ALASKA RESPONSIBLE FISHERIES MANAGEMENT CERTIFICATION

Full Assessment and Certification Report

For The

US Alaska Salmon Commercial Fisheries

Facilitated By the

Alaska Fisheries Development Foundation

Assessors: Ivan Mateo, Lead Assessor
Brian Allee, Assessor
Marc Johnson, Assessor
Scott Marshall, Assessor

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Global Trust Certification Ltd.
3rd Floor, Block 3,
Quayside Business Park,
Mill Street,
Dundalk,
Co. Louth,
Ireland.
T: +353 42 932 0912
F: +353 42 938 6864
www.GTCert.com

Foreword

The Alaska Responsible Fisheries Management (RFM) Standard Version 1.3 is composed of Conformance Criteria and is 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 here.

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Acronyms

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
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

i. Summary and Recommendations

This is the Reassessment Report (ref AK/Sal/002./2016) for the US Alaska Salmon Commercial Fisheries following original certification in March 11th 2011.

The United States Alaska commercial salmon [all Pacific salmon species: Chinook *Oncorhynchus tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *Oncorhynchus 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 Global Trust procedures for Alaska RFM V1.3.

The assessment was conducted by a team of Global Trust appointed Assessors comprising of three externally contracted fishery experts and Global Trust 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).

ii. Schedule of Key Reassessment Activities

Assessment Activities	Date(s)
Appointment of Reassessment Team	March 14th 2016
On-site Witnessed Reassessment and Consultation Meetings	April 11th – 18th 2016
Draft Reassessment Report	July 25th 2016
Client Corrective Action Plan and Acceptance	December 9th 2016
External Peer Review	January 2nd – 9th 2017
Stakeholder Consultation	January 21st – February 21st 2017
Final Reassessment Report	February 22nd 2017
Certification Review/Decision	February 27th 2017

iii. Reassessment Team Details

Dr. Ivan Mateo, Lead Assessor
SAI Global/Global Trust Certification Ltd.
Saunderstown, Rhode Island, USA
Tel/skype: ralfe501
Email: Ivan.mateo@saiglobal.com

Scott Marshall, Assessor:
Independent fishery expert,
Eagle ID, USA
Email: slmarshallfisheries@gmail.com

Dr. Brian Allee, Assessor
Independent fishery expert,
Gilroy, California, USA.
Email: allee.keta@gmail.com

Dr. Marc Johnson, Assessor:
Independent fishery expert,
Corvallis, Oregon, USA
Email: marc.aaron.johnson@gmail.com

Jean Ragg, Program Administrator
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
Email: Jean.ragg@saiglobal.com

1. Introduction

The US Alaska Commercial Salmon Fisheries, employing troll, purse seine, beach seine, drift gillnet, set gillnet (and fish wheel in Upper Yukon River only) gear, in the four administrative Regions of Alaska, was assessed against the requirements of the Alaska Responsible Fisheries Management (AFM) Certification Program.

The request for reassessment was made by the Alaska Fisheries Development Foundation (AFDF) on behalf of the Alaska commercial salmon fisheries and participants, and was conducted by Global Trust Certification Ltd.

This reassessment report documents the procedure for the continuing certification of commercially exploited Alaska salmon under the Alaska RFM Certification Program. This is a voluntary program for Alaska fisheries developed by the Alaska Seafood Marketing Institute (ASMI) to provide an independent, third-party verification that Alaska fisheries are responsibly managed according to the FAO Code of Conduct for Responsible Fisheries.

The reassessment was conducted in accordance to Global Trust accredited procedures for V1.3 of the Standard. The Standard is accredited in accordance with ISO/IEC 17065: Requirements for bodies certifying products, processes and services. It is also benchmarked against GSSI.

The reassessment is based on the criteria specified in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (1995) and the minimum criteria set out for marine fisheries in the FAO Guidelines for the Eco-Labelling of Fish and Fishery Products from Marine Capture Fisheries (2005/2009), hereafter generally referred to as the FAO Criteria.

The reassessment is based on 6 major components of responsible management that are derived from the FAO Code of Conduct for Responsible Fisheries and Guidelines for the Eco-labelling of products from marine capture fisheries.

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

These six major components are supported by 13 fundamental clauses, which in turn are sustained by 124 sub-clauses. Collectively, these form the Alaska RFM Standard against which a fishery applying for certification is assessed. The reassessment was comprised of planning, onsite audits, certification reporting, peer review, and a Certification Committee review. Five site visits were made to the fishery during the reassessment. At various stages in the reassessment process, information pertaining to the step in the process was posted on the ASMI website[1]. A summary of the consultation meetings is presented in section 5 in this report. Assessors are external contracted fishery consultants and Global Trust internal staff (Appendix 1). Peer Reviewers are external contracted fisheries consultants (Appendix 2).
This report documents each step in the reassessment process and recommendations made to the Certification Committee of Global Trust, who will make the certification decision according to the requirements of ISO/IEC Guide 65 accredited certification.

[1] http://www.alaskaseafood.org/rfm-certification/certified-fisheries-companies/certified-fisheries

1.1 Recommendations of the Assessment Team

Following approval of the client's action plan to address the minor non-conformance found on sub clause 13.4 during this reassessment, the Assessment Team recommends continuing certification under the AK RFM Certification Program for, US Alaska Commercial Salmon Fisheries, under federal National Marine Fisheries Service (NMFS) and North Pacific Fishery Management Council (NPFMC) and state of Alaska Department of Fish and Game (ADFG) and Board of Fisheries (BOF) management, fished by the directed fisheries with troll, purse seine, beach seine, drift gillnet, set gillnet, and, in the upper Yukon River, fish wheel gear, in the four administrative Regions of Alaska and within Alaska's 200 nm EEZ.

2. Fishery Applicant Details

Table 1. Fishery applicant information.

Applicant Contact Information			
Organization/Company Name:	Alaska Fisheries Development Foundation	**Date:**	March 2016
Correspondence Address:	P.O. Box 2223, Wrangell, AK 99929-2223		
Street :			
City :	Wrangell		
State:	Alaska		
Country:	USA		
Phone:	907-276-7315	**E-mail Address:**	jdecker@afdf.org
Key Management Contact Information			
Full Name:	(Last) **Decker**	(First) **Julie**	
Position:	Director		
Correspondence Address:			
Street :	P.O. Box 2223		
City :	Wrangell		
State:	Alaska		
Country:	USA		
Phone	907-276-7315		
E-mail Address	jdecker@afdf.org		

3. Background to the Fishery

3.1. Species Biology

The life histories of all Pacific salmon have been studied and reported on extensively. For the purpose of this 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 2. Salmon species life-cycle, habitat and primary types of gear used by region.

Species	Life Cycle	Habitat/ Feeding	Primary Gear Types by Region
King/Chinook[2]	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
Keta/chum[3]	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	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	R1: Seine, gillnet R2:Seine, drift gillnet R3:Gillnet, fish wheel

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

	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.	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	R4:Purse seine, gillnet
Coho/silver[4]	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[5]	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	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.	R1: Purse seine R2:Purse seine, gillnet R3:Gillnet R4:Purse seine, gillnet

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

	America with an average weight of about 3.5 to 4 pounds and average length of 20-25 inches.	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.	
Sockeye/red[6]	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 months. Returning adults usually weigh between 4 and 8 pounds, although weights in excess of 15 pounds have been reported.	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

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

[6] http://www.adfg.alaska.gov/static/education/wns/sockeye_salmon.pdf

3.2. 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 3: 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).

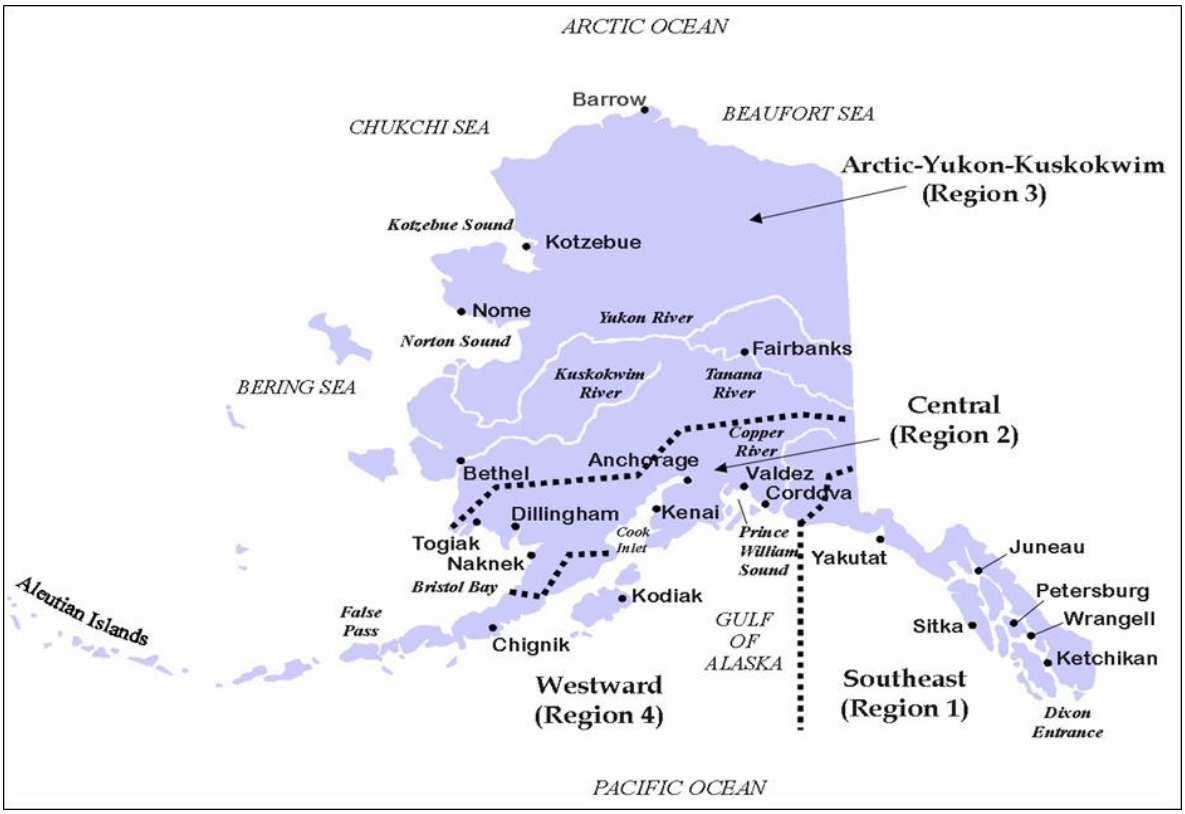

Figure 1. The four fishery management regions (Southeast, Central, Arctic-Yukon-Kuskokwim, and Westward) of the Alaska Department of Fish and Game, Division of Commercial Fisheries. (From Brenner, R. E., and A. R. Munro, editors. 2016. Run forecasts and harvest projections for 2016 Alaska salmon fisheries and review of the 2015 season. Alaska Department of Fish and Game, Special Publication No. 16-07, Anchorage)

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[7].

Fishing Methods

Purse Seining

Purse seiners[8] (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 include the following: Southeast/Yakutat Region - Seine Northern and Southern District, the Central Region - Prince William Sound and Lower Cook Inlet; Westward Region - Kodiak, Chignik, North & South Peninsula, and the Aleutian Islands purse seine fisheries.

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[9]. 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.

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

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

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. 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. Driftnets, on the other hand, are allowed to drift with the current, usually close to the surface. Like setnets, 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. Alaska salmon Gillnet fisheries include: the SE/Yakutat Region - Tree Point Gillnet; Central Region - Prince William Sound (PWS), Eshamy District Drift/Set gillnet, the Upper Cook Inlet UCI Set/Drift Gillnet, The Bristol Bay Naknek-Kvichak Drift/Set Gillnet; the AYK Region Kuskokwim Bay Gillnet; and the Westward Region- Kodiak gillnet fishery.

Figure 3. Gillnetter http://www.cf.adfg.state.ak.us/geninfo/pubs/pubshome.php#vessels.

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 50 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. Alaska salmon fisheries include the SE/Yakutat Region Troll fishery.

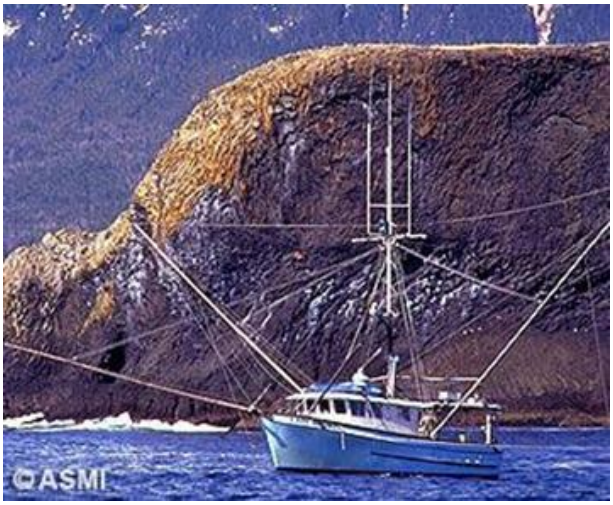

Figure 4. Salmon troller http://www.cf.adfg.state.ak.us/geninfo/pubs/pubshome.php#vessels.

All Alaska salmon fisheries are based on the seasonal migrations of the different salmon species returning to Alaska. A descriptive figure (Table 3) is provided below.

Table 3. Seasonality of Alaska salmon runs[11].

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

[10] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/whatkindofboat_cf.pdf
[11] http://www.alaskaseafood.org/the-catch/seasonality/

3.3. Fishery Management History and Organization

Commercial salmon fishing in Alaska began in the 1880s[12]. 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).

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 5[13]). Average catches over the last 5 years have been 199 million fish compared to catches of about 20 million fish in the early 1970s.

[12] http://www.adfg.alaska.gov/FedAidpdfs/Sp05-09.pdf
[13] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch

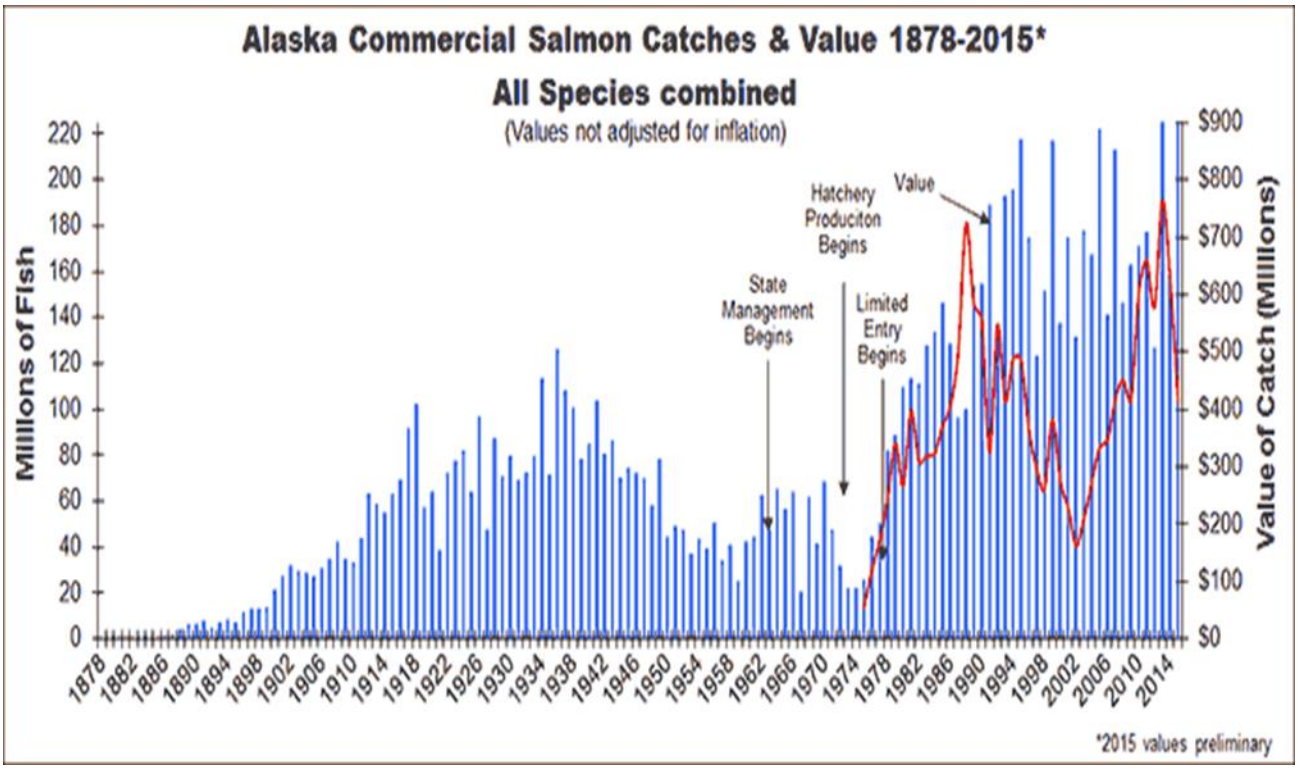

Figure 5. Alaska commercial salmon catches and ex-vessel values for all species combined, 1878-2015.

