]	Met	Over	Met	Over	Over	Over	Met	Over
	Situk River (even year)		NA[i]							
	Situk River (odd year)	Met		Met						
	Situk River				Under[j]	Met	Under	Met	Under	Met
Sockeye Salmon	Hugh Smith Lake	Met	Met	Over	Met	Under	Met	Over	Met	Met
	McDonald Lake	Under[a]	Met	Met	Met	Under	Under	Met	Under	Under
	Mainstem Stikine River	Under	Met	Met	Met	Met	Met	Met	Met	Under
	Tahltan Lake	Over	Met	Over	Under	Under	Over	Over	Over	Met
	Speel Lake	Under	Met	Met	Met	Met	Met	Met[k]	Met	Under
	Taku River	Met	Over	Over	Over	Met	Over	Over	Over	Over
	Redoubt Lake	Met	Met	Met	Over	Over	Met	Met	Met	Over
	Chilkat Lake	Over[a]	Under	Under	Met	Met	Met	Met	Met	Met
	Chilkoot Lake	Under[a]	Met	Met	Over	Met	Over	Met	Over	Met
	East Alsek-Doame River	Under	Met	Over	Met	Over	Met	Met	Met	Met
	Klukshu River	Under	Over	Over	Over	Under[d]	Over	Over	Under	Under
	Lost River	NA[g]	Met	Met	Under	Under	NA	Under	Under	NA
	Situk River	Over	Met	Over	Met	Over	Over	Over	Met	Over

Note: NA = data not available. Blank cells indicate that there was no official escapement goal for the stock in that particular year.

[a] Escapement goal reevaluated, goal range changed.

[b] Prior to 2009, goal was based on index count of escapements.

[c] Escapement goal reevaluated, lower-bound goal changed.

[d] Escapement goal reevaluated, upper-bound goal changed.

[e] Management target revised.

[f] Management target changed to a goal range.

[g] Escapement goal reevaluated, upper-bound goal eliminated, lower-bound goal remained the same.

[h] Expansion factor was removed from escapement estimates and escapement goal was reevaluated.

[i] Situk River weir was pulled well before peak of pink salmon run; therefore, a valid assessment of whether the goal was met is not possible.

[j] Escapement goal reevaluated, odd and even-year goals replaced by single goal, goal range changed to lower-bound goal.

[k] Escapement goal reevaluated, goal type and goal range changed.

Munro, 2018 §Table 7. Assessment of whether escapements met (Met), exceeded (Over), or did not meet (Under) the escapement goal in place at the time of enumeration for salmon stocks in Central Region (Bristol Bay, Cook Inlet, and Prince William Sound/Copper River).

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chinook salmon	*Bristol Bay*									
	Nushagak River	Met	Met	Met	Over	Met[a]	Met	Met	Over	Met
	Togiak River	NS	NS	NS	NS	eliminated				
	Naknek River	Under	NS	NS	NS	NS	NS	Under	eliminated	
	Alagnak River	Under	NS	NS	NS	NS	NS	Under	Under	Under
	Egegik River	Under	NS	NS	NS	eliminated				
	Upper Cook Inlet									
	Alexander Creek	Under	Under	Under	Under	Under	Under	Under	Under	Under
	Campbell Creek	Met	Met	Under	NS	NS	Under	Met	Met	Met
	Chuitna River	Under	Under	Under	Under	Met	Met	Met	Met	Under
	Chulitna River	Met	Under	Met	Under	Under	Under	Met	Under	NC
	Clear (Chunilna) Creek	Met	Under	Under	Met	Met	Met	Met	NS	Under
	Crooked Creek	Under	Met	Met	Under	Met	Met	Met	Over	Met
	Deshka River	Under	Met	Met	Met	Met	Met	Met	Met	Under
	Goose Creek	Under	Under	Under	Under	Under	Under	NC	NC	Under
	Kenai River - Early Run (all fish)	Over	NA[b]	NA[b]	NA[b]	Under[c]	Met	Met	NA	eliminated
	Kenai River - Early Run (large fish)									Met
	Kenai River - Late Run (all fish)	Under	NA[b]	NA[b]	NA[b]	Met[c]	Met	Met	NA	eliminated
	Kenai River - Late Run (large fish)									Met
	Lake Creek	Under	Under	Met	Under	Met	Met	Met	Met	Under
	Lewis River	Under	Under	Under	Under	Under	Under	NA	Under	NA
	Little Susitna River	Met	Under	Under	Met	Met	Met	Met	Met	Met
	Little Willow Creek	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Montana Creek	Met	Under	Under	Under	Met	Under	Met	Under	Under
	Peters Creek	Met	NC	Met	Under	Met	Met	Met	Met	Under
	Prairie Creek	Met	Under	Under	Under	Met	Under	Met	Under	Under
	Sheep Creek	Under	NC	Under	Under	NC	Under	NC	NC	NC
	Talachulitna River	Met	Under	Under	Under	Met	Met	Met	Met	Under
	Theodore River	Under	Under	Under	Under	Under	Under	Under	Under	Under
	Willow Creek	Under	Under	Under	Under	Met	Under	Met	Met	Under
	Lower Cook Inlet									
	Anchor River	Under	Under	Under[d]	Met	Met	Under	Over	Met	Met[e]
	Deep Creek	Met	Met	Met	Met	Met	Met	Met	NS	Met[f]
	Ninilchik River	Under	Met	Met	Met	Met	Met	Met	Met	Met[g]
	Prince William Sound									
	Copper River	Met	Under	Met	Met	Met	Under	Met	Under	NA