The total 2015 state-wide commercial salmon harvest was 263.5 million fish, and was comprised of 474,000 Chinook salmon, 15.2 million chum salmon, 3.6 million coho salmon, 190.5 million pink salmon, and 54 million sockeye salmon. Overall, this represents the second largest salmon harvest on record, and was exceeded only by the record harvests of 2013. Pink and sockeye salmon returns were especially strong; the number of harvested pink salmon came close to the 2013 record year, and sockeye salmon harvests were among the top 10 of all time[14]

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

[14] http://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr10162015

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[15].

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

3.4. 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 6). 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.

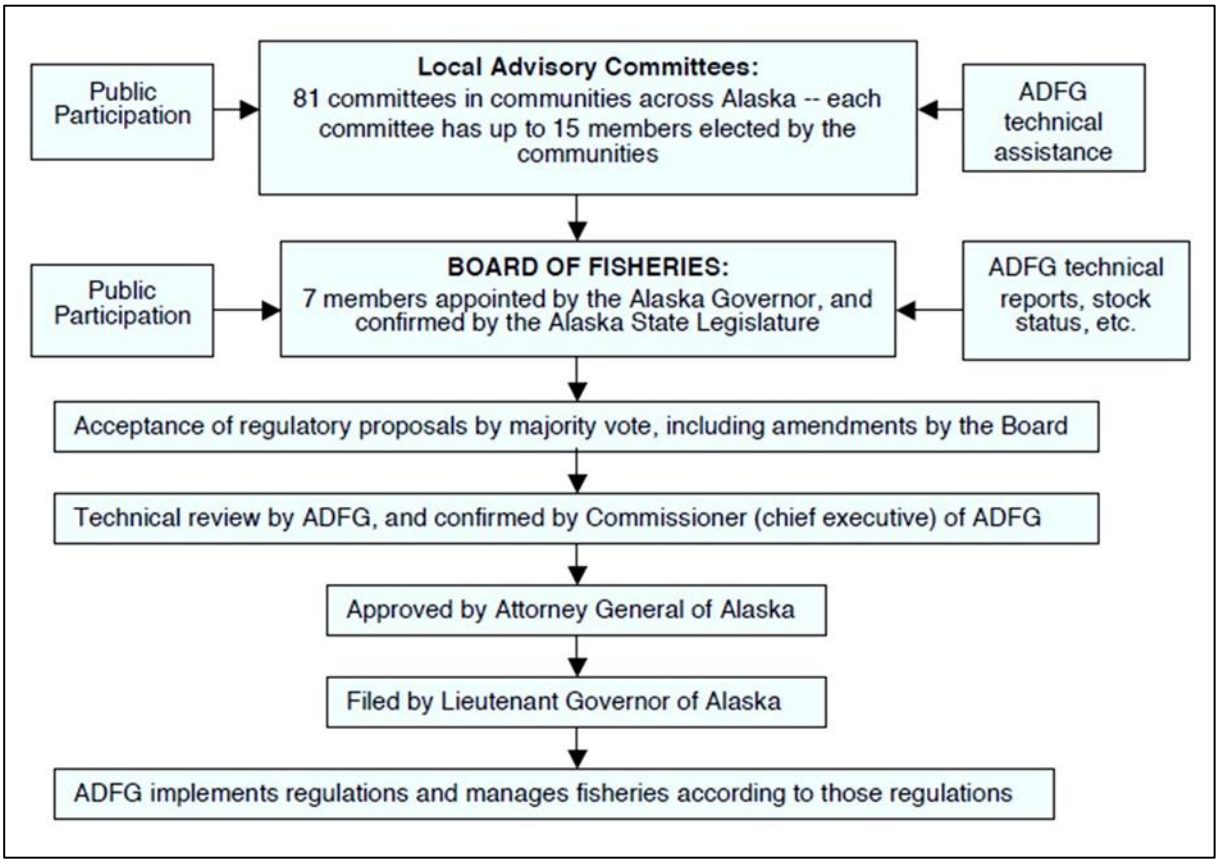

Figure 6. Functional management process of the Alaska salmon fishery.

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)).

3.5. 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, forecast, 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.

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

Alaska fishery 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 (names 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[16] 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.

[16] 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

3.6. Historic Biomass and Removals in the Fishery

Pink salmon[17] is the most numerous of the salmon species in the Alaska commercial catch and the most abundant salmon in the Pacific Ocean. Annual state-wide commercial harvests have been around 100 million pink salmon since about 1990. In Alaska, pink salmon are harvested primarily by commercial purse seine fleets, and much of the harvest is canned.

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 ranged from about 20 to 60 million fish over the past 40 years. In Alaska, most sockeye salmon are harvested using gillnets, although seine gear is used in limited areas. The Bristol Bay sockeye run is one of Alaska's most important commercial fisheries. The run is harvested as returning adult salmon migrate past the Alaska Peninsula in June and then as they pass the large gillnet fisheries in 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 in Japan). Annual state-wide commercial harvests of chum salmon have been around 20 million fish since the early 1990s. In Alaska, chum salmon are harvested primarily by gillnet and purse seine fleets. This species is also important in subsistence fisheries in Western Alaska.

Coho salmon are the fourth most numerous salmon species in the Alaska commercial catch and the fourth most abundant salmon in the Pacific Ocean. Recent annual state-wide commercial harvests have been near 5 million fish. 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. Recent annual state-wide commercial harvests have been around one-half million fish. In Alaska, 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[18]. 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.

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

[17] http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/salmon_harvest.php
[18] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main

- 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 3: 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[19]. 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. Herring are harvested in winter bait, sac roe, spawn-on-kelp, and bait pound fisheries. Miscellaneous shellfish (sea cucumber, sea urchins, and geoduck clams) are harvested in dive fisheries in the region. The Alaska Department of Fish and Game (ADF&G) has management jurisdiction over all groundfish resources within state waters in Region I. In addition, the State has management authority for Demersal Shelf Rockfish, ling cod, and black and blue rock fish in both state and federal waters. There are several commercially important shellfish species in Southeast Alaska. They include golden and red king crab, Dungeness crab, Tanner crab, and pandalid shrimp.

Southeast/Yakutat:

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[20]. 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, 77% of the salmon harvested in Southeast Alaska commercial fisheries have been caught with purse seine gear[21]. 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 hatchery production. Other species of salmon are harvested incidentally to pink and chum salmon. Over the recent 10- year period, from 2010 through 2015, the species composition of the purse seine harvest was 89% pink, 9% chum, 1% sockeye, and 1% coho salmon. Chinook salmon harvest percentages are insignificant (1 %<) compared with other species[18].

The Region I cumulative commercial salmon harvest by all harvest categories, including hatchery cost recovery, was 50.6 million in 2015[22]. Total common property commercial harvest was 46.0 million, which was 91% of the total harvest after excluding private hatchery cost recovery, Annette Island Reservation harvests, and miscellaneous harvests. Overall harvest in numbers of salmon in 2015 was 102% of that in 2014. The 2015 harvests by species compared with 2014 were as follows: Chinook 82%, sockeye 92%, coho 57%, pink 94% and chum salmon 173%. The Region I total commercial salmon harvest proportions by species were as follows: 1% Chinook, 3% sockeye, 4% coho, 69% pink, and 23% chum salmon. The 2015 combined-gear, Chinook salmon harvest of 351,000 was 108% of the most recent 10-year average and 116% of the long-term average. The sockeye salmon harvest of 1.5 million was 130% of the recent 10-year average and 114% of the long-term average. The coho salmon harvest of 2.1 million was 80% of the 10-year average and 99% of the long-term

[19] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.main
[20] http://www.americansalmonforest.org/uploads/3/9/0/1/39018435/econreportfull.pdf
[21] http://www.adfg.alaska.gov/FedAidPDFs/RIR.1J.2016.05.pdf
[22] https://www.adfg.alaska.gov/FedAidPDFs/SP16-07.pdf

average. The pink salmon harvest of 35.1 million was 86% of the 10-year average and 112% of the long-term average. The chum salmon harvest of 11.5 million was 115% of the 10-year average and 199% of the long-term average. The all species total harvest was 92% of the recent 10-year average harvest and 124% of the long-term average harvest.

Region 2: Central:

Appendix 3: Figures 2-5): Region 2. Central (Fig. 5: Prince William Sound, Fig. 6: Cook Inlet and Fig. 7: Bristol Bay Areas).

Central Region Alaska commercial fisheries[23] are composed of four 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 groundfish fisheries are small, yet diverse, targeting Pollock, Pacific cod, rockfish, sablefish, lingcod, and skate while small shrimp and scallop fisheries in Prince William Sound cater predominately to local markets. 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[24] 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. Beginning in the early 1900s with razor clams, diverse shellfish fisheries including those for shrimp and scallops as well as king, Dungeness and Tanner crabs, sustained area residents through the 1980s. As shellfish resources declined, fisheries developed for groundfish including Pacific cod, sablefish, and Pollock.

The 2015 Prince William Sound (PWS) Area commercial salmon harvest[25] was 103.47 million individuals. Harvest was composed of 97.32 million pink, 3.39 million sockeye, 2.51 million chum, 227,000 coho, and 23,400 Chinook salmon. The 2015 harvest was composed of 95.07 million (92%) commercial common property fishery (CPF), and 8.44 million (8%) hatchery cost recovery and broodstock fish.

Bristol Bay:

The Bristol Bay Management Area[26] 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, 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. Additionally, Togiak District provides spawning grounds for the largest commercial Pacific herring fishery in Alaska.

[23] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southcentral
[24] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.main
[25] https://www.adfg.alaska.gov/FedAidPDFs/SP16-07.pdf
[26] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.main

The five species of Pacific salmon found in Bristol Bay are the focus of major commercial, subsistence, and sport fisheries[27][28]. The Bristol Bay 2015 harvest of all salmon species was 36.7 million fish, ranking second over the last 20 years (1995-2014). Annual commercial catches for the most recent 20-year span (1995–2014) averaged approximately 23.2 million sockeye, 55,000 Chinook, 936,000 chum, 415,000 (even-years only) pink and 84,000 coho salmon. Sockeye salmon dominated the inshore commercial harvest, totaling 36.7 million fish, which was the largest harvest since 1995. Chinook salmon harvests in 2015 were above 20-year (1995–2014) averages in all districts except Ugashik and Togiak. The 2015 commercial harvest of 1.1 million chum salmon was 17% above the 20-year (1995– 2014) average of 937,000 fish. Chum salmon catches were above 20-year (1995–2014) averages in all districts except Togiak. Commercial harvest of coho salmon was 37,210 fish, well below the 20-year (1995–2014) average of 84,000, largely because of a lack of market interest in Nushagak District; typically the largest coho salmon run in Bristol Bay. The largest commercial harvest of coho salmon was in the Togiak District, where 26,080 fish doubled the 20-year (1995–2014) average of 13,000 coho salmon.

Cook Inlet:

The Cook Inlet Management Area[29] 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. Numerous groundfish species are also commercially harvested in directed fisheries including Pacific cod, sablefish, lingcod, and pelagic shelf rockfish (primarily black rockfish). Other groundfish species commercially harvested as bycatch to other directed groundfish and halibut fisheries include walleye Pollock, skate, and a variety of rockfish species. Shellfish species commercially harvested in the Cook Inlet Area are octopus, which may be retained as bycatch to other directed fisheries, and razor clams. Historically, the area supported crab, littleneck clam, and shrimp fisheries, but these fisheries are currently closed while stocks rebuild. These varied resources are assessed and managed by Alaska Department of Fish and Game in Soldotna and Homer.

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. More than 1,300 drift and set gillnet limited entry fishing permits have been issued for the UCI area, contributing about 10% of salmon permits issued statewide. Sockeye salmon are most important in terms of their economic value. Commercial harvests of razor clams date back to 1919. Harvests have fluctuated from no fishery to a harvest in excess 500,000 pounds, driven largely by market demand. Small commercial harvests of smelt, locally known as hooligan and a herring bait fishery also occur.

The 2015 UCI commercial harvest of approximately 3.1 million salmon was 15% less than the recent 10-year average annual harvest of 3.7 million fish[30][31]. The commercial harvest of nearly 2.6 million sockeye salmon was approximately 17% less than the 2005–2014 average annual harvest of 3.1 million fish, and ranks as the 6th lowest harvest in the past 10 years. The 2015 drift gillnet harvest of 127,000 coho salmon was 25% greater than the recent 10-year average of approximately 101,000 fish. The 2015 harvest of pink salmon was estimated to be approximately 47,000 fish, which was 43% less than the average annual harvest of nearly 83,000 fish from the previous 10-years of odd-year harvests. The 2015 harvest of approximately 269,000 chum salmon was more than double the previous 10-year average annual harvest of nearly 123,000 fish, and represents the highest chum salmon harvest since 1995.

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[27] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/650190311.pdf
[28] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/615370072.pdf
[29] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareacookinlet.main
[30] http://www.adfg.alaska.gov/FedAidPDFs/FMR16-14.pdf
[31] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/627886085.pdf

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. 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. Historically, the area supported herring as well as several crab and shrimp fisheries, but these fisheries are currently closed while stocks rebuild. These varied resources are protected, maintained, and improved through efforts by the area management and research staffs based in Homer.

The preliminary estimate of the 2015 Lower Cook Inlet Area commercial salmon harvest was 6,904,402 salmon[3233]. The harvest was composed of 6,526,903 pink, 259,374 sockeye, 112,475 chum, 4,779 coho, and 871 Chinook salmon. The harvest was comprised of 4.5 million (65.4%) commercial common property fishery, and 2.4 million (34.6%) hatchery cost recovery and broodstock salmon.

Region 3: Arctic-Yukon-Kuskokwim

Appendix 3: 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[34] 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. King crab is harvested near Nome in both commercial and subsistence fisheries. Whitefish are also important to the residents of this region

Kuskokwim:

The Kuskokwim Management Area[35] 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.

A total of 2,714 sockeye; 117,557 coho; and 19,048 chum salmon were commercially harvested in the District 1 for 2014[36]. Harvests of sockeye, coho, and chum salmon were all below their recent 10-year averages (2005-2014). A total of

[32] http://www.adfg.alaska.gov/FedAidPDFs/FMR16-14.pdf
[33] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/621975264.pdf
[34] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.interior
[35] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.main
[36] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/496937848.pdf

2,265 Chinook; 58,879 sockeye; 52,317 coho; and 14,563 chum salmon were commercially harvested in District 4. Harvests of Chinook and chum salmon were below average, while harvests of sockeye and coho salmon were above average. Coho salmon harvest was approximately 13% above the most recent 10-year average. Chinook, sockeye, and chum salmon harvests were below the most recent 10-year averages (87%, 26%, and 77%, respectively). The Chinook salmon harvest was the second lowest since 1967. Chum salmon harvest was the second lowest since 1987. A total of 205 Chinook; 20,515 sockeye; 52,158 coho; and 3,403 chum salmon were commercially harvested in District 5. Chinook and chum salmon harvests were below average. Harvest of sockeye salmon was average, while and harvest of coho salmon were above average. Coho salmon harvest was the highest on record and approximately 70% above the most recent 10-year average (2005-2014). Chinook, sockeye and chum salmon harvests were below the most recent 10-year averages (90%, 36%, and 75%, respectively). The Chinook salmon harvest was the lowest since 1972. Chum salmon harvest was the lowest since 2005.

Yukon:

The Yukon Salmon Management Area[37] 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. 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 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[38], 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.

[37] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareayukon.main
[38] http://www.kwikpakfisheries.com/fisheriesmanagement.html

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.

Total commercial harvest for the Yukon River fall season in the Alaska portion of the drainage was 191,470 fall chum and 129,700 coho salmon[39]. Fall chum salmon commercial harvest was above the most recent 5-year (2010–2014) and 10-year (2005–2014) averages. The coho salmon harvest was the highest on record, eclipsing the previous high of 106,696 fish in 1991.

Arctic Norton Sound:

Norton Sound[40], 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.

The 2015 Norton Sound salmon runs were the best in recent memory[41]. Commercial harvest was the highest in over 30 years for chum salmon and record setting for coho and sockeye salmon. Record sockeye salmon subsistence harvests also occurred in Norton Sound and Port Clarence due to a convergence of intensive fishing effort and coast-wide increase in sockeye salmon abundance bolstered by strong runs of sockeye salmon to the Sinuk and Pilgrim rivers. For odd-numbered years, pink salmon run strength throughout Norton Sound was the strongest since the record odd-year run of 2005. Commercial harvest of chum salmon in Norton Sound in 2015 was 153,039 fish, which ranks 11th highest in 55 years of commercial salmon harvests and was the largest chum salmon harvest recorded since the record 1983 season. The 2015 season also marked the 5th time in the last 6 years in which harvest of chum salmon eclipsed 100,000 fish. In addition, this year's harvest was 20% above the long-term average harvest of 90,271 chum salmon. Pink salmon commercial harvest was 64,497 fish, the 7th highest in 26 odd-numbered year harvests, and 60% above the long-term (1965–2013) odd-year average harvest of 40,287 fish. Southern Norton Sound accounted for 90% of the overall harvest in

[39] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/633559108.pdf
[40] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareanortonsound.main
[41] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/628912565.pdf

2015 and the Norton Bay Sub district harvest of 11,898 pink salmon was a record for odd years. The 2015 overall commercial coho salmon harvest in Norton Sound was 154,487 fish, which surpassed the previous 2006 season's record harvest of 130,808 coho salmon by 18%.

Kotzebue:
The 2015 harvest was the third highest in over 25 years and would have easily finished in the top 10 harvests all-time, but because of capacity concerns. Cooper River Systems, a local processor, restricted daily deliveries for the most of the season to 1,500 pounds per permit holder[42]. The preliminary commercial harvest figure of 306,174 chum salmon was the twelfth highest in the 54-year history of the fishery.

Region 4: Westward: Appendix 3: Region 4. Westward (Fig. 14: Kodiak, Fig. 15: Aleutians, Fig. 16: Chignik Areas, Figure 17: Alaska Peninsula).

Westward Region[43] 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

Alaska Peninsula:
The Alaska Peninsula and Aleutian Islands Management Area[44], 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. 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 2015 commercial salmon harvest in the Alaska Peninsula, Aleutian Islands, and Atka-Amlia Islands Management Areas totaled 53,876 Chinook, 5.9 million sockeye, 322,791 coho, 16.78 million pink and 867,279 chum salmon[45].

Chignik:
The Chignik Management Area[46] (CMA) is located on the south side of the Alaska Peninsula, approximately 250 miles southwest of Kodiak. 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

[42] http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/626631479.pdf
[43] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southwest
[44] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.main
[45] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/akpeninsula/2015AlaskaPeninsulaSeasonSummary.pdf
[46] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareachignik.main

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.

A total of 9,105 Chinook salmon were commercially harvested in the CMA in 2015, which was above recent average harvests[47]. A total of 1.5 million sockeye salmon were commercially harvested in 2015, which was above the most recent 10-year average harvest but below the prior 5-year average harvest. A total of 82,049 coho salmon were commercially harvested in 2015, which was similar than the prior 5- and 10-year average harvests. A total of 1.98 million pink salmon were commercially harvested in 2015, which was above the prior 5- and 10-year average harvests. A total of 101,001 chum salmon were commercially harvested in 2015, which was well below the prior 5- and 10-year average harvests.

Kodiak:

The Kodiak Management Area[48] (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.

The 2015 commercial sockeye harvest in the KMA totaled 3.1 million fish[49]. The harvest was above the recent 10-year average (2.2 million). The commercial coho salmon harvest of 410,502 was above the most recent 10 year average (322,526). Overall, the 2015 pink salmon harvest of 33 million was above the 10 years average harvest of 20.0 million, and also the third largest ever in Kodiak Island.

Aleutian Islands:

The Bering Sea/Aleutian Islands Area includes all waters of the Pacific Ocean and Bering Sea west of the longitude of Scotch Cap light and north of the Alaska Peninsula, including waters of the US EEZ extending to the US – Russia maritime boundary and into the Chukchi and Beaufort seas. These waters encompass king crab Registration Areas O, T, and Q and the Bering Sea, Eastern Aleutian, and Western Aleutian Districts of Tanner crab Registration Area J. The Bering Sea/Aleutian Islands Area supports some of the largest and most valuable commercial fisheries in the United States including the Bristol Bay red king crab fishery, Bering Sea snow crab fishery, and Bering Sea walleye Pollock fishery. Important fisheries are conducted for golden king crab, Tanner crab, weathervane scallops, Dungeness crab, Pacific cod, several species of flatfish, sablefish, Pacific salmon, and Pacific herring. Many of these fisheries occur within both waters of Alaska and the US EEZ and are regulated through a complex structure of interrelated state and federal management plans. Finfish and shellfish stocks in this area provide year-round commercial fishing opportunity for all size classes of vessels and sustain important subsistence harvests for local residents. While the geography of the Bering Sea/Aleutian Islands Area includes waters of Bristol Bay, the Yukon and Kuskokwim Deltas, and Norton Sound, salmon and herring fisheries occurring in those areas are managed from the Central and Arctic – Yukon - Kuskokwim regions. Major fish processing operations are located in Dutch Harbor, Saint Paul, and Akutan.

The Aleutian Islands Area may open to commercial salmon fishing by emergency order if adequate escapement is observed and there is interest from the fishing industry. During an aerial survey in July of the Aleutian Islands, an inadequate amount of pink salmon (approximately 37,000) were observed in streams. The low abundance of pink salmon in the Unalaska Area did not allow for a commercial salmon fishery to occur in 2015. McLees Lake had a sockeye salmon escapement of 12,424, which met the SEG of10,000–60,000. **State-wide Alaska 2015, Salmon Commercial Fisheries Forecasts and Harvest.**

[47] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/chignik/2015ChignikSalmonSeasonSummary.pdf
[48] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByAreaKodiak.main
[49] http://www.adfg.alaska.gov/static/fishing/PDFs/commercial/kodiak/2015KodiakSalmonSeasonSummary.pdf

The 2015 total commercial salmon catch (all species) projection of 221 million was expected to include 59,000 Chinook salmon, 58.8 million sockeye salmon, 4.6 million coho salmon, 140.1 million pink salmon, and 17.2 million chum salmon (Table 4)[5051].

[50] http://www.adfg.alaska.gov/fedaidpdfs/sp15-04.pdf
[51] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery

Table 4. Actual and forecasted harvests for the Alaska salmon commercial fishery by Region, area and species (in thousands of fish), 2015.

Region/Area	Chinook	Sockeye	Coho	Pink	Chum	TOTAL
Southeast/Yakutat - Region 1						
Actual Harvest	307	1,389	1,876	34,089	8,559	46,218
Forecasted Harvest	n/a	1,111	2,918	58,000	9,265	71,294
Central - Region 2						
Prince William Sound						
Actual Harvest	24	3,210	198	98,254	2,544	104,230
Forecasted Harvest	9	4,548	434	51,415	2,902	59,308
Cook Inlet						
Actual Harvest	11	2,840	218	6,398	382	9,847
Forecasted Harvest	7	4,189	162	1,825,872	238	6,421
Bristol Bay						
Actual Harvest	53	36,673	31	3	930	36,688
Forecasted Harvest	n/a	40,520	133	1	751	41,405
Central Region Grand Total						
Actual Harvest	88	41,723	447	104,650	3,856	150,764
Forecasted Harvest	15	49,256	729	53,241	3,891	107,132
Arctic-Yukon-Kuskokwim (AYK) - Region 3						
Actual Harvest	10	61	333	69	1,026	1,499
Forecasted Harvest	1	90	315	50	2,115	2,571
Westward Region – 4						
Actual Harvest	73	10,579	823	51,683	1,742	64,900
Forecasted Harvest	38	8,316	618	28,976	1,944	39,893
Statewide Grand Total						
Actual Harvest	474	53,748	3,574	190,492	15,177	263,463
Forecasted Harvest	54	58,773	4,580	140,268	17,216	220,891

3.7. Economic Value of the Fishery

The estimated value of the 2015 commercial salmon harvest was $414 million[52]. Sockeye salmon was the most valuable salmon species, with state-wide harvests grossing approximately $198 million. A little less than half of the sockeye salmon value came from Bristol Bay, where the harvest was excellent but ex-vessel prices were 50% lower than last year, at $0.50 a pound. The state-wide value of the pink salmon harvest was second among the salmon species, at $132 million. Chum, Chinook, and coho salmon, respectively, filled the remainder of the rankings. The most valuable salmon fishing area in the state for 2015 was Prince William Sound, with an all-species harvest value of $118 million. In addition to $72 million in pink salmon, Prince William Sound sockeye salmon yielded an ex-vessel value of $35 million. Prince William Sound chum and Chinook salmon followed, with values of $8 million and $2 million, respectively (Table 5).

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 5. Alaska commercial salmon harvests (numbers and pounds) and ex-vessel values, 2015.

Species	Av. weight (lbs)	Av. Price per lb	Number (thousands)	Pounds (thousands)	Ex-vessel Value US$ (thousands)
Southeast					
Chinook	10.06	$3.81	307	3,085	$11,751
Sockeye	4.36	$1.09	1,389	6,054	$6,598
Coho	5.88	$0.78	1,876	11,030	$8,604
Pink	3.84	$0.20	34,089	130,900	$26,180
Chum	8.46	$0.50	8,559	72,407	$36,204
Totals			46,218	223,473	$89,335
Prince William Sound					
Chinook	16.42	$5.65	24	388	$2,189
Sockeye	5.35	$2.01	3,210	17,183	$34,593
Coho	7.43	$0.66	198	1,469	$966
Pink	3.38	$0.22	98,254	332,085	$71,913
Chum	5.38	$0.61	2,544	13,679	$8,331
Totals			104,229	364,802	$117,990
Cook Inlet					
Chinook	16.00	$2.05	11	176	$361
Sockeye	5.32	$1.59	2,840	15,100	$23,992
Coho	5.88	$0.60	218	1,282	$770
Pink	3.17	$0.21	6,398	20,254	$4,260
Chum	6.71	$0.41	382	2,565	$1,048
Totals			9,847	39,375	$30,429
Bristol Bay					
Chinook	15.1	$0.50	53	792	$396
Sockeye	5.2	$0.50	35,673	184,792	$92,396
Coho	6.7	$0.25	31	206	$52
Pink	3.7	$0.20	3	8	$2
Chum	6.1	$0.30	930	5,700	$1,995

[52] http://www.adfg.alaska.gov/index.cfm?adfg=pressreleases.pr10162015

Totals			36,688	191,496	$94,840
Kodiak					
Chinook	9.10	$0.96	9	77	$74
Sockeye	4.86	$0.89	3,104	15,058	$13,402
Coho	6.04	$0.36	417	2,517	$906
Pink	3.32	$0.19	33,008	109,452	$20,796
Chum	7.05	$0.40	772	5,433	$2,174
Totals			37,308	132,536	$37,350
Chignik					
Chinook	8.12	$1.01	10	72	$75
Sockeye	5.50	$0.78	1,541	8,470	$6,601
Coho	6.38	$0.19	83	524	$102
Pink	2.95	$0.16	1,979	5,844	$941
Chum	6.50	$0.25	102	657	$165
Totals			3,711	15,565	$7,881
AK Peninsula / Aleutian Is					
Chinook	6.09	$0.75	54	369	$277
Sockeye	5.58	$0.60	5,934	33,360	$20,016
Coho	6.18	$0.32	323	2,014	$645
Pink	3.13	$0.15	16,696	52,510	$7,877
Chum	6.41	$0.22	868	5,507	$1,212
Totals			23,873	93,758	$30,025
Kuskokwim					
Chinook	10.1	$0.50	9	84	$42
Sockeye	6.1	$0.50	57	345	$173
Coho	8.0	$0.50	149	1,192	$588
Pink	0.0	$0.50	0	0	$0
Chum	6.4	$0.50	22	136	$68
Totals			234	1,755	$870
Prince William Sound					
Chinook					
Sockeye					
Coho	7.18	$0.70	130	933	$653
Pink	3.50	$0.14	4	14	$2
Chum	6.38	$0.60	550	3,510	$2,095
Totals			683	4,456	$2,749
Norton Sound					
Chinook	11.00	$2.27	1	11	$25
Sockeye	6.50	$0.62	4	26	$16
Coho	7.97	$1.10	154	1,227	$1,349
Pink	3.32	$0.14	65	216	$31
Chum	6.93	$0.50	147	1,018	$509
Totals			370	2,496	$1,928
Kotzebue					
Chinook					
Sockeye					
Coho					

Pink					
Chum	8.6	$0.31	307	2,626	$826
Totals			307	2,626	$826
ALASKA TOTALS					
Chinook	10.65	$3.01	474	5,050	$15,186
Sockeye	5.22	$0.71	53,748	280,385	$197,783
Coho	6.26	$0.65	3,574	22,389	$14,631
Pink	3.42	$0.20	190,492	651,280	$131,999
Chum	7.46	$0.48	15,177	113,232	$54,621
Totals			263,463	1,072,334	$414,219

4. Proposed Units of Assessment

The following are the proposed units of assessment and certification for **US Alaska Salmon Commercial Fishery**:

Table 6. Proposed units of assessment and certification for the US Alaska Salmon Commercial fishery.

Unit of Certification			
US ALASKA COMMERCIAL SALMON FISHERIES			
Fish Species (Common & Scientific Name)	**Geographical Location of Fishery**	**Gear Type**	**Principal Management Authority**
Chinook salmon *O.tschawytscha* Sockeye salmon *O.nerka* Coho salmon *O. kisutch* Pink salmon *O. gorbuscha* Chum salmon *O. keta*	ADFG Admin Region 1: Southeast & Yakutat	▪ Troll ▪ Purse Seine ▪ Drift Gillnet ▪ Set Gillnet	Alaska Department of Fish and Game (ADFG)
Chinook salmon *O.tschawytscha* Sockeye salmon *O.nerka* Coho salmon *O. kisutch* Pink salmon *O. gorbuscha* Chum salmon *O. keta*	ADFG Admin Region 2: Central	▪ Purse Seine ▪ Drift Gillnet ▪ Set Gillnet	Alaska Department of Fish and Game (ADFG)
Chinook salmon *O.tschawytscha* Sockeye salmon *O.nerka* Coho salmon *O. kisutch* Pink salmon *O. gorbuscha* Chum salmon *O. keta*	ADFG Admin Region 3: Arctic-YukonKuskokwim	▪ Drift Gillnet ▪ Set Gillnet ▪ Fish wheele ▪ Beach seine ▪ Dip net	Alaska Department of Fish and Game (ADFG)
Chinook salmon *O.tschawytscha* Sockeye salmon *O.nerka* Coho salmon *O. kisutch* Pink salmon *O. gorbuscha* Chum salmon *O. keta*	ADFG Admin Region 4:Kodiak, Chignik, Alaska Peninsula, Aleutian Islands	▪ Purse Seine ▪ Drift Gillnet ▪ Set Gillnet ▪ Beach Seine	Alaska Department of Fish and Game (ADFG)

5. Consultation Meetings

5.1. On-Site Assessment and Consultation Meetings

Table 7. Summary of Meetings, Alaska Salmon Commercial Fishery, April-2016.