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chum salmon	*Bristol Bay*									
	Nushagak River	Met	Met	Met	Met	Met[a]	Met	NS	Met	Met
	Upper Cook Inlet									
	Clearwater Creek	Met	Over	Over	Met	Over	Under	Over	Met	Met[h]
	Lower Cook Inlet									
	Port Graham River	Under	Under	Met	Under	Met	Met	Met	Met	Over[h]
	Dogfish Lagoon	Met	Over	Over	Met	Over	Over	Over	Over	Over[h]
	Rocky River	Met	Met	Met	Met	Over	Over	Met	Met	Over[h]
	Port Dick Creek	Over	Met	Over	Over	Met	Under	Over	Over	Met[e]
	Island Creek	Met	Under	Met	Met	Met	Under	Over	Met	Met[h]
	Big Kamishak River	Met	NS	Under	Met	Under	Under	Under	Under	Over[h]
	Little Kamishak River	Under	Met	Met	Over	Met	Met	Met	Met	Over[h]
	McNeil River	Under	Under	Met	Under	Under	Under	Under	Met	Met
	Bruin River	Met	Met	Under	Over	Met	Under	Over	Over	Over[h]
	Ursus Cove	Over	Over	Over	Under	Over	Under	Over	Met	Over[h]
	Cottonwood Creek	Over	Over	Under	Under	Under	Met	Over	Under	Met[h]
	Iniskin Bay	Over	Over	Under	Under	Under	Met	Under	Under	Over[h]
	Prince William Sound									
	Eastern District	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Northern District	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Coghill District	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Northwestern District	Met	Met	Met	Met	Under	Met	Met	Met	Met
	Southeastern District	Met	Met	Met	Met	Met	Met	Met	Met	Met
Coho salmon	*Bristol Bay*									
	Nushagak River					Over	Over	NS	NS	NS
	Upper Cook Inlet									
	Deshka River									Over
	Fish Creek (Knik)			Met[i]	Met	Over	Over	Over	Met	Over
	Jim Creek	Over	Under	Under	Under	Over	Under[e]	Met	Under	Over
	Little Susitna River	Under	Under	Under	Under	Met	Over	Met	Under	Over
	Prince William Sound									
	Copper River Delta	Met	Met	Met	Met	Met	Met	Met	Over	Met
	Bering River	Met	Met	Met	Met	Met	Met	Met	Met	Met
Pink salmon	*Bristol Bay*									
	Nushagak River					NA	Met	NS	NS	NS