Meeting Date and Location	Personnel	Areas of discussion
Date: April/11/2016 **Location:** ADFG Anchorage Time:8:30 AM	**ADFG Anchorage** Bill Templin, Eric Volk Andrew Munro **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	**Topics Discussed:** Salmon Genetics
Date: April/11/2016 **Location:** APICDA Anchorage Time:2:00PM	**Kodiak Regional Aquaculture Association** Tina Fairbanks **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	**Topics Discussed:** Status of hatchery permit requests in 2014/15 updates on any pathology issues at salmon hatcheries in 2014/15 Strategies in terms of hatchery release, size or time of release or location of remote fry releases of pink or chum salmon that could reduce the proportion of hatchery fish on the spawning grounds Fry release strategies discussed in the Regional Salmon Planning Team process.
Date: April/11/2016 **Location:** APICDA Anchorage Time:3:30PM	**Prince William Sound Science Center** Eric Knudsen Ron Josephson (ADFG) **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	•Discussion about the hatchery straying field studies and the implications of the inter-annual variability in straying in pink salmon in PWS and how it impacts the original experimental design • Update of the recent research review in Anchorage and plans for the future •Discussion of significant funding constraints that might impact the research plans •Type of Information collected (i.e. sex, fork length, external mark, photograph; fin tissue, scale, otolith etc.) •Challenges have been encountered and how have they been addressed Status of subsequent funding
Date: April/12/2016 **Location:** ADFG Anchorage Time:8:30 AM	**ADFG Bristol Bay** Bert Lewis, Jack Erickson Travis Ellison **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor	**Topics Discussed: <u>Bristol Bay Status of fisheries, assessment programs and biological data</u>** State-wide harvest survey Information on log books Creel Surveys Studies on the Kenai. Information on catch for personal use Katchemak Bay research reserve Research Tools for form annual and with-in season

	Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	management decisions: Otolith mark data Genetic information Coded wire tag data
Date: **April/12/2016** **Location:** **ADFG** **Anchorage** **Time:10:00** **AM**	**ADFG Cook Inlet** Bert Lewis, Patrick Ellis **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	**Topics Discussed:** **<u>Cook Inlet Status of fisheries, assessment programs and biological data</u>** State-wide harvest survey Information on log books Creel Surveys Studies on the Kenai. Information on catch for personal use Katchemak Bay research reserve Research Tools for form annual and with-in season management decisions: Otolith mark data Genetic information Coded wire tag data
Date: April/12/2016 **Location:** APICDA Anchorage Time:1:30 AM	**ADFG Staff Westward** **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	**Topics Discussed:** Westward Status of fisheries, assessment programs and biological data State-wide harvest survey Information on log books Creel Surveys Studies on the Kenai. Information on catch for personal use Katchemak Bay research reserve Research Tools for form annual and with-in season management decisions: Otolith mark data Genetic information Coded wire tag data
Date: April/13/2016 **Location:** ADFG Cordova Time:10:00 AM	**ADFG Cordova Personnel** Tommy Sheridan, Jeremy Botz and Steve Moffitt **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	**Topics Discussed:** Prince William Sound Status of fisheries, assessment programs and biological data Harvest – post season and in-season reports for Subsistence fishers Reports of retained commercial catch by personal use Otolith mark data utilization for guidance in-season harvest management? Examples Otolith mark data usage for guidance in hatchery management (i.e. production levels, release strategies, etc.) Examples Utilization of otolith mark data to estimate hatchery salmon stray rates onto natural spawning grounds Otolith mark data utilization to estimate wild salmon integration rates into hatchery broodstocks
Date: April/13/2016	**ADFG Cordova Personnel** Sheridan, Botz and Moffitt **Client: AFDF**	**Topics Discussed:** Prince William Sound Status of fisheries, assessment programs and biological data

Location: ADFG Cordova Time:10:00 AM	Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Harvest – post season and in-season reports for Subsistence fishers Reports of retained commercial catch by personal use Otolith mark data utilization for guidance in-season harvest management? Examples Otolith mark data usage for guidance in hatchery management (i.e. production levels, release strategies, etc.) Examples Utilization of otolith mark data to estimate hatchery salmon stray rates onto natural spawning grounds Otolith mark data utilization to estimate wild salmon integration rates into hatchery broodstocks
Date: April/13/2016 **Location:** PWSAC Cordova Time:1:30 PM	**Prince William Sound Aquaculture Center** Dave Regianni **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Discussion on percent marine survival for all hatchery production in 2015 and how does it compare to previous seasons and what was the estimated contribution to the fishery Fish health concerns in 2015 and in 2016 Status of hatchery permit requests in 2015/16 Changes in hatchery production for 2016
Date: April/13/2016 **Location:** DIPAC Cordova Time:8:30 AM	**Douglas Island Pink and Chum Aquaculture Center** Eric Prestegard , John Burke, Alex Wertheimer, Ed Jones Steve Reifensthul **ADFG** Ed Jones, **Client: AFDF** Julie Decker Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson, Assessor	Discussion on percent marine survival for all hatchery production in 2015 and how does it compare to previous seasons and what was the estimated contribution to the fishery Fish health concerns in 2015 and in 2016 Status of hatchery permit requests in 2015/16 Changes in hatchery production for 2016
Date: April/13/2016 **Location:** ADFG Cordova Time:1:30 AM	ADFG Juneau Headquarters Scott Kelley, Forrest Bowers, Lowell Fair **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Southeast Status of fisheries, assessment programs and biological data Harvest – post season and in-season reports for Subsistence fishers Reports of retained commercial catch by personal use Otolith mark data utilization for guidance in-season harvest management Examples Otolith mark data usage for guidance in hatchery management (i.e. production levels, release strategies, etc.) Utilization of otolith mark data to estimate hatchery salmon stray rates onto natural spawning

		grounds Otolith mark data utilization to estimate wild salmon integration rates into hatchery broodstocks
Date: April/13/2016 **Location:** NOAA Auke Bay Lab Time:3:30 AM	**NOAA Alaska Fisheries Science Center** James Murphy, Phil Mundy **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Presentation on marine survival on Salmonids
April/14/2016 **Location:** **Goldber Hotel** **Time:8:30 AM**	**Discussion with Client:** **Client: AFDF** Julie Decker Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	Discussion on findings of the reassessment
Date: April/13/2016 **Location:** Offsite meeting Time:10:00 AM	**ADFG AYK Regional Office** Jan Conits Chuck Brazil John Linderman **Client: AFDF** Dave Gaudet **Assessment Team Members:** Ivan Mateo, Lead Assessor Brian Allee, Assessor Scott Marshall, Assessor Marc Johnson , Assessor	AYK Region Status of fisheries, assessment programs and biological data Harvest – post season and in-season reports for Subsistence fishers Reports of retained commercial catch by personal use otolith mark data utilization for guidance in-season harvest management Otolith mark data usage for guidance in hatchery management (i.e. production levels, release strategies, etc.) Examples Utilization of otolith mark data to estimate hatchery salmon stray rates onto natural spawning grounds Otolith mark data utilization to estimate wild salmon integration rates into hatchery broodstocks

6. Assessment Outcome Summary

A. The Fisheries Management System

Clause 1: Structured and legally mandated management system

Evidence adequacy rating: High

Alaska's salmon fisheries are managed under a clear structure of laws, regulations, treaties, and other legal mandates and instruments, at the international, national, and local levels. This management process is well established and transparent. ADFG's Commercial Fisheries Division is responsible for conservation of Alaska's salmon stocks and for management of the commercial fisheries. ADFG's main priority is achieving escapement, which ensures that enough salmon escape the fisheries, and spawn in their natal rivers to provide a maximum sustainable yield. The Alaska Wildlife Troopers are charged with protecting the fishery through reducing illegal harvest, waste, and illegal sale of commercially and sport-harvested fish, and by protecting fish and wildlife habitat in state waters. The NPFMC FMP prohibits commercial salmon fisheries in the modified West Area, and continues to delegate management authority to the State of Alaska for the directed commercial salmon troll fishery and the sport salmon fishery in the East Area of the EEZ. No significant changes at the management level occurred between 2013 and 2015.

Clause 2: Coastal area management frameworks

Evidence adequacy rating: High

The institutional capacity of existing agencies and the existing intimate and routine cooperation between federal and state agencies managing Alaska's coastal resources is capable of planning and managing coastal developments in a transparent, organized and sustainable way. Moreover, the available public processes between fishermen and other users and among fishermen (i.e. BOF process) tends to bring stakeholders together early during coastal development proposals and avoid conflict to various degrees. Courts of law are used when conflict cannot be resolved through other processes.

Clause 3: Management objectives and plans

Evidence adequacy rating: High

The BOF's main role is to conserve and develop the fishery resources of the state. The BOF is also charged with making allocative decisions, and ADFG is responsible for management based on those decisions. The BOF has adopted three state-wide regulatory policies within the Title 5 Alaska Administrative Code: 1) Policy for Management of Mixed Stock Salmon Fisheries (MMSSF) (5 AAC 39.220), which seeks to conserve wild stocks consistent with sustained yield; 2) Policy for MMSSF (5 AAC 39.222), which seeks to ensure conservation of wild salmon and their habitats by establishing a comprehensive policy for regulation and management, including identification and rebuilding stocks of concern; and 3) Policy for State-wide Salmon Escapement Goals (SSEG) (5 AAC 39.223), which establishes concepts, criteria, and procedures for setting and modifying escapement goals, and a process to facilitate public review of any associated allocative issues. These policies provide the foundation of the management of every salmon fishery in Alaska. The BOF has also adopted a variety of fishery–specific regulatory management plans within each Region that are implemented by responsible ADFG biologists. Additionally, the NPFMC developed, under the MSFCMA, the FMP for the Salmon Fisheries in the EEZ off the Coast of Alaska. This plan forms the basis for management of salmon fisheries in the United States Exclusive Economic Zone (EEZ; 3 nautical miles to 200 nautical miles offshore) off Alaska. The plan became effective in 1979 after it was approved by Secretary of Commerce, and was comprehensively revised in 1990 and 2012.

B. Science and Stock Assessment Activities

Clause 4: Fishery data

Evidence adequacy rating: High

The core of Alaska's fishery abundance –based management system is: 1) the establishment of escapement goals and BOF regulatory Management Policies and Plans, 2) in-season assessment of run strength using fishery dependent data, test fishing, and independent assessment of numbers of fish escaping the fishery to spawn; and 3) delegated local authority to quickly open and close times and areas where fishing may occur.

Fishery harvest data are collected by tallying sales receipts. By Alaska law (AS 16.05.690) each buyer of fish is required to keep a record of each purchase showing the name or number of the vessel landing the catch, the date of landing, vessel license number, pounds purchased of each species, number of each species, and the ADFG statistical area where the fish were harvested, as well as other information ADFG may require for specific fisheries or areas. On an in-season basis, Area Management Biologists may also obtain rapid assessments of harvest via telephone surveys of processors, or sub-sampling of individual fishers on the fishing grounds. In several fisheries, in-season estimates of stock composition or hatchery/wild composition are also made based in mark recoveries or genetic analysis of test fishing catches, harvests, and other samples.

Clause 5: Stock assessment

Evidence adequacy rating: High

In addition to stock assessment activities that are fishery dependent, (e.g. estimating harvest numbers, stock and age composition of harvests, migration timing and pathways), ADFG undertakes extensive and intensive assessment of the numbers, age composition, and distribution of escapements. Assessing the escapement of salmon in Alaska requires many different approaches depending on local circumstances. The sheer magnitude and diversity of salmon spawning population spread over the vast landscape of a State that with over 500,000 square miles of land mass and nearly 7,000 miles of coastline makes the assessment program very challenging. However, the extent of the stock assessment toolkit used by ADFG reflects a high scientific standard in support of optimal resource use, and rivals that of any other agency along the Pacific Rim.

C. Precautionary Approach

Clause 6: Biological reference points and harvest control rule

Evidence adequacy rating: High

Scientifically defensible escapement goals are the reference points used to manage Alaska salmon fisheries. The legal authority to set and manage harvest so as achieve these goals is founded in the Alaska Constitution's sustained yield principle Article VIII, section 4) and in state statute (AS 16.05.020). There are also two state-wide regulatory policies within the Title 5 Alaska Administrative Code that establish various biological reference points, including escapement goals, stocks of concern identification, and harvest control procedures: 1) Policy for Management of Sustainable Salmon Fisheries (5 AAC 39.222) and 2) Policy for State-wide Salmon Escapement (5 AAC 39.223).

Clause 7: Precautionary approach

Evidence adequacy rating: High

Alaska's policies for Sustainable Fisheries Management, embodied in the State Constitution and regulations, include 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. Of note, is the state's modest 2015 increase in hatchery production, which provides evidence of continued corrective precautionary measures.

The precautionary approach requires application of prudent foresight; avoidance of irreversible changes; and priority to conserve the productive capacity of the resource. Currently, there are two pressing salmon management issues in Alaska: 1) most Chinook salmon populations in Alaska, especially those in the Arctic-Yukon-Kuskokwim region, are exhibiting depressed runs, declining productivity, and biological changes in age and size; and, 2) new findings have documented genetic introgression of hatchery fish into wild populations, which heightens concerns over significant straying of hatchery

pink salmon within Prince William Sound and chum salmon in Southeast Alaska. To address Chinook salmon problems, ADFG has restricted commercial, sport, and even subsistence harvests of Chinook salmon to meet escapement goals and international treaty obligations. ADFG also has taken the lead in developing partnerships with other state and federal agencies, academia, and NGOs to implement a new comprehensive Chinook Salmon Stock Assessment and Research Plan, which involves 12 key stocks in all regions of the state. Initial funding for this plan, secured in 2013, was sufficient to conduct 2014 field work, but there is uncertainty about future funding. A complementary Arctic-YukonKuskokwim Chinook Salmon Research Action Plan, developed through the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, is directed at critical management issues in Western Alaska. To address hatchery-wild interactions of pink and chum salmon, a new long term Alaska Hatchery Research Program, coordinated and funded by state, industry, Regional Aquaculture Associations and academia, was initiated in 2012 and completed its second field season in 2013. The work follows specific schedules for tasks and reports from a research plan developed by a science panel, with intensive field work and sampling in both regions directed by Prince William Sound Science Center. This research is designed to provide definitive information on impacts of different levels of straying on the genetic structure and fitness of wild stocks, and will gives credence to appropriate levels of risk assessment involving this complex issue. Continued funding supporting new research plans for both Chinook salmon and hatchery-wild stock interactions is essential for providing critical information needed for maintaining precautionary approach principles in Alaska salmon management.

D. Management Measures

Clause 8: Management measures

Evidence adequacy rating: High

Fisheries regulations are published for the various areas in Alaska. These documents contain selected Alaska statutes enabling legal management of resources, state-wide general provisions, management plans, gear allowances, closed and open areas, and all other area specific provisions. Some regulations may be changed during the season by the issuance of emergency orders. There are also management regulations specific to Private Non Profit Salmon Hatcheries, transporting, possessing and releasing live fish, and aquatic farming (5 AAC 40 and 41). The Alaska (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. All Alaska salmon fisheries are limited entry, with only a set number of permits. 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).

Escapement goals are the most critical harvest control rule used for management of Alaska salmon. Currently, there are 296 active salmon stock escapement goals throughout the state of Alaska. However, while not all Alaska salmon fisheries and salmon stocks are managed to achieve a formal escapement goal, all harvests are closely controlled through in-season management and the issuing of emergency orders. In-season management involves opening and closing geographical areas and prosecuting commercial, sport, personal use, and subsistence fisheries using emergency orders based on run size projections, historical and contemporary escapement indices and estimates, intensive harvest and fishing-effort tracking, test fishing, escapement monitoring, environmental conditions, catch and escapement sampling, and any other available information. During the 2015 calendar year, ADFG issued approximately 800 emergency orders to open and close commercial salmon fisheries in Alaska.

Clause 9: Management measures to produce maximum sustainable levels

Evidence adequacy rating: High

There are defined management measures designed to maintain stocks at levels capable of producing maximum sustainable levels. Escapement goals (BEGs, SEGs, OEGs and SETs) are set to allow sufficient salmon to escape and spawn in their natal rivers, and enable them to produce, over the long term, maximum sustainable levels. Stocks that are deemed below the escapement goals are classified as: yield, management, or chronic inability concern. For stocks of concern, action plans dealing with their recovery are prepared and applied. To improve the ability of managers to regulate harvests and meet escapement in a more orderly and predictable manner, all commercial Alaska salmon fisheries were made limited entry fisheries 1973 to stabilize the number of fishers in each salmon fishery. The Commercial Fisheries Entry Commission manages the limited entry program by issuing permits and vessel licenses.

E. Implementation, Monitoring and Control

Clause 10: Effective legal and administrative framework

Evidence adequacy rating: High

The AWT in the Department of Public Safety continues to be charged with protecting the state's natural resources through reducing illegal harvest, waste and illegal sale of commercially and sport harvested fish, and by safeguarding fish and wildlife habitat.

The structure of ADFG, with management authority instilled at the area office level, allows it to more effectively monitor, control and enforce compliance with fishery regulations and emergency orders. Area Management Biologists are on the scene to actually watch the prosecution of the fishery in their area through aerial surveys and on-the ground observations.

Clause 11: Framework for sanctions

Evidence adequacy rating: High

Alaska salmon management is supported by a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations. Salmon management is entrusted to ADFG, pursuant to Alaska Statutes Title 16 and Alaska Administrative Code Title 5. These laws and regulations are enforced by the, which works within all state waters including its 0-3 nautical miles jurisdiction. AWT coordinate with, and are supported, when required, by law enforcement personnel from United States Coast Guard (USCG) and NMFS Office of Law Enforcement (OLE). The US Forest Service (USFS) and US Fish and Wildlife Service (USFWS) also work with the state on the enforcement of state and federal fish and game regulations on federal public lands.

F. Serious Impacts of the Fishery on the Ecosystem

Clause 12: Impacts of the fishery on the ecosystem

Evidence adequacy rating: High

Alaska's Sustainable Salmon Policy includes provisions to address potential effects of ecological changes and perturbations on sustainable harvests since salmon fisheries are managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning. Bycatch of non-targeted species does not appear to be a significant issue in most Alaska salmon fisheries. Most non-targeted fish harvested in salmon fisheries, which are reported on fish tickets, are other species of salmon. Alaska's Policy for Management of Mixed Stock Salmon Fisheries (5 AAC 39.220) seeks to conserve wild stocks consistent with sustained yield. Salmon bycatch occurs in groundfish fisheries conducted in the Bering Sea, Aleutian Islands, and the Gulf of Alaska is managed by the NPFMC, whose regulations are implemented by the NMFS. Gears used for commercially harvesting Alaska salmon are not considered deleterious to physical habitats since, unlike bottom trawl, dredges and pot gear as used in other fisheries, they do not interact directly with them Take of endangered species, such as Chinook from the Columbia River system, are regulated under treaties and other agreements, such as PST regulations. Potential negative effects of the Alaska salmon fisheries seem to be mainly represented by the dynamics surrounding ecological and genetic interactions between wild and hatchery salmon and between salmon and other species.

Clause 13: Fisheries Enhancement Activities

Evidence adequacy rating: High

Hatchery production of salmon in Alaska is transparently regulated by a state administrated permitting process that annually evaluates economic gains and ecological risks associated with changes to fisheries enhancement activities and then rules on their implementation. ADFG actively supports and participates in research to evaluate the effects of salmon fisheries enhancement on the genetic structure and diversity of natural salmon populations. Research activities include, but are not limited to, genetic stock identification of catches in mixed stock fisheries, surveys to estimate hatchery salmon stray rates, and genetic analyses to estimate genetic introgression rates of hatchery salmon into wild populations. Research findings have revealed wide ranges of stray rates by hatchery sockeye, pink and chum salmon in Alaska's Prince William Sound (PWS). Highest proportions of hatchery pink salmon were recorded for streams in relatively close proximity to a hatchery, but similar patterns were not found for other species. Genetic introgression rates from hatchery chum salmon appeared to be most strongly and positively correlated with spawn-timing overlap, and not proximity to hatchery facilities.

6.1. Conformity Statement

The Assessment Team recommends:

Continuing certification under the Alaska Responsible Fisheries Management Certification Program for the applicant fishery, US Alaska Commercial Salmon Fisheries, under federal (NMFS/NPFMC) and state (ADFG/BOF) management, fished by the directed fisheries with troll, purse seine, beach seine, drift gillnet, set gillnet, and, in Upper Yukon River, fish wheel gear, in the four administrative Regions of Alaska, and within Alaska's 200 nm EEZ.

7. Fishery Assessment Evidence

Section A: The Fisheries Management System

7.1. Fundamental Clause 1

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

FAO CCRF (1995) 7.1.3/7.1.4/7.1.9/7.3.1/7.3.2/7.3.4/7.6.8/7.7.1/10.3.1
FAO Eco (2009) 28
FAO Eco (2011) 35, 37.3

No. Supporting clauses/sub-clauses	13
Supporting clauses applicable	10
Supporting clauses not applicable	3
Non Conformances	0

Supporting Clause 1.1

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

FAO CCRF (1995) 7.7.1
FAO Eco (2009) 28
FAO Eco (2011) 35

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[53].

* "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 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[54].

* 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[55]. 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[56].

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[57].
For more details please see section 6 under sub clause 6.2.

[53] http://w3.legis.state.ak.us/docs/pdf/citizens_guide.pdf
[54] http://www.energy.gov/sites/prod/files/2015/06/f22/16.20.195.pdf
[55] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.sustainingakfisheries
[56] http://www.adfg.alaska.gov/index.cfm?adfg=process.main
[57] http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP114.pdf

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 1.2

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

FAO ECO (2009) 30.3
FAO ECO (2011) 37.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Management measures take into account the whole Alaska salmon stock unit over its entire area of distribution. 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.

Evidence:
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[58]. 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

[58] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section223.htm

made available to the public through the agencies' 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[59]. 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.	
References:	
Non-Conformance Number (if relevant)	**NA**

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

Supporting Clause 1.2.1

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

FAO CCRF (1995) 7.3.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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 – [60]
* Prince William Sound – [61]
* Cook Inlet – [62]
* Kodiak & Westward – [636465]
* Bristol Bay – [66]
* Arctic-Yukon-Kuskokwim – [6768]

References:	
Non-Conformance Number (if relevant)	**NA**

[60] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon#fishery
[61] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareapws.salmon
[62] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareacookinlet.salmon
[63] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByAreaKodiak.salmon
[64] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareachignik.salmon
[65] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaakpeninsula.main
[66] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.salmon
[67] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareanortonsound.salmon
[68] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.salmon

Supporting Clause 1.3

Where trans-boundary, shared, straddling or highly migratory fish stocks and high seas fish stocks are exploited by two or more States (neighboring or not), the applicant management organizations concerned shall cooperate and take part in formal fishery commission or arrangements that have been appointed to ensure effective conservation and management of the stock/s in question and its environment.

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Representatives of ADFG and NMFS routinely and actively participate in several relevant Salmon management forums and organizations that deals with transboundary issues.				
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))[69]. * Pacific Salmon Commission (PSC)[70] * Pacific States Marine Fisheries Commission (PSMFC)[71] *Pacific Fisheries Management Council (PFMC)				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 1.3.1

Conservation and management measures established for such stock within the jurisdiction of the relevant States for shared, straddling, high seas and highly migratory stocks, shall be compatible. Compatibility shall be achieved in a manner consistent with the rights, competences and interests of the States concerned.

FAO CCRF (1995) 7.1.3, 7.1.4, 7.1.5, 7.3.2, 10.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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 and the United States PST) and supporting this, research policies that further understanding on marine range and distribution of each major strain of Pacific salmon.				

[69] http://www.npafc.org/new/index.html
[70] http://www.psc.org/
[71] http://www.psmfc.org/

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).
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)[72]. 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 and the United States PST and, supporting this, research policies that further understanding on marine range and distribution of each major strain of Pacific salmon[73]. 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[74]. U.S- Canada Pacific Salmon Commission[75] it's the one body that Alaska shares straddling stocks with, and really does have almost daily coordination on management resources.

References:	
Non-Conformance Number (if relevant)	**NA**

[72] http://www.npafc.org/new/index.html
[73] http://www.psc.org/
[74] http://www.psmfc.org/
[75] http://www.psc.org/

Supporting Clause 1.4

A State not member/participant of a sub-regional or regional fisheries management organization shall cooperate, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization/arrangement.

FAO CCRF (1995) 7.1.5

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence:				
Evidence: Supporting Clause 1.4 is NOT APPLICABLE because the nations that fish North Pacific Salmon AK fishery, namely the U.S. and Canada, are members of the NPAFC, and PSC.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 1.4.1

States seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.

FAO CCRF (1995) 7.3.5

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				
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 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[76]. 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				

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

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.[77] 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.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 1.5

The Applicant fishery's management system shall actively foster international cooperation and coordination on fishery matters with regard to:

- Information gathering and exchange
- Fisheries research
- Fisheries management
- Fisheries development

FAO CCRF (1995) 7.3.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[78]

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

[77] https://alaskafisheries.noaa.gov/habitat
[78] http://www.npafc.org/new/science.html

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[79]
* Pacific States Marine Fisheries Commission[80].

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. 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;

*Pacific Fisheries Management Council.

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]...priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs;[81] The Wild Salmon Centre[82], 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[83]; and the Saltonstall-Kennedy grant program[84],which is a fund administered by the NMFS to provide grants or cooperative agreements for fisheries research and development.

References:	
Non-Conformance Number (if relevant)	**NA**

[79] http://www.psc.org/Meetings/2016_PSC_Annual_Meeting_Summary.pdf
[80] http://www.psmfc.org/
[81] http://www.nprb.org/nprb/about-us/mission-research-principles/research-approaches/multidisciplinary-integrated-ecosystem-based-research/
[82] http://wildsalmoncenter.org/
[83] http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/pacific_coastal_salmon_recovery_fund.htmlhttp://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/pacific_coastal_salmon_recovery_fund.html
[84] http://www.nmfs.noaa.gov/mb/financial_services/docs/noaa-fisheries-sk-grants-fy1516-alaska.pdf

Supporting Clause 1.6

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

FAO CCRF (1995) 7.7.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[85]

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[86].

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[87].

References:	
Non-Conformance Number (if relevant)	**NA**

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

Supporting Clause 1.6.1

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

FAO CCRF (1995) 7.8.1

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence:				
Evidence: Supporting clause 1.6.1 is NOT APPLICABLE. There are no flagged vessels fishing in the US Alaska salmon fishery.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 1.7

Procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review to revise or abolish them in the light of new information.
Review procedures shall be established within the management system.
A mechanism for revision of management measures shall exist.

FAO CCRF (1995) 7.6.8

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				
Evidence: Alaska's salmon fisheries are managed by ADFG. The Division of Commercial fisheries[88] manages commercial harvests, and, in conjunction with the Division of Subsistence[89], harvests by subsistence fishermen. The				

[88] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main
[89] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistence.main

Division of Sport Fisheries manages sport and personal use resource harvests[90] . 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[91]), 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[92].	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 1.8

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

- Management arrangements
- Decision-making

FAO CCRF (1995) 7.1.9

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[93]. Decision-making also generally takes two forms: those made by the BOF and those made by ADFG to achieve BOF goals. Decisions made by

[90] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main
[91] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf
[92] http://www.adfg.alaska.gov/index.cfm?adfg=gameboard.main
[93] http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main

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[94]. 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.	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 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.

FAO CCRF (1995) 8.2.6

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence:				
Evidence: Supporting clause 1.9 is NOT APPLICABLE because staff from USA Agencies participate on different international groups responsible for high seas fisheries management.				
References:				
Non-Conformance Number (if relevant)				**NA**

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

7.2. Fundamental Clause 2

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

FAO CCRF (1995) 10.1.1/10.1.2/10.1.4/10.2.1/10.2.2/10.2.4

No. Supporting clauses/sub-clauses	10
Supporting clauses applicable	10
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 2.1

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

FAO CCRF (1995) 10.1.1, 10.1.3, 10.2.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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 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[95].

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.[96]

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

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

[96] http://www.skagway.org/vertical/sites/%7B7820C4E3-63B9-4E67-95BA-7C70FBA51E8F%7D/uploads/Information_on_the_Alaska_Coastal_Management_Program_Initiative.pdf

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[97]All fishery management plans include a 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.[98]

References:	

Non-Conformance Number (if relevant)	**NA**

[97] http://www.npfmc.org/habitat-protections/essential-fish-habitat-efh/
[98] https://alaskafisheries.noaa.gov/habitat

Supporting Clause 2.1.1

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

FAO CCRF (1995) 10.4.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[99] 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[100]. 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

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

[100] https://www.adfg.alaska.gov/sf/SARR/AWC/

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[101] (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 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[102] (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.

References:	

Non-Conformance Number (if relevant)	**NA**

[101] https://alaskafisheries.noaa.gov/habitat
[102] http://habitat.psmfc.org/

Supporting Clause 2.1.2

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

FAO CCRF (1995) 10.4.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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.[103][104]

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[105].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[106]. 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

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

increasing restrictions to affected fisheries.	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 2.2

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

FAO CCRF (1995) 10.1.2, 10.2.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[107]; 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.

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

ADFG sport fish area managers work closely with the BOF[108], 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 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 ensure that the system is legal, timely, and accessible to all citizens of the state.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 2.3

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

FAO CCRF (1995) 7.6.5, 10.1.4, 10.15

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

Evidence: ADFG –BOF:

The BOF process serves to provide a forum for fishery conflict resolution. 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

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

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[109], deliberately takes into account all resources and users of those resources in order to resolve potential conflicts among users before project approvals are given. 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.

North Pacific Fishery Management Council[110]
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. 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.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 2.4

States and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.
FAO CCRF (1995) 7.1.10

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

[109] https://alaskafisheries.noaa.gov/fisheries/nepa-guidance
[110] http://www.npfmc.org/wp-content/PDFdocuments/help/Navigating_NPFMC.pdf

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.	
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[111] 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)[112]. 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.	
References:	
Non-Conformance Number (if relevant)	**NA**

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

Supporting Clause 2.5

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

FAO CCRF (1995) 10.2.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[113]. Economic impacts of the private non-profit salmon hatchery program in Southeast Alaska have been assessed regularly. [114][115]

The NEPA processes provide the public with information and opportunity for public involvement that is

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

[114] https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/se_hatcheries_10.pdf

[115] http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=775

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[116] is critical to the cultural and economic wellbeing of more than 100,000 Alaska Natives and non-Natives living in rural Alaska. 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[117] is a multi-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. 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[118] 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. 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[119]. 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[120], 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

[116] https://seagrant.uaf.edu/map/fisheries/
[117] https://www.doi.gov/subsistence
[118] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.subsmission
[119] https://www.cfec.state.ak.us/pregs/Homan30YrsLimitedEntrySummary.pdf
[120] https://www.cfec.state.ak.us/Publications/permit_holdings.htm

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 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.	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 2.6

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

FAO CCRF (1995) 10.2.4, 10.2.5, 10.3.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[121]'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. 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

[121] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf

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[122][123][124].

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[125].

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[126].

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[127] .

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[128].

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[129].

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.

References:	

[122] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#fisheries
[123] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.publications_reports#subsistence
[124] http://www.adfg.alaska.gov/index.cfm?adfg=habitat_publications.main
[125] http://www.akssf.org/
[126] http://www.adfg.alaska.gov/static/fishing/PDFs/sport/StrategicPlan2015Final.pdf
[127] http://www.npafc.org/new/publications/HandBook/Handbook%203rd%20E%20English.pdf
[128] http://www.aykssi.org/wp-content/uploads/WEB-AYKbsfa-0210_REPORT_cmprssd.pdf
[129] http://www.ims.uaf.edu/

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 2.7

States shall, within the framework of coastal area management plan, establish management systems for artificial reefs and fish aggregation devices. Such management systems shall require approval for the construction and deployment of such reefs and devices and shall take into account the interests of fishers, including artisanal and subsistence fishers.

FAO CCRF (1995) 8.11.3

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting clause 2.7 is NOT APPLICABLE because this fishery this fishery don't use artificial reefs and fish aggregation devices.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 2.8

In the case of activities that may have an adverse transboundary environmental effect on coastal areas, States shall:
a) Provide timely information and if possible, prior notification to potentially affected States;
b) Consult with those States as early as possible.

FAO CCRF (1995) 10.3.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				

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 [130]are 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.

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.

[130] http://riverswithoutborders.org/home/wp-content/uploads/2007/04/takubackgrounder.pdf

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, 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.

References:	

Non-Conformance Number (if relevant)	**NA**

[131] http://ltgov.alaska.gov/services/transboundary-relations/

7.3. Fundamental Clause 3

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

FAO CCRF (1995) 7.3.3/7.2.2
FAO ECO (2009) 28.1, 28.2
FAO ECO (2011) 35.1, 35.2

No. Supporting clauses/sub-clauses	8
Supporting clauses applicable	8
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 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.

FAO CCRF (1995) 7.3.3
FAO ECO (2009) 28.1
FAO ECO (2011) 35.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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

Evidence:

The BOF[132] 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.

[132] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

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[133]
39.222 Policy for the Management of Sustainable Salmon Fisheries[134]
39.223 Policy for State-wide Salmon Escapement Goals[135]
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[136] (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
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.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 3.2

[133] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/findings/ff93145x.pdf
[134] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf
[135] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section223.htm
[136] http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=%5bjump!3A!27title5chap29!27%5d/doc/%7b@0%7d?firsthit

Management measures shall provide inter alia that:

Supporting Clause 3.2.1

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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[137]. 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)[138] 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

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

economic benefits have accrued that may not have existed under open access.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 3.2.2

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				
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 proposals to alter fisheries management plans so as to improve the economic efficiency and is designed in a manner that conserves the biological resource.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 3.2.3

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				

Evidence: The interests of all harvesters are protected through the BOF process[139]. 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)[140]. 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[141]. In 'nonsubsistence 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.	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 3.2.4

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

FAO CCRF (1995) 7.2.2
FAO ECO (2009) 28.2
FAO ECO (2011) 35.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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

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

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".

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.)[142] . 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[143], 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 or for scientific research).

The Commercial Fisheries Division maintains a Fish Pathology Laboratory that has an important role in ecosystem conservation[144]. 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[145] 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 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[146] (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

[142] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.haboverview
[143] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main
[144] http://www.adfg.alaska.gov/index.cfm?adfg=fishingpathologylab.main
[145] http://mtalab.adfg.alaska.gov/
[146] http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks

any salmon 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[147] 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 state. Those takes are regulated under the PST[148] 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. [149] [150].

[147] http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akendangered
[148] www.psc.org
[149] http://www.psc.org/info_codedwiretagreview.htm
[150] http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 3.2.5

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

FAO ECO (2011) 41.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Conservation of the biodiversity of aquatic habitats and ecosystems is the responsibility of Habitat Division within ADFG. Activities by individuals, private companies, or agencies within streams used by anadromous fish require permission of this division, which oversees activities in refuges, critical habitat, and sanctuaries. Habitat 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.				
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.)[151] . 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.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 3.2.6

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

FAO ECO (2011) 36.9

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence:				

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

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.

Evidence:

Article 2, 5AAC 39.220, Policy for the management of mixed stock salmon fisheries[152], 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[153], 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.

References:	

Non-Conformance Number (if relevant)	**NA**

[152] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section220.htm

[153] http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf

Section B: Science and Stock Assessment Activities

7.4. Fundamental Clause 4

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

FAO CCRF (1995) 7.1.9/7.4.4/7.4.5/7.4.6/8.4.3/12.4
FAO ECO (2009) 29.1-29.3
FAO Eco (2011) 36.1, 36.3-36.5, 37.4

No. Supporting clauses/sub-clauses	13
Supporting clauses applicable	10
Supporting clauses not applicable	3
Non Conformances	0

Supporting Clause 4.1

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

FAO CCRF (1995) 7.3.1, 7.4.6, 7.4.7, 12.4
FAO Eco (2009) 29.1-29.3
FAO Eco (2011) 36.1, 36.3, 36.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

ADFG maintains programs at the area, regional and state-wide levels to collect harvest statistics. In commercial fisheries, a record of the transaction each time fish are sold is mandated by statute that includes species, areas fished, number and weight of fish sold. In sport fisheries, creel surveys are used when required for in-season management purposes. A state-wide survey of recreational anglers provides an annual estimate of the number, by species, caught and retained in each area. Household surveys and/or numbers recorded on permits are used for subsistence and personal use fisheries. The number of fish caught in groundfish fisheries is obtained by on-board observers. Catch sampling to determine age, sex and size composition is routinely conducted state-wide. The stock composition of catches in many mixed stock fisheries is determined with a variety of methods including genetic analysis, scale pattern analysis, otolith analysis, and coded micro-wire tags. Data collected is shared with relevant federal and international organizations, and various reports with this information are also available to the public.