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Lower Cook Inlet									
	Humpy Creek	Under	Met	Under	Met	Under	Met	Met	Over	Over[h]
	China Poot Creek	Under	Under	Met	Over	Met	Under	Met	Under	Under[h]
	Tutka Creek	Under	Under	Over	Met	Met	Met	Over	Over	Over
	Barabara Creek	Met	Over	Over	Under	Over	Met	Over	Met	Over[h]
	Seldovia Creek	Under	Met	Over	Over	Met	Met	Over	Under	Met[h]
	Port Graham River	Met	Met	Over	Over	Met	Over	Over	Met	Over[e]
	Dogfish Lagoon Creeks						Over	Over	Met	Over[h]
	Port Chatham	Over	Under	Met	Under	Over	Met	Over	Under	Over[e]
	Windy Creek Right	Over	Met	Under	Met	Over	Met	Over	Under	Met[h]
	Windy Creek Left	Over	Met	Met	Met	Over	Met	Over	Under	Met[h]
	Rocky River	Over	Met	Met	Met	Over	Met	Over	Under	Met[h]
	Port Dick Creek	Met	Met	Under	Under	Met	Met	Over	Under	Over[h]
	Island Creek	Over	Over	Met	Met	Met	Over	Over	Under	Met[h]
	S. Nuka Island Creek	Over	NS	NS	Under	Met	Met	Met	Under	Under[h]
	Desire Lake Creek	Over	Met	Under	Met	Over	Under	Over	Under	Met[h]
	Bear & Salmon Creeks	NS	NS	eliminated						
	Thumb Cove	NS	NS	eliminated						
	Humpy Cove	NS	NS	eliminated						
	Tonsina Creek	NS	NS	eliminated						
	Bruin River	Over	Met	Under	Met	Under	Met	Met	Met	Met[h]
	Sunday Creek	Over	Met	Under	Under	Met	Met	Over	Under	Met[h]
	Brown's Peak Creek	Over	Met	Under	Met	Met	Met	Over	Under	Over[h]
	Prince William Sound									
	All Districts Combined (even year)		Met		eliminated					
	All Districts Combined (odd year)	Met		Over	eliminated					
	Eastern District (even year)				Met		Met		Over	
	Eastern District (odd year)					Over		Over		Met
	Northern District (even year)				Under		Under		Met	
	Northern District (odd year)					Over		Over		Over
	Coghill District (even year)				Over		Met		Met	
	Coghill District (odd year)					Over		Over		Met
	Northwestern District (even year)				Met		Under		Over	
	Northwestern District (odd year)					Over		Over		Over
	Eshamy District (even year)				Under		Over		NA	
	Eshamy District (odd year)					Over		Over		Under
	Southwestern District (even year)				Met		Met		NA	
	Southwestern District (odd year)					Over		Over		Over

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Montague District (even year)				Met		Under		NA	
	Montague District (odd year)					Over		Over		Met
	Southeastern District (even year)				Met		Met		Met	
	Southeastern District (odd year)					Over		Over		Met
Sockeye salmon	*Bristol Bay*									
	Kvichak River	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Alagnak River	Met	Met	Met	Met	Met	Under	Met	Met	Met
	Naknek River	Met	Over	Met	Met	Met	Over	Met[e]	Met	Met
	Egegik River	Met	Met	Met	Met	Met	Met	Over[e]	Met	Over
	Ugashik River	Over	Met	Met	Met	Met	Met	Over[e]	Over	Met
	Wood River	Met	Over	Met	Met	Met	Over	Over[e]	Met	Over
	Igushik River	Over	Over	Over	Met	Over	Over	Over[e]	Over	Over
	Nushagak River	Met	Met	Met	Met	Over[a]	Met	Over	Met	Over
	Kulukak Bay	NS	NS	NS	NS	eliminated				
	Togiak River	Over	Met[j]	Met	Met	Met	Met	Met	Met	Met
	Upper Cook Inlet									
	Crescent River	NS	Over	Over	Met	NS	eliminated			
	Fish Creek (Knik)	Over	Over	Met	Under	Under	Met	Over	Met	Over[h]
	Kasilof River	Over	Met	Met	Met	Over	Over	Over	Met	Met
	Kenai River	Under	Met	Met	Met	Met	Met	Met	Met	NA[k]
	Packers Creek	Met	NS	NS	NS	NA	Met	Met	NA	Met
	Russian River - Early Run	Over	Met	Met	Met	Met	Over	Over	Met	Met
	Russian River - Late Run	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Chelatna Lake	Under	Met	Over	Met	Over	Met	Over	Met	Met[e]
	Judd Lake	Met	Under	Met	Under	Under	Under	Met	NA	Met[h]
	Larson Lake	Met	Met	Under	Met	Met	Under	Met	Under	Met[e]
	Lower Cook Inlet									
	English Bay	Over	Met	Met	Under	Met	Met	Met	Met	Over
	Delight Lake	Over	Over	Over	Met	Under	Over	Under	Under	Met[h]
	Desire Lake	Over	Under	Met	Met	Under	Met	Under	Under	Met[h]
	Bear Lake	Over	Over	Over	Met	Over	Over	Over	Over	Over
	Aialik Lake	Under	Met	Under	Under	Under	Under	Under	Under	Met[h]
	Mikfik Lake	Over	Met	Under	Under	Under	Over[c]	Met	Met	Met[e]
	Chenik Lake	Over	Over	Met	Over	Met	Over	Over	Over	Over[h]
	Amakdedori Creek	Met	Under	Over	Under	Met	Over	Over	Met	Met[g]
	Prince William Sound									
	Upper Copper River	Met	Over	Over	Over[h]	Over	Over	NA	NA	Met

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Copper River Delta	Met	Met	Met	Met	Met	Met	Met	Under	Met
	Bering River	Under	Under	Met	Met[h]	Met	Under	Met	Met	Met
	Coghill Lake	Under	Met	Over	Over[h]	Under	Met	Under	Under	Met
	Eshamy Lake	Met[h]	Met	Met	NA	NA	NA	NA	NA	NA

Note: NA = data not available; NC = no count; NS = no survey. There are no escapement goals for coho salmon in Lower Cook Inlet and there are no pink salmon escapement goals in Upper Cook Inlet.

[a] Escapement goal reevaluated, historic escapements converted from Bendix counts to DIDSON equivalents. Escapements in Table 2 are based on DIDSON counts.

[b] Target strength based escapement estimate deemed unreliable or not available.

[c] Escapements and escapement goal reevaluated, goal range changed. Escapement estimates in Table 2 are based on new methodology.

[d] Escapement goal reevaluated, lower-bound goal changed to a range.

[e] Escapement goal reevaluated, upper bound changed, lower bound remained the same.

[f] Escapement goal reevaluated, goal range changed to a lower-bound goal.

[g] Escapement goal reevaluated, lower bound changed, upper bound remained the same.

[h] Escapement goal reevaluated, goal range changed.

[i] Previous escapement goal reinstated.

[j] Escapement goal reevaluated, goal type changed but goal range remained the same.

[k] BOF removed OEG from management plan. Stock managed to meet BEG.

Munro, 2018 §Table 8. Assessment of whether escapements met (Met), exceeded (Over), or did not meet (Under) the escapement goal in place at the time of enumeration for salmon stocks in Arctic-Yukon-Kuskokwim Region.

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chinook salmon	*Kuskokwim Area*									
	North (Main) Fork Goodnews R	NS	NS	Met	Under	NS	Under	Met	Met	NS
	Middle Fork Goodnews River	Met	Met	Met	Under	Under	Under	Under	Over	Over
	Kanektok River	NS	Under	NS	NS	Under	Under	Met	Met[a]	NS
	Kuskokwim Area (entire area)					Under	Over	Met	Over	Over
	Kogrukluk River	Met	Met	Met	NA	Under[a]	Under	Met	Met	Over
	Kwethluk River	Under	Under	Under	NA	Under[a]	Under	Over	Over	Met
	Tuluksak River	Under	Under	Under	Under	eliminated				
	George River	Met	Under	Under	Under	Under[a]	Met	Met	Under	Over
	Kisaralik River	NS	Under	NS	Met	Met	Met	Met	Met	NS
	Aniak River	NS	NS	NS	NS	Under	Over	NS	Under	Met
	Salmon River (Aniak R)	NS	NS	Under	Under	Under	Met	Met	NS	Met
	Holitna River	NS	NS	NS	NS	Under	NS	Under	Met	Under
	Cheeneetnuk River (Stony R)	Under	NS	Under	Under	Under	Met	NS	Under	Met
	Gagaryah River (Stony R)	Met	Under	Under	Under	Under	Met	Under	Under	Met
	Salmon River (Pitka Fork)	Met	Under	Met	Met	Under	Over	Over	Met	Met
	Yukon River									
	East Fork Andreafsky River	Under	Met[b]	Over	Met	Under	Over	Over	Met	Met
	West Fork Andreafsky River	Over	Met	Met	NS	Met	Over	NS	NS	Met
	Anvik River	Under	Under	Under	Under	Under	Met	Over	NS	Met
	Nulato River (forks combined)	Over	Under	Met	Met	Met	NS	Met	NS	Met
	Gisasa River	Met	eliminated							
	Chena River	Met	Under	NS	Under	Under	Over	Over	Over	Met
	Salcha River	Over	Met	Over	Over	Met	NS	Met	Under	Met
	Canada Mainstem	Met	Under[c]	Met	Under	Under	Over	Over	Over	Over
	Norton Sound									
	Fish River/Boston Creek	NS	NS	NS	NS	Under	NS	Met	eliminated	
	Kwiniuk River	Met	Under	Under	Under	Under	Met	Met	Under[d]	Under
	North River (Unalakleet R)	Met	Met	Under	Under	Under	Over	Met	Under	Under
	Shaktoolik River	NS	NS	Under	NS	eliminated				
	Unalakleet/Old Woman River	Over	NS	Under	NS	NS	NS	NS	eliminated	
Chum salmon	*Kuskokwim Area*									
	Middle Fork Goodnews River	Met	Met	Met	Under	Met	Under	Under	Met	Met
	Kanektok River	NS	NS	NS	NA	eliminated				
	Kogrukluk River	Over	Over	Over	NA	Over	Met	Met	Met	Over