Evidence:

Commercial Fisheries

The primary method of accounting for commercial fishery harvest is the state's fish ticket system. By Alaska law (AS 16.05.690 Record of Purchase) each buyer of fish is required to keep a record of each purchase showing the name or number of the vessel from which the catch was taken, the date of landing, vessel license number, pounds purchased of each species, number of each species and the ADFG statistical area in which the fish were taken, as well as other information ADFG may require for specific fisheries. The primary

responsibility for filling out and submitting a fish ticket lies with the fish buyer and they may not knowingly submit a false or inaccurate fish ticket. The seller of the fish (fisherman) is also legally responsible to ensure that the information they provide on a fish ticket is accurate. ADFG distributes fish ticket books upon request to all buyers, processors and sellers of fish in Alaska. A copy of the fish tickets is provided to ADFG within 7 days. The state is currently working towards implementing an electronic fish ticket system that will provide near real time data. In addition, because of the remote nature of some fisheries, the Area Management staff may call processors directly to get rapid reporting of catch when needed.

Although non-commercial catches are not included in certification, the assessment team reviewed the harvest reporting systems for sport, personal use and subsistence fisheries to determine if and how they were determined.

Recreational Fisheries

A state-wide mail survey provides estimates of the number of each species of fish sport fishers harvested, fish they released, where they fished, and the number of days fished. This information is provided in a searchable database[154] for the years 1977 – 2014. The primary disadvantage of this type of information is that the estimates are not finalized until approximately a year after the harvest. To obtain more timely estimates, the Sport Fish Division conducts creel censuses on important fisheries such as the SE marine sport fishery (Chapell and Power 2015) and the Kenai River sport fishery (Perschbacher 2015). Onsite creel censuses have also been used to validate the accuracy of the state-wide harvest survey estimates (Clark 2009). The third type of sport fishery harvest and effort data is provided via a logbook program required of all guides and charter operators. All freshwater and saltwater guides must register with the Division of Sport Fish. Each registered guide/charter operator must report information about their client's time spent fishing, areas fished, harvest and catch of all species. Logbooks must be completed before offloading any fish and completed forms must be returned to ADFG for processing every week. A summary of the logbook program can be found in Powers and Sigurdsson (2016). In a report to the NPFMC, ADFG attempted to verify logbook estimates by comparing them to harvest estimates from the state-wide harvest survey, onsite creel censuses, a post season survey of guides and individual comparisons of logbook entries with specific guides that were interviewed during creel surveys (Meyer et al. 2008). In general, logbook estimates were determined to be reliable, especially when individual onsite interview are compared with the corresponding logbook entry (except for halibut).

Subsistence and Personal Use Harvests

Most state managed subsistence fisheries are administered by the Commercial Fisheries Division and most personal use fisheries are managed by the Sport Fish Division. Permits are generally required to participate. Regulations including legal gear, location, time and maximum harvest level vary by area and fishery. In most areas, the number of fish harvested for personal use and subsistence must be recorded on the permit and returned to ADFG at the end of the season[155] [156].

In cases where the subsistence harvest represents a significant portion of the total harvest or when dealing with a particular management issue, subsistence fishermen may be required to report their harvest at intervals during the season. Subsistence and personal use harvests are reported each year (Marchino et al. 2015). Subsistence harvest information by fishery is also usually reported in commercial fishery annual management reports.

[154] http://www.adfg.alaska.gov/sf/sportfishingsu rvey/index.cfm?FA=main.historic
[155] http://www.adfg.alaska.gov/index.cfm?adfg=PersonalUseRegulations.main
[156] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSubsistenceByArea.main

Alaska commercial fishermen may also retain all, or a portion of their catch for their own use (5AAC 39.010(a)). These fish may not be sold or bartered. Fish retained for personal use typically represent a small portion of the total commercial catch, but because these fish are not sold, they are not necessarily reported on fish tickets. In some management areas, where retained commercial catch is significant, such as occurs in the Chignik Area, the retained catch for personal use must be reported on fish tickets(5AAC 15.355(b). Steelhead (Oncorhynchus mykiss) must also be reported (5AAC 39.010(b). In the Southeast and Yakutat areas this steelhead reporting requirement is only in effect when implemented by emergency order (Southeast 5AAC 33.39; Yakutat 5AAC 30.395).

Bycatch

Bycatch of non-targeted species is not significant in most Alaska salmon fisheries. Most non-targeted fish harvested in salmon fisheries are other species of salmon and are reported on fish tickets. Alaska fishing regulations, management plans and in season management actions are often specifically designed to minimize the harvest of non- targeted salmon species. For example, the upper Cook Inlet gillnet fishery targets sockeye, pink and chum salmon but coho salmon are also caught. The Cook Inlet Northern District Salmon Management Plan (5AAC 21.358) provides a series of regulatory measures to minimize harvest of coho salmon bound for the Northern District of upper Cook Inlet.

Alaskan origin Chinook and chum salmon are incidentally caught in the groundfish fisheries off Alaska's coast. The MSA requires the NPFMC to minimize bycatch while also allowing for optimum yield in the groundfish fisheries. The NPFMC has implemented or refined existing measures from 2011 to 2013 to reduce this bycatch. Measures implemented by the NPFMC for the Bering Sea Pollock fishery include; 1) a hard cap on the number of Chinook salmon that can be taken, and if reached requires closure of the fishery, 2) an incentive plan and penalties to keep bycatch lower than the cap level, 3) an industry program to close areas of the Pollock fishing grounds when Chinook salmon bycatch rates are high in those areas, 4) a requirement that every Pollock vessel have at least one observer onboard at all times and 5) a requirement to count all salmon caught and permit genetic sampling to determine stock of origin (see for example Guthrie et al. 2016) . In the Gulf of Alaska, measures include; 1) a bycatch cap of 25,000 Chinook for the western and central Pollock trawl fisheries, 2) a hard cap of 7,500 salmon on Chinook bycatch in all remaining GOA trawl fisheries and, 3) full retention of Chinook salmon required in all trawl fisheries in order to support research to determine the origins on the fish caught. Observers are placed on some, but not all groundfish vessels in the Gulf of Alaska (NPFMC 2014).

Age –Sex and Size Data

Because all Pacific salmon, other than pink salmon, mature at various ages, it is necessary to sample harvested fish to obtain estimates of age and size of fish returning by sex (AWL data). These data, when coupled with similar estimates for the number of fish escaping provide the data required to estimate biological based and sustainable escapement goals. There is extensive effort state-wide to collect AWL data from the state's commercial fisheries.

Stock Composition

Many, if not most of Alaska's commercial harvest, occurs in areas where harvests are composed of more than one stock of fish. Understanding the stock composition of these harvests has been a long standing and ongoing effort of ADFG. The need for stock composition data and the approaches used vary widely. Selected highlights of the ADFG program are provided below.

Coded micro-wire tags (CWT) are used almost exclusively for Chinook and coho salmon. Notable programs that use CWT include the following:

In Southeast Alaska, a series of coho salmon indicator stocks have been tagged for many years. Recovery of these tags has provided data on where these stocks are harvested, the harvest rate, and the annual survival rates (Elliot and Power 2015).

The Chinook Technical Committee of the PSC uses CWT and recovery data as the basis for determining the status of coast-wide Chinook salmon stocks. This analysis is used to set abundance-based harvest quotas for Southeast Alaska's all-gear harvest and for ocean fisheries in British Columbia.

Recovery of CWT tagged Alaska-origin hatchery Chinook is used to determine what portion of the Southeast catch can be excluded from the quota (PSCCJTC 2015).

To meet internal needs and international commitments to share data the ADFG maintains a lab to read and process coded micro-wire tags[157].

Otolith making is used primarily to determine whether harvested pink, chum and sockeye are of hatchery or wild origin and to determine if fish on the spawning grounds are of hatchery or wild origin. In Prince William Sound and Southeast, the Private Non-profit Hatchery operators play a significant role in marking the fish, in sampling the fisheries and reading the otoliths. The ADFG maintains an Otolith Lab, where otoliths sampled from selected commercial fisheries, test fisheries and escapements are read. The Lab also compiles an annual "Voucher Report" that documents otolith marks that are induced each year and maintains an on-line database to provide managers information on the number and types of marks recovered each year[158]. Three noteworthy programs are:

In Prince William Sound, the Regional Aquaculture Association otolith marks all of its pink and chum salmon, samples the fishery and reads the otoliths to determine hatchery wild contributions. This provides crucial in-season information to ADFG managers (Wiese, et al. 2015).

In Southeast Alaska, all hatchery reared chum are otolith marked by the hatchery operators. The commercial fisheries are sampled and the information on the contribution of hatchery fish provided to managers (Gray et al. 2014).

Sockeye salmon from the Snettisham Hatchery in Southeast Alaska are otolith marked by the Douglas Island Pink and Chum (DIPAC) hatchery and recoveries in the Taku gill net fishery provide the data needed to separate these hatchery fish from the Taku River sockeye catch that is regulated under the U.S. Canada PST (PSCJTTC 2015).

The Gene Conservation Laboratory has made estimates of harvest and harvest rates in several fisheries around the state, some examples include:

Since 2006, the Lab has estimated the stock composition of sockeye harvested in the Bristol Bay sockeye fishery and in the Port Moller Test Fishery which is used to update preseason forecasts of Bristol Bay sockeye abundance[159].
In the Southeast Region, the Lab estimated the contribution of various sockeye stocks harvested in the purse

[157] http://mtalab.adfg.alaska.gov/CWT/Default.aspx
[158] http://mtalab.adfg.alaska.gov/OTO/reports.aspx
[159] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.bbaysockeye_application

seine fishery operating in Chatham Strait, Icy Strait and Lynn Canal to provide more complete run reconstruction and help illuminate what stocks were being harvested the subject of some dispute for subsistence fishers[160]. Reported subsistence harvests in Kanalku Bay (the preferred subsistence salmon fishery for the community of Angoon) increased substantially in the late 1990s, and abundance appeared to decline at the same time.

In 2010, Kootznoowoo, Inc. filed a petition with the secretaries of the U.S. departments of Interior and Agriculture requesting the federal government exert extraterritorial jurisdiction over state waters to manage or close commercial fisheries in order to address concerns about subsistence fisheries important to the community of Angoon. Final action on the petition was deferred until 2015 to allow stakeholder discussions that would promote locally developed solutions to the perceived problem: that commercial purse seine fisheries in portions of Icy and Chatham straits interfere with the ability of Angoon residents to meet their subsistence needs for salmon.
There is some uncertainty surrounding this issue in the lack of information concerning the contribution of Kanalku and other northern Chatham Strait sockeye salmon stocks to the commercial purse seine harvest. A portion of all sockeye salmon stocks returning to natal streams in the inside waters of northern Southeast Alaska migrate east through Icy Strait (District 114; Figure 1) and turn south into Chatham Strait (District 112) or north into Lynn Canal (Rich 1926; Rich and Suomela 1927; Rich and Morton 1929). These fish are harvested incidentally in commercial mixed stock purse seine fisheries in Districts 112 and 114, which are managed to harvest pink salmon (O. gorbuscha; Ingledue 1989).

The assumption has been that sockeye salmon harvests in those fisheries are dominated by very large north-migrating runs (e.g., Chilkat, Chilkoot, Taku, and Snettisham Hatchery) and include contributions from many smaller runs from scattered locations throughout northern Southeast Alaska (e.g., Eggers et al. 2010).

In response, to better understand the contribution, run timing, and distribution of northern Chatham Strait sockeye salmon harvested in the commercial purse seine fisheries in Districts 112 and 114, ADFG has initiated a 3-year genetic mixed stock analysis study which commenced in 2012 to estimate stock compositions of sockeye salmon harvests in these fisheries.

To monitor compliance with provisions of the Pacific Salmon Treaty for sockeye harvests in the Northern Boundary Area, the Lab provides annual estimates of the stock composition of Alaska's catches.
Scale pattern analysis is currently used to determine the contribution of Pillar Creek Hatchery sockeye to Kodiak purse seine catches and to make in season estimates of the harvest of stocks in the Lynn Canal drift gill net fishery.

Historical Studies:
There has been an 80 year effort to research Alaska salmon. Under Federal management, the Bureau of Commercial Fisheries initiated numerous studies. In the late 1940's the University of Washington's Fishery Research Institute began large scale studies on the high seas, in Bristol Bay, Chignik, Kodiak and Southeast Alaska with funding from the Alaska processing industry[161]. NMFS[162] has a long history of salmon research in the marine environment. At statehood in 1959, the ADFG initiated studies and in the 1970's the

[160] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.chatham_icy_lynncanal_project
[161] http://depts.washington.edu/aksalmon/
[162] http://www.afsc.noaa.gov/ABL/default.php

University of Alaska joined the research effort [163] . Since then, new players like the Prince William Sound Science Centre (PWSSC) [164] have joined the effort. Many of the studies by these agencies documented stock composition, migration timing in mixed stock fisheries, productivity and other life history attributes through a variety of methods including mark-recovery, scale patterns analysis and genetic methods, see for example Marshall et al. 1987. Several of these studies still form a basis for management of many mixed stock fisheries even though they are not repeated annually.

International and Interstate Cooperation and Data Sharing

The timely distribution of important fishery data among relevant state and international managers and researches is a key component of Alaska's management system. Besides active online access[165] (see for example the state is actively engaged in several international and interstate forums where management information, management decisions, research, data and enhancement activities are coordinated and exchanged in a timely manner.

YRP: Alaska fishers in the Yukon harvest Chinook and fall chum salmon that spawn in Canada as well as in Alaska. Management, research and enhancement activities are coordinated by international agreement through the YRPI[166] .

PSC: Several fisheries in Southeast Alaska (troll Chinook, Transboundary Rivers and Northern Boundary Area) are subject to terms of the PST [167] The PST process provides for policy guidance by sanctioning Panels to address management issues in each fishing area and for technical committees to provide annual stock assessment and enhancement information.

PSMFC: The PSMFC is an interstate compact that among other things coordinates the maintenance and distribution of coded micro-wire tag data marking and mark recovery data among member states and with Canada[168] .

References:	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. 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. 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. Gray, D., D. Gordon, D. Harris, S. Conrad, J. Bednarski, R. Bachman, A. Piston, S. Walker

[163] http://www.uaf.edu/sfos/research/fisheries/
[164] http://pwssc.org/research/fish
[165] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main)
[166] http://yukonriverpanel.com/salmon/
[167] http://www.psc.org/.
[168] http://www.psmfc.org/

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.

Marchioni, M., E. Mikow, J. Ream, L. Sill and T. Lemons. 2015. Alaska subsistence and personal use salmon fisheries 2013 Annual Report. ADFG 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.

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.

NPFMC. 2014. Reducing bycatch in Alaska. North Pacific Management Council flyer. Anchorage.

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 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.

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.

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.

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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.1.1

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

FAO CCRF (1995) 7.4.4, 12.3, 12.13
FAO Eco (2009) 29.1, 29.3
FAO Eco (2011) 36.3, 36.5

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
To facilitate fine-scale management, state waters have been classified and numbered into regions, areas, districts, sub-districts, individual river systems and sections within rivers when needed. A record of sale for each commercial landing provides the location, time, species, number and weight of fish caught. In season, area offices compile summaries of the catch and effort from these fish tickets. Post season, fish ticket data are maintained by the headquarters computer services section. When needed, creel surveys provide sport fish catch in-season. Post season, a state-wide survey provides estimates of recreational harvest and effort by species and area. Commercial and sport fish catch and effort data are available on-line. Personal use and subsistence harvests are obtained from permits and/or household surveys.

Evidence:
To facilitate fine-scale 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[169] A record of sale for each commercial landing provides the location, time, species, number and weight of fish caught. In season, area offices compile summaries of the catch and effort from these fish tickets. The Division of Commercial Fisheries Computer Services section maintains the fish ticket computer software and archives the fish ticket data. Historically, the area offices edited and entered the data from these paper fish tickets. The state is the process of developing and deploying an electronic fish ticket system[170] .

Commercial catch estimates, both in season and historic, are readily available on the Commercial Fisheries website[171]. Catch and effort data is also available in annual management reports for each area. 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. Sport fishery harvest and fishing effort estimates obtained from the state-wide harvest survey are available on the Sport Fish website[172] When required for in-season management, sport fishery catches are obtained by creel surveys. Post season, personal use and subsistence harvests are obtained from data recorded on permits or by household surveys.