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Aniak River	Met	Met	Met	NS	NA	NA	NA	eliminated	
	Yukon River Summer Chum									
	Yukon River Drainage								Over	Over
	East Fork Andreafsky River	Under	Met[d]	Met	Met	Met	Under	Met	Met	Met
	Anvik River	Under	Met	Met	Met	Met	Met	Met	Under	Met
	Yukon River Fall Chum									
	Yukon River Drainage	Met	Met[e]	Over	Met	Over	Over	Met	Over	Over
	Tanana River	Over	Over	Over	Met	Over	Over	Met	Over	Over
	Delta River	Met	Over	Over	Met	Over	Over	Over	Over	Over
	Toklat River	NA	eliminated							
	Upper Yukon River Tributaries	NA	Met	Over	Over	Over	Met	Met	eliminated	
	Chandalar River	NA	Over	Over	Over	Over	Over	Over	Over	Over
	Sheenjek River	Met	Under	Met	Over	Over	Met	Under	eliminated	
	Fishing Branch River (Canada)	Met	Under	Under	Met	Met	Under	Under	Met	Met
	Yukon R. Mainstem (Canada)	Met	Over[c]	Over	Over	Over	Over	Over	Over	Over
	Norton Sound									
	Subdistrict 1 Aggregate	Under	Over	Over	Over	Over	Over	Over	Over	Over
	Sinuk River	Under	eliminated							
	Nome River	Under	Over	Met	Under	Over	Over	Over	Over	Over
	Bonanza River	Over	eliminated							
	Snake River	Under	Over	Over	Under	Over	Over	Over	Over	Over
	Solomon River	Under	eliminated							
	Flambeau River	Under	eliminated							
	Eldorado River	Under	Over	Over	Over	Over	Over	Over	Over	Over
	Niukluk River	Under	Met[a]	Met	Under	NS	NA	NS	eliminated	
	Kwiniuk River	Under	Over	Over	Under	Under	Over	Over	Under	Over
	Tubutulik River	Under	NS	Over	NS	NS	NS	NS	NS	NS
	Unalakleet/Old Woman River	NS	NS	NS	NS	Met	NS	NS	eliminated	
	Kotzebue Sound									
	Kotzebue Sound Aggregate									
	Noatak and Eli Rivers	Met	NS	NS	NS	NS	Over	NS	NS	NS
	Upper Kobuk w/Selby River	Over	NS	NS	NS	NS	Over	NS	NS	NS
	Salmon River	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Tutuksuk River	NS	NS	NS	NS	NS	NS	NS	NS	NS
	Squirrel River	NS	NS	NS	NS	NS	NS	NS	NS	NS
Coho salmon	*Kuskokwim Area*									
	Middle Fork Goodnews River	Met	Met	Met	NA	NA	NA	Met	NS	NS

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Kogrukluk River	Met	Met	Met	Met	Met	Over	Over	NS	NS
	Kwethluk River		NA	NA	Met	NA	Met	Met	Met	Met
	Yukon River									
	Delta Clearwater River	Met	Met	Met	Met	Met	Under	Over	Met	Met
	Norton Sound									
	Kwiniuk River	NS	Over	Over	NS	NS	NS	NS	Over	NS
	Niukluk River	Over	Over[a]	Met	Under	NS	NS	NS	eliminated	
	Niukluk River/Ophir Creek								Met	NS
	North River (Unalakleet R.)	Over	NS	Met	NS	Met	NS	NS	NS	NS
Pink salmon	*Norton Sound*									
	Nome River (odd year)	Met		Met		Met		Met		Met
	Nome River (even year)		Met		Met		Met		Met	
	Kwiniuk River	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Niukluk River	Met	Met	Met	Met	NS	NS	NS	eliminated	
	North River	Met	Met	Met	Met	Met	Met	Met	Met	Met
Sockeye salmon	*Kuskokwim Area*									
	North (Main) Fork Goodnews River	NS	NS	Met	Met	NS	NS	Over	Over[a]	NS
	Middle Fork Goodnews River	Met	Met	Under	Met	Met	Over	Over	Over	Over
	Kanektok River	NS	Met	NS	NA	Over	Over	Over	Over[a]	NS
	Kogrukluk River		Met	Met	NA	Met	Met	Met	Met	Over
	Norton Sound									
	Salmon Lake/Grand Central River	Under	Under	Met	Met	Met	Met	Over	Over	NS
	Glacial Lake	Under	Under	NS	NS	Met	Over	Over	Met	NS

Note: NA = data not available; NS = no survey. There are no escapement goals for pink salmon in Kuskokwim Area and Yukon River and there are no escapement goals for sockeye salmon in Yukon River.

[a] Escapement goal reevaluated, goal value changed.

[b] Previous escapement goal was based on aerial surveys, replaced with escapement goal based on weir counts. Escapements in Table 3 are weir counts.

[c] Escapement goal revised by The United States and Canada Yukon River Panel.

[d] Escapement goal reevaluated, goal range changed to a lower-bound goal.

[e] Escapement goal reevaluated, goal type changed but goal value remained the same.

Munro, 2018 §Table 9. Assessment of whether escapements met (Met), exceeded (Over), or did not meet (Under) the escapement goal in place at the time of enumeration for salmon stocks in Westward Region (Alaska Peninsula/Aleutian Islands, Kodiak, and Chignik areas).

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chinook salmon	*AK Peninsula*									
	Nelson River	Under	Met	Under	Under	Under	Met	Met	Over	Under
	Chignik									
	Chignik River	Met	Over	Met	Met	Under	Over	Met	Met	Under
	Kodiak									
	Karluk River	Under	Under	Met[a]	Met	Under	Under	Under	Met	Under
	Ayakulik River	Under	Met	Met[a]	Met	Under	Under	Under	Met	Under[a]
Chum salmon	*AK Peninsula*									
	Northern District	Met	Met	Under	Met	Met	Met	Met	Over	Met
	Northwestern District	Under	Met	Met	Met	Under	Under	Under	Met	Met
	Southeastern District	Met	Under	Met	Under	Met	Under	Over	Met	Over
	South Central District	Under	Under	Met	Under	Met	Met	Over	Over	Over
	Southwestern District	Over	Met	Met	Under	Met	Under	Over	Met	Over
	Unimak District	Met	Met	Met	Under	eliminated				
	Chignik									
	Entire Chignik Area	Met	Met	Met	Met	Met	Met	Met	Met[b]	Met
	Kodiak									
	Mainland District	Under	Met	Met	Met	Met	Under	Met	Under	eliminated
	Kodiak Archipelago Aggregate	Met	Met	Met	Met	Met	Under	Met	Under	Met[b]
Coho salmon	*AK Peninsula*									
	Nelson River	Met	Under	Met	Met	Met	Met	Met	Met	Met
	Thin Point Lake	Under	NA	Under	Under	eliminated				
	Ilnik River		Met[c]	Met	Met	Met	Met	Met	Met	Under
	Kodiak									
	Pasagshak River	Met	Met	Under[d]	Met	Met	Met	Met	Under	Under
	Buskin River	Over	Met	Met	Met	Met	Met[a]	Under	Under	Met
	Olds River	Under	NA	Met[d]	Under	Met	Met	Met	Met	Met
	American River	Met	NA	Met[d]	Met	Met	Met	Met	Met	Met
Pink salmon	*AK Peninsula*									
	Bechevin Bay Section (odd year)	Met		Met		eliminated				
	Bechevin Bay Section (even year)		Under		Under	eliminated				
	South Peninsula Total (odd year)	Met		Met		Met		Over	eliminated	
	South Peninsula Total (even year)		Under		Under		Under		eliminated	
	South Peninsula Total								Under	Over