The first buyer of raw fish, persons who catch and process fish, and persons who catch and have fish

[169] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmonmaps
[170] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.elandings
[171] http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/salmcatch.php
[172] http://www.sf.adfg.state.ak.us/statewide/FishingSurvey/

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[173]). To promote and support development of applied research and stock assessment necessary for informed management, ADFG employs research staff in each region and area office who not only guide local development of information critical to management, but also participates in and advises managers when making in-season management decisions. Specialized services such as decoding micro-wire tags and conducting genetic studies are maintained at the headquarters level and have strong linkages to local programs. 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 by regional staff, in-season memoranda's being distributed to area, regional and headquarters staff to final reports being accessible on-line[174] . Research results are typically incorporated into reports to the BOF to inform the development of management plans[175].	
References:	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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.1.2

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

FAO Eco (2009) 30.4
FAO ECO (2011) 37.4

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting clause 4.1.2 is NOT APPLICABLE as all management decisions are made using stock specific information. Evidence of full conformance can be found in the annual management reports for each fishery, for example please see Elison et al. 2015.				
References:	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.			
Non-Conformance Number (if relevant)				**NA**

[173] http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.coar
[174] http://www.adfg.alaska.gov/index.cfm?adfg=library.main
[175] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=01-31-2014&meeting=uci

Supporting Clause 4.2

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

FAO CCRF (1995) 8.4.3
FAO Eco (2009) 29.2bis

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Observers are generally not needed to verify catch or to sample the catch in Alaska's salmon fisheries as these fisheries occur in-river or coastal waters and landed in local ports where fish tickets are issued to document harvest and fish are sampled for biological information. Regulations allow the placement of observers on salmon vessels and in special circumstances observers have been used.

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 in-river or close to shore 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. State regulations (5AAC; 39.140, Inspection of Fishing Establishments and Vessels), allow ADFG and Department of Public Safety personnel with unobstructed access to all fishing vessels and processing establishments to inspect catch, gear and compliance with Alaska laws and regulations.

When special needs arise, the ADFG has placed observers aboard salmon fishing vessels. For example there has been a need to verify estimates of immature Chinook salmon caught and released in Southeast troll fishery (Davis et al. 1989) and to verify estimates of Chinook caught in the Southeast purse seine fishery (Rowsey and Marshall 1988).

References:

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.
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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.3

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

FAO CCRF (1995) 7.4.6/7.4.7

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐

Summary 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 strata was obtained from a small number of participants.

There are processes in place to share data with other states through the PSMFC, with Canada through the YRP and PSC and with the NPAFC.

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 strata was obtained from a small number of participants (see for example Weiland et al. 2003).

Besides the extensive in season and post season reporting undertaken by ADFG previously cited, there are process in place to share data with other states through the PSMFC, with Canada through the YRP and PSC and with the NPAFC. 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[176] (see). The PSC has established Technical Committees to compile and evaluate stock assessment data and a Data Sharing Committee (see for example the Chinook Technical Committee reports[177] and PSCJTCDS 1989).

References:

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.

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.

Non-Conformance Number (if relevant)	**NA**

[176] http://www.psmfc.org/program/regional-mark-processing-center-coded-wire-tag-rmpc?pid=17
[177] http://www.psc.org/publications_tech_techcommitteereport.htm#TCCHINOOK

Supporting Clause 4.4

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

FAO CCRF (1995) 12.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska supports both the ASMI and the Kodiak Seafood and Marine Science Centre (KSMC) to stimulate research and to support and distribute the benefits of seafood in human diets.

Evidence:

State and national policies regarding seafood are guided by the Alaska Seafood Marketing Institute (ASMI), U.S. Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), the U.S. National Institute of Health (NIH). ASMI[178] 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 (see for example Nettleton 2009).

The state of Alaska also operates the Kodiak Seafood and Marine Science Centre (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 (see for example Faber et al. 2010). 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.

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.

Nettleton, Joyce. 2009. Are fish and plant omega-3s the same? ASMI. Juneau, Ak.

Non-Conformance Number (if relevant)	**NA**

[178] http://www.alaskaseafood.org

Supporting Clause 4.5

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

FAO CCRF (1995) 7.4.5, 12.9

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

The BOF uses economic, social and cultural aspects of fish and fishing, as well as biological information, to establish management policies and regulations. A tremendous amount of local information is provided to the BOF through local Advisory Committees, public testimony, and written reports prepared by state and federal agencies and consultants. Information on economics and marketing are also available from other sources, including ASMI has contracted studies to determine the value of Alaska's seafood industry, the University of Alaska Institute of Social and Economic Research conducts research on Alaska salmon fisheries of Alaska, and the CFEC publishes research on the optimum number of fishing permits that should be issued.

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:

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.

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.

The MSSF (5AAC 39.222(c) (5)) requires the Board to consider (among other things) the social, cultural and economic risks and needs of future generations.

The CFEC uses economic and biological data to establish the number of permits that will be issued to participate in the state's commercial fisheries.

The state relies on several sources of social, cultural and economic information to develop management policy.

There are 82 local ACs 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) (see for example Anchorage Advisory Committee 2014[179].

The Commercial Fisheries Division maintains data on the ex-vessel value of commercial landings [180] and on wholesale value[181].

[179] http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2014-2015/pws_finfish/ac_comments_pws_2014.pdf.

[180] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery

[181] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch_wholesale

The Sport Fish Division has published reports on the value of recreational fishing (see for example Southwick *et al.* 2008). The Division of Subsistence publishes numerous papers on the history and current use of salmon for subsistence (see for example Ikuta et al. 2013 and Marchioni et al. 2013). The Alaska Seafood Marketing Institute has contracted studies to determine the value of Alaska's Seafood Industry (see for example McDowell 2015). The University of Alaska Institute of Social and Economic Research conducts research on the salmon fisheries of Alaska (see for example Knapp 2011). The CFEC publishes research on the optimum number of permits that should be issued for a fishery (see for example Schelle et. al. 2004).	
References:	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. Knapp, G. 2011. Local permit ownership in Alaska salmon fisheries. Marine Policy 35(5) pgs. 658-666. 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. McDowell Group. 2015. The economic value of Alaska's seafood industry. 3960 Glacier Hwy. Suite 201. Juneau Ak. Minutes of the Anchorage Advisory Committee. November 18, 2014. Available from Div. of Boards, AK Dept. Fish and Game, Anchorage. 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. 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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.6

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

FAO CCRF (1995) 12.12

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska has documented traditional fisheries knowledge in several areas, and evaluated their applicability to sustainable fisheries. In most cases traditional knowledge has been documented for subsistence fisheries. Most subsistence fisheries occur on stocks that are also harvested commercially and are managed to achieve escapement goals. Also, the commercial fisheries where traditional knowledge has been document would not be considered "small scale". There are no small scale commercial salmon fisheries that are managed solely using traditional knowledge.

Evidence:

There are large traditional subsistence salmon fisheries in Western and Central Alaska and smaller fisheries scatted throughout the state. Most subsistence fisheries occur on stocks that are also harvested commercially. While traditional knowledge has been documented in some areas, (Simeone and Kari 2002) the fisheries are managed to achieve escapement goals (Please see Clause 6 for reference). There are no small scale commercial salmon fisheries that are managed solely using traditional knowledge.

There are many subsistence fisheries throughout Alaska, and both Alaska and federal laws and regulations give subsistence uses of natural resources a priority over all other uses. Both ADFG and the FSMP investigate and document traditional knowledge of resources, methods and means, processing and storage methods, and harvests patterns, as well as actual harvests taken. Much of this tradition information has been passed on orally through generations of rural residents, many of whom also participate in commercial fisheries. Therefore, there is continual interchange of knowledge among the various fisheries, and at least some of this comes to the BOF and ADFG through local ACs and interactions with the FSP with its state-wide system of Regional ACs.

References:	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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.7

States conducting scientific research activities in waters under the jurisdiction of another State shall ensure that their vessels comply with the laws and regulations of that State and international law.

FAO CCRF (1995) 12.14

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 4.7 is NOT APPLICABLE because 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.				
References:	Scott Kelly, Director of Commercial Fisheries Division, ADFG. Personal communication.			
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 4.8

States shall promote the adoption of uniform guidelines governing fisheries research conducted on the high seas and shall, where appropriate, support the establishment of mechanisms, including, inter alia, the adoption of uniform guidelines, to facilitate research at the sub-regional or regional level and shall encourage the sharing of such research results with other regions.

FAO CCRF (1995) 12.15, 12.16

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska coordinates high seas salmon research through the NPAFC. The Commission has established a long-term research and monitoring program for salmon stocks, developed multi-year research plans, maintains an on-line catch and hatchery release database for member countries and exchanges information on marks placed on the otoliths of hatchery origin salmon.				
Evidence: Coordination and sharing of salmon research on the high seas is accomplished through the NPAFC[182] . 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.				

[182] http://www.npafc.org/new/index.html

The NPFAC authorizes fishing for anadromous fish in the Convention Area for scientific purposes under national and joint research programs approved by the NPAFC. The taking of anadromous fish for scientific purposes must be consistent with the needs of the research program and provisions of the Convention and be reported to the NPFAC. Scientific research is conducted under the Commission's Science Plan (Anonymous 2010). The NPFAC has developed a consensus long-term research and monitoring plan for Pacific salmon in the North Pacific (Beamish et. al. 2009). The member countries cooperate in collecting, reporting and exchanging biostatistical data, biological samples, fisheries data and organizing scientific communications, such as seminars, workshops, exchanges of scientific personnel and publications (See for example Farley et al. Eds. 2009) . The members provide 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[183][184] .	
References:	Anonymous. 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. 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. 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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 4.9

States and relevant international organizations shall promote and enhance the research capacities of developing countries, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development and provision of research facilities, in order for them to participate effectively in the conservation, management and sustainable use of living aquatic resources.

FAO CCRF (1995) 12.18

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 4.9 is NOT APPLICABLE as ADFG does not promote or enhance research capacities of developing countries.				

[183] http://wgosm.npafc.org/
[184] http://www.npafc.org/new/science_statistics.html

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 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 un-fished or very lightly fished.

FAO CCRF (1995) 12.19

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 4.10 is NOT APPLICABLE as the AK salmon fisheries do not fall into the category of unfished or very lightly fished.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 4.11

Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries, in particular the least developed among them and small island developing countries.

FAO CCRF (1995) 12.20

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 4.11 is NOT APPLICABLE as the AK Salmon fisheries don't have ties to small island developing countries				
References:				
Non-Conformance Number (if relevant)				**NA**

7.5. Fundamental Clause 5

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

FAO CCRF (1995) 7.2.1/12.2/12.3/12.5/12.6/12.7/12.17
FAO Eco (2009) 29-29.3, 31
FAO Eco (2011) 42

No. Supporting clauses/sub-clauses	7
Supporting clauses applicable	7
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 5.1

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

FAO CCRF (1995) 12.2/12.6

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
ADFG has established a strong hierarchal structure of professional managers, researchers and biometrics staff to support management at the local level. A strong operational planning process ensures peer review of stock assessment and research activities. The quality, quantity and relevance of ADFG's reports publications are outstanding. ADFG's efforts are supported by federal research and graduate level research at educational institutions.

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, the ADFG was organized into a hierarchal scheme. The core research and management functions are conducted by professional staff deployed to 23 area offices located throughout the state[185]. Overarching the area office structure, are four specialized Divisions within the Department that have responsibilities for fisheries issues. The Commercial Fish Division [186]has the primary responsibility for research and management of stocks that are harvested commercially. The Sport Fish Division [187] 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 [188] 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 [189]

[185] http://www.adfg.alaska.gov/index.cfm?adfg=contacts.main)
[186] http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main
[187] http://www.adfg.alaska.gov/index.cfm?adfg=fishingSport.main
[188] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.habmission
[189] http://www.adfg.alaska.gov/index.cfm?adfg=divisions.subsmission

compiles and analyzes existing data and conducts research to gather information on the role of subsistence fishing by Alaskans.

Within each Division, administrative regions were 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 provides overall guidance to the regional staff in management, research and biometrics as well as providing state-wide technical services, such as the Gene Conservation Laboratory[190].
Educational and experience standards for all Department 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[191].

At the core of the ADFG's scientific program is a requirement for peer reviewed planning. 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). Examples of stock assessment operational plans are Richards et al. 2013 and Bernard and Jones 2010. Each year, the area management staff prepares a detailed report on the results of harvest, effort and escapements and other stock assessment activities undertaken in their area (see for example Sheilds and Dupuis 2015.

The ADFG's program is augmented by research conducted by biologists in other state and Federal agencies. The Alaska Region of the National Marine Fisheries Service's Auke Bay Laboratory[192] plays an important role in supporting implementation of the Pacific Salmon Treaty and in research in the marine phase of salmon life history. The U.S. Fish and Wildlife Service[193] augments state stock assessment by conducting research on salmon production and habit on federal lands. The Federal Subsistence Program is comprised of five federal agencies that conduct applied fisheries research – US Fish and Wildlife Service, Forest Service, Park Service, Bureau of Land Management, and Bureau of Indian Affairs.
The University of Alaska [194] and the University of Washington [195]maintain active faculty and graduate student fisheries research programs.

References:	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. 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.

[190] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main .
[191] https://www.governmentjobs.com/careers/alaska/classspecs/889586).
[192] http://www.afsc.noaa.gov/ABL/default.php
[193] Http://www.fws.gov/alaska/fisheries/fieldoffice/anchorage/field/program_overview.htm
[194] https://www.uaf.edu/sfos/
[195] http://depts.washington.edu/aksalmon/

	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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 5.1.1

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

FAO Eco (2011) 42

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 5.1.1. is NOT APPLICABLE as The Alaskan Pacific Salmon Commercial fishery is not a small scale fishery and is not of low value. Furthermore there is a lot of information on the biology and fisheries operations, thus we can't say this fishery meets data poor stocks models.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 5.1.2

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

FAO CCRF (1995) 12.1/7.4.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The ADFG and other institutions conduct appropriate research into all aspects of the fisheries. Alaska maintains world-class academic fisheries education thru the University of Alaska system. The ADFG's structure and employment practices foster strong institutional building and provide training opportunities to staff.				
Evidence: Research into the biology, ecology, environmental science and aquaculture is conducted by several institutions.				

The ADFG's Area, Regional and Headquarters research staff are actively involved in many fishery research programs. For example, the Gene Conservation Laboratory staff work in understanding age and growth (Lewis et al. 2015), the Fish Pathology Laboratory's work on health of cultured fish (Meyers 2007), headquarters staff research into understanding the accuracy of sonar to measure fish size (Burwen et al. 2010) and work to understand methods for setting escapement goals (Clark et al. 2014). The Department's publications are accessible via a searchable database at http://www.adfg.alaska.gov/index.cfm?adfg=library.main .

The National Marine Fisheries Service Ted Stevens Marine Science Center (formerly known as the NMFS Auke Bay Lab) [196] conducts research into the early marine life history of salmon (Hertz et al. 2015), genetics and stock identification (Kondezla et al. 2016) and environmental science and pollution (Farrow et al. 2016).
The University of Alaska [197]has an extensive graduate student and faculty research program in salmon fisheries (see for example Adkison, M. D. 2010).
The University of Washington [198] maintains three field stations in Alaska to study salmon and train graduate students. The program has a distinguished publication history, a recent example of which is Clark et al. 2015.

The USFWS augments state stock assessment by conducing s research on salmon production and habit on federal lands, (see for example Tanner and Suresh 2014).
The USFS, USPS and USBLM perform fisheries research projects and activities associated with management of subsistence fisheries on federal lands.

The PWSSC[199] conducts studies and collaborates with other agencies to answer questions about resource use and sustainability, the impacts of oil development and transportation, foods webs which support coastal and inland economies, and about issues associated with the management, harvest and processing of fish and shellfish.

Social and economic data and research is undertaken by several institutions.
The Commercial Fisheries Division maintains data on the ex-vessel value of commercial landings[200] and on wholesale value[201].
The Sport Fish Division has published reports on the value of recreational fishing (see for example Southwick *et al.* 2008).
ASMI has contracted studies to determine the value of Alaska's Seafood Industry (see for example McDowell 2015).

The University of Alaska Institute of Social and Economic Research conducts research on economics Alaska's fisheries (see for example Knapp 2011).

[196] http://www.afsc.noaa.gov/ABL/default.php
[197] https://www.uaf.edu/sfos/
[198] http://depts.washington.edu/aksalmon/
[199] http://pwssc.org/
[200] http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery
[201] http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch_wholesale

The CFEC publishes research on the optimum number of permits that should be issued for a fishery (see for example Schelle et al. 2004).

The Division of Subsistence publishes numerous papers on the history and current use of salmon for subsistence (see for example Hiroko et al. 2013 and Marchioni et al. 2013).
The University of Alaska[202] provides bachelor, masters and doctoral programs in fisheries science, associate degrees and certificates in fisheries technology. University faculty supervise graduate student research on a broad array of biological topics including quantitative stock assessment, biology and ecology of marine and freshwater species, molecular genetics, behavioral ecology and related topics. Facilities are located across Alaska in Juneau, Seward, Kodiak and Fairbanks.

The Kodiak Seafood and Marine Science Centre researches the biochemistry and nutritional value of seafood (Oliveira et al. 2010) among other topics.

The Alaska Department of Fish and Game 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 at 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 state-wide specialized positions such as the state-wide 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 or Director.

The development of the internet and the commitment of the above named institutions to effectively employee its capability has ensured that study results are made easily and quickly available.

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).

Burden, 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.

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Non-Conformance Number (if relevant)	**NA**

Supporting Clause 5.2

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

FAO CCRF (1995) 12.5
FAO Eco (2009) 31

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The ADFG, University of Alaska, NMFS and USFWS maintain strong research programs to monitor the state of the stocks and effects of fishing, pollution, habitat alteration and climate change.

Evidence:
Alaska's salmon stock assessment program is extensive and comprehensive. The program to determine the number caught and their composition is explained in Clause 4.1 and 4.1.1. 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 6.1, 6.2 and 6.3.

In addition to its permitting responsibilities, the Habitat Division performs research to monitor or evaluate the potential effects of development projects (see for example Brewster 2016). The Sport Fish Division strategic plan (ADFG- SF, 2015) prioritizes habitat research. The Sport Divisions also operates the Katchemak Bay Research Reserve [203] which includes programs related to the effects of climate change, changes in sea level and marine and freshwater temperatures, frequency of storm events, long-term drying trends, rapid loss of coastal glaciers and coastal uplift.

The NMFS Habitat Conservation Division (HCD) responsibilities include conducting and/or reviewing environmental analyses for a large variety of activities including commercial fishing, coastal development, large transportation and energy projects. The HCD focuses on activities in habitats (see for example NOAA 2013) 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 [204] to support fisheries research and development. NOAA also administers the Pacific Coastal Salmon Recovery Fund [205]that was established by Congress to provide funding

[203] http://www.adfg.alaska.gov/index.cfm?adfg=kbrr_research.home
[204] http://www.nmfs.noaa.gov/mb/financial_services/skhome.htm
[205] http://www.nwr.noaa.gov/Salmon-Recovery- Planning/PCSRF/Index.cfm

to states and tribes of the Pacific Coast Region to protect, restore, and conserve Pacific salmon and steelhead populations and their habitats.

The USFWS has recognized climate change as a potential driver in aquatic systems and supports research into the possible effects (see for example Prucha et al. 2012). The University of Alaska's Climate Research Centre [206]conducts basic climate research useful for understanding potential impacts on aquatic systems (see for example Wendler et al. 2015).
The North Pacific Research Board [207]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[208] which is a partnership between the North Pacific Research Board 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 [209]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.

There is also the Alaska Ocean Observation System[210] whose programmatic focus are

- Safe marine operations
- Coastal hazard mitigation
- Tracking ecosystem and climate trends
- Monitoring water quality

Over time, many factors (i.e. climate or environmental change, fishing pressure habitat alteration or pollution) can affect the state of a stock. Even if specific causal relationships cannot be determined for such changes, there is a very strong stock assessment program and a process in place to periodically review and update the status of the stocks and escapement goals every three years through the Board of Fisheries.

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[206] http://climate.gi.alaska.edu/Climate
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Non-Conformance Number (if relevant)	**NA**

Supporting Clause 5.3

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

FAO CCRF (1995) 12.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The State of Alaska participates in the three relevant international organizations (PST, YRP and NPAFC) that support and encourage research on salmon in, and around Alaska to ensure optimum utilization.

Evidence:
The State of Alaska participates in the three international organizations that support and encourage research on salmon in and around Alaska to ensure optimum utilization.

The 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 [211]

The YRP 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 specifically, the Panel;

- makes annual recommendations to the respective responsible management agencies of both countries concerning conservation and management coordination;
- sets and adjusts the annual salmon spawning escapement objectives, if necessary, based on pre-season projections, stock status and recommendations from the Joint Technical Committee and;
- oversees the use and administration of the Research and Enhancement Fund.

The Panel acts independently from other annexes under the PST. Panel membership includes six representatives from Alaska. The Panel meets twice a year[212]. The Panel sponsors active stock assessment and research programs (see for example DeCovich and Borba 2014).

The PST between Canada and the United states was signed in 1985 and established a Commission, Panels

[211] http://www.npafc.org/new/about_npafc.html .
[212] http://yukonriverpanel.com/salmon/about/organizational-structure/ .

and Technical Committees to develop agreed fishing regimes and monitor performance. The Commission and Panels meet three times a year[213]). In Southeast Alaska, the harvest of Chinook salmon by all gear groups, catches at the mouths of the Transboundary Rivers and in the Northern boundary area are subject to terms of the Treaty[214] . The treaty process provides for policy guidance by sanctioning Panels to address management issues in each covered fishing area and for Joint Technical Committees to provide annual stock assessment and enhancement information. Alaskans serve on the Commission, Panels and Joint Technical Committees. Stock assessment and research activities of the Joint Technical Committees are reported to the Panels and Commission each year (see for example TCBN 2016).	
References:	N. DeCovich 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. 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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 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 trans-boundary aquatic stocks.

FAO CCRF (1995) 12.7, 12.17

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The PSC's Technical Committees, YRP Technical Committee and The NPAFC develop collaborative technical and research programs to improve understanding of the biology, environment and status of transboundary aquatic stocks.				
Evidence: The PSC's Technical Committees, YRP Technical Committee and The NPAFC develop collaborative technical and research programs to improve understanding of the biology, environment and status of transboundary aquatic stocks, see Clause 5.3 for details.				
References:				
Non-Conformance Number (if relevant)				**NA**

[213] http://www.psc.org/meetings_schedule.htm
[214] http://www.psc.org/pubs/treaty/treaty.pdf

Supporting Clause 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.

FAO CCRF (1995) 12.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Confidentially of some types of fishery information is required by Alaska statute, and data are redacted in reports when necessary.				
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 strata were obtained from a small number of participants (see for example Weiland et al., 2003).				
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Non-Conformance Number (if relevant)				**NA**

Section C: The Precautionary Approach

7.6. Fundamental Clause 6

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

FAO CCRF (1995) 7.5.3, 7.6.1
FAO Eco (2009) 29.2-29.2bis, 29.6, 30-30.2
FAO Eco (2011) 36.2, 36.3, 37, 37.1, 37.2

No. Supporting clauses/sub-clauses	4
Supporting clauses applicable	4
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 6.1

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Alaska has a rigorous program for collecting the stock assessment data needed to establish escapement goals, which serve as target reference points for management. ADFG sets one of three types of escapement goals depending upon the type and quality of the available data. In special circumstances, the BOF may, during the regulatory process, determine the appropriateness of establishing an optimal escapement goal. There are currently 295 active salmon escapement goals in the state. ADFG and the BOF also have procedures to identify and manage salmon stocks of concern.

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

A Biological Escapement Goal (BEG) is defined as an escapement range that provides the greatest potential for maximum sustained yield. Once established, a BEG becomes the primary management objective unless the Board of Fisheries establishes an optimal escapement or in-river run goal. A BEG is developed with age specific data for a stock's catch and escapement over a series of years. Typically, a Ricker type stock – recruitment function is used to establish the BEG. ADFG seeks to maintain evenly distributed salmon escapements within the range.

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 BOF. 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.

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, an 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. An SET is established by the ADFG, in consultation with the BOF, as needed, for salmon stocks of management or conservation concern.

In special circumstances, the Board of Fisheries may determine it is appropriate to establish an optimum escapement goal (OEG). If the board establishes an OEG, it must provide an explanation of the reasons, and with the assistance of the department, an estimate of expected differences in production relative to maximum sustained yield.

The BOF may also establish an in-river escapement goal to provide for harvest in addition to escapement. 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).

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.

Spawner-Recruit Analysis: Analysis of the relationship between the number of fish in the escapement and subsequent production of adults in the next generation. The Ricker type production model is almost exclusively used.

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.

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.

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).

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 generalizations 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).

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).
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).

Spawning Habitat Model: Estimates of spawning capacity or number of spawners that produce maximum sustained yield (see for example Burgner et al. 1969).

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 (Koening and Burkett 1987).

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).

Conditional Sustained Yield Analysis: Observed escapement indices and harvest are used to estimate if, on average, surplus production results from a particular goal range (Nelson et al. 2005). Estimated yields are conditioned on extreme values of measurement error in the escapement indices.

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 MSSF (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.

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.

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.

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 MSSF (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:

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.

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.

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.

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 (see for example Erickson et al. 2015). Details about how escapements were determined each year are typically provided in annual management report (see for example Wilburn and Stump 206). Each year ADFG publishes a summary of adopted escapement goals and a 10 year history of performance in meeting these goals (Munro and Volk 2015). There are currently 295 active salmon stock escapement goals in the state.

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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.

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.

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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.

Hilborn, R., and C. J. Walters. 1992. Quantitative fisheries stock assessment: Choice, dynamics and uncertainty. Chapman and Hall, New York.
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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.

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.

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.
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.

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.

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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 6.2

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Almost all of Alaska's escapement goals (whether BEGs, SEGs, or OEGs) are established as a range. A few stocks with Sustainable Escapement Thresholds (SET) have only a lower limit. The lower end of each range, or SET is essentially a safe 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 or SET. Perhaps the best evidence that the ADGF takes effective management actions to achieve escapement goals is the fact that escapement goals are generally attained state-wide (Munro and Volk 2015).

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 Sustainable Escapement Thresholds (SET) have only a lower limit. The lower end of each range, or SET is essentially a limit reference point, because all fisheries must, by regulation (5AAC 39.222) be managed to provide escapements that are above the lower end of the escapement goal range.

Prior to each season, the ADFG publishes management plans that outline expectations of run size and the management strategy for the upcoming season. The Management Plan for Southeast Alaska's District 15 gillnet fishery (Gray et al. 2016) illustrates the intent to manage the fishery so as to obtain escapement goals.

"In 2016, ADF&G intends to manage the summer Lynn Canal drift gillnet fishery to obtain escapements within the established escapement goal ranges for all salmon stocks. Area, time, and gear restrictions will be in place during the first two or three weeks of the summer season to protect projected poor returns of Chilkat River Chinook salmon. The department intends to manage the fishery to minimize harvest of wild stock summer chum salmon while harvesting returns of hatchery chum salmon in Section 15-C. The fall Lynn Canal drift gillnet fishery will be managed to conserve Klehini River (early-run) fall chum salmon while providing opportunity to harvest Chilkat River fall chum and coho salmon if run strength indicates a harvestable surplus based on the size of the run as measured in the lower Chilkat River fish wheels."

Post season, annual management reports detail how the season unfolded as stock assessment data became available. A summary of the early sockeye season at Chignik in 2015 illustrates how ADFG uses stock assessment data to ensure escapement goals are met (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 (Tables 1, 3, and 4). 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." Good evidence that the ADGF takes management action to achieve escapement goals is the fact that escapement goals are generally attained state-wide, Munro and Volk 2015.	
References:	Gray, D., M. Sogge, T. Kowalske, S. Forbes, B. Meredith and E. Coonradt. 2016. 2016 Southeast Alaska drift gillnet Fishery Management Plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J16-03, Douglas. 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. 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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 6.3

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

FAO CCRF (1995) 7.5.3, 7.6.1
FAO Eco (2009) 29.2-29.2bis, 29.6, 30-30.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska has a large and ongoing stock assessment program to obtain the extensive scientific information necessary to measure the status of the stocks being fished in relation to their escapement goals and allow managers to impose management any actions needed to alter fisheries so as to achieve those escapement goals (see Clauses 4.1, 4.1.1, 5.1.2, 5.2, 5.3 and 6.1). Every three years, escapement goals are reviewed to account for any changes in productivity.				

Evidence:
Alaska has a large and ongoing stock assessment program to obtain the extensive scientific information necessary to measure the status of the stocks being fished in relation to their escapement goals and allow managers to impose any needed management actions to alter fisheries so as to achieve those escapement goals, (see Clauses 4.1, 4.1.1, 5.1.2, 5.2, 5.3 and 6.1). These stock assessment programs collect:

- escapement data using counting towers, weirs, aerial and foot surveys, sonar or mark- recapture abundance estimates;
- age, sex, size, data from escapements and well as marks and tags to help determine stock and year of origin;
- catch and catch per unit of effort by gear, time and area;
- age, sex and size of the harvest, and recovery marks, tags and biological samples to determine the stock of origin;
- environmental data such as river discharge and water quality.

Data needed to manage the fisheries is obtained, synthesized and interpreted in-season 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. Every three years, escapement goals are reviewed to account for any changes in productivity.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 6.4

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

FAO CCRF (1995) 7.5.3
FAO Eco (2009) 29.6, 30.2
FAO Eco (2011) 36.3

FAO Eco (2011) 36.2, 36.3, 37, 37.1, 37.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The state-wide Sustainable Salmon Policy (5AAC 39.222) mandates that escapement goals must be established for all exploited salmon stocks and that escapement should fall within established ranges. This basic management tenant sets public expectations for the ADFG to use its time and area authority to open or close fisheries as necessary to meet escapement goals. When deemed appropriate by the Board of Fish, it may establish formal management plans in regulation to specify how the conservation burden and fishing opportunity will be shared among user groups. There are over 100 salmon management plans that detail the specific management actions that are to be taken to ensure that management targets are met (see http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial for ADFG commercial fishing regulations by area).

Evidence:
The state-wide Sustainable Salmon Policy (5AAC 39.222) mandates, among other things, that escapement goals must be established for all exploited salmon stocks and that fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning. This basic policy sets the expectation among fishers that the Department of Fish and Game will, as needed, exercise its statutory responsibility to manage the time and areas where fishing is allowed so as to achieve 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. Examples of recent stock status and escapement goal reports presented to the Board of Fish include Schaberg et al. 2015 for the Alaska Peninsula stocks, Conitz et al. 2015 for the Arctic-Yukon-Kuskokwim stocks and Heinl et al. 2014 for Southeast Alaska.

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 BOF determines it is in the states 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. There are over 100 salmon management plans that detail the specific management actions that are to be taken to ensure that management targets are met (see http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial for ADFG commercial fish regulations by area). For example, the Situk-Ahrnklin Inlet and Lost River King Salmon Management Plan (5AAC 30.365) 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 calls 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.

References:	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. 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. Schaberg, K. L., D. A. Tracy, M. B. Foster and M. Loewen. 2015. Review of salmon escapement goals in the Chignik Management Area, 2015. Alaska Department of Fish and Game, Fishery Manuscript Series No. 15-02, Anchorage.
Non-Conformance Number (if relevant)	**NA**

7.7. Fundamental Clause 7

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

FAO CCRF (1995) 7.5.1/7.5.4/7.5.5/12.3
FAO ECO (2009) 29.6/32
FAO Eco (2011) 36.7

No. Supporting clauses/sub-clauses	5
Supporting clauses applicable	5
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 7.1

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

FAO Eco (2009) 29.6
FAO Eco (2011) 36.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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

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.

Previous Surveillance Reports have outlined 2 examples of fishery concern which are:

1. Depressed runs, declining productive, and biological changes in age and size of state-wide Chinook salmon populations, especially the AYK region;
2. Concern over hatchery origin pink salmon in Prince William Sound (PWS) and hatchery origin chum salmon in Southeast Alaska (SEAK).

Regarding the Chinook salmon issue, ADFG management has limited commercial and sport fisheries and traditional subsistence harvest of Chinook salmon to meet escapement goals and international treaty obligations. ADFG also has taken the lead in developing partnerships with other state and agencies, academia, and NGOs to implement the new comprehensive Chinook Salmon Stock Assessment and Research Plan involving 12 key stocks in all regions of the state. Initial funding for this plan was estimated to be $30 million, however, this has been revised to $15 million over five years. A complementary AYK Chinook Salmon Research Action Plan developed through the AYK Sustainable Salmon Initiative is directed at these critical management issues in Western Alaska.

Chinook salmon are critically important to subsistence, commercial, and sport users and to communities and economies across Alaska. Recent downturns in productivity and abundance of Chinook salmon across the state and the resulting hardships have highlighted the significant need for the ADFG to better understand and characterize the changing productivity and abundance trends for Chinook salmon and to identify actions that could be taken to lessen the hardships experienced by Alaskans that use and depend on this resource. Overall, there is clear evidence of recent and persistent state-wide declines in Chinook salmon productivity, run abundance, and inshore harvest from available stock assessment data as well as from local and traditional knowledge sources. This decline in productivity appears to have begun with the 2001 brood year and has persisted through at least the 2007 brood year, resulting in below average run abundance and harvest during 2007 through present. There is some evidence that a state-wide downturn in run abundance occurred during the early to late 1970s, but this is based on incomplete information. Trends in stock specific productivity during brood years 1975 through 2000 and in run abundance during 1977 through 2006 did not appear consistent state-wide, although some regional trends were apparent throughout the time series.

Fishery management has been responsive to lower run abundances by constraining significantly