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Chignik									
	Entire Chignik Area (odd year)	Over		Over		Over		Over	[b]	Over
	Entire Chignik Area (even year)		Met		Met		Met		Under[b]	
	Kodiak									
	Mainland District	Met	Met	Met[c]	Met	Met	Met	Met	Under	Over
	Kodiak Archipelago (odd year)	Met		Met[f]		Met		Over		Over
	Kodiak Archipelago (even year)		Met	[f]	Met		Under		Under	
		Over		Over		Over		Over	[b]	Over
Sockeye salmon	*AK Peninsula*		Met		Met		Met		Under[b]	
	Cinder River	Over	Over	Over	Over	Over	Over	Over	Over[b]	Over
	Ilnik River	Over	Met	Met	Over	Met	Met	Under	Over	Over
	Meshik River	Over	Met[a]	Met	Met	Met	Over	Over	Over[b]	Over
	Sandy River	Met	Met	Met	Under	Met	Met	Over	Over	Over
	Bear River Early Run	Met	Met	Met	Under	Met	Met	Over	Over	Over
	Bear River Late Run	Met	Met	Met	Under	Over	Over	Over	Met	Over
	Nelson River	Met	Met	Under	Met	Over	Over	Over	Over	Over
	Christianson Lagoon	Met	Met	Met	Met	Under	Met	Under	Over	Over
	Swanson Lagoon	Under	Under	Under	Met	Under	Under	Under	Under	Under
	North Creek	Met	Over	Over	Over	Met	Met	Over	Over	Met
	Orzinski Lake	Over	Met	Met	Met	Met	Under	Over	Over	Over
	Mortensen Lagoon	Over	Over	Under	Met	Met	Under	NA	Over	Over
	Thin Point Lake	Over	Under	Met	Met	Under	Under	Met	Over	Over
	McLees Lake		Met[c]	Met	Met	Met	Met	Met	Met	Met
	Chignik									
	Chignik River Early Run	Met	Over	Over	Met	Met	Met[e]	Over	Met	Over
	Chignik River Late Run	Met	Met	Met	Met	Met	Met	Over	Met	Met
	Kodiak									
	Malina Creek	Met	Met	Met	Met	Met	Met	Met	Met	Met
	Afognak (Litnik) River	Met	Over	Met	Met	Met	Met	Met	Met	Met
	Little River	Under	Met	Met	Met	Met	eliminated			
	Uganik Lake	Met	Met	Met	Under	Met	Under	Under	Met	eliminated
	Karluk River Early Run	Under	Under	Under	Met	Met	Over	Over	Met	Met[a]
	Karluk River Late Run	Met	Met	Met	Met	Met	Over	Over	Met	Met[a]
	Ayakulik River	Met	Met	eliminated						
	Ayakulik River Early Run			Met[g]	Met	Met	Met	Met	Met	Met
	Ayakulik River Late Run			Met[g]	Met	Met	Met	Met	Met	Over
	Upper Station River Early Run	Met	Met	Met	Met	Met	Met[h]	Met	Met	Met[h]
	Upper Station River Late Run	Met	Met	Under	Met	Met	Met	Met	Met	Met

Species	System	2009	2010	2011	2012	2013	2014	2015	2016	2017
	Frazer Lake	Met	Met	Met	Met	Met	Over	Over	Met	Met
	Saltery Lake	Over	Met	Met[e]	Met	Over	Met	Over	Over	Over
	Pasagshak River	Under	Met	Met[d]	Met	Met	Under	Under	Met	Met
	Buskin Lake	Under	Met	Over[i]	Over	Over	Over	Over	Over	Met

Note: There are no coho salmon escapement goals in Chignik Area.

[a] Escapement goal reevaluated, goal range changed.

[b] Escapement goal reevaluated, number of index streams used to develop escapement goal changed, and escapement goal changed. Escapements in Table 4 are adjusted for new set of index streams for all years.

[c] Goal reestablished. New analysis.

[d] Escapement goal reevaluated, upper bound eliminated, lower goal bound remained the same.

[e] Escapement goal reevaluated, upper bound of goal changed.

[f] Single escapement goal was separated into odd- and even-year escapement goals.

[g] Single escapement goal was changed to separate early- and late-run escapement goals.

[h] OEG changed from 25,000 fish to 30,000 fish in 2014, then eliminated in 2017.

[i] Escapement goal reevaluated, goal type and range changed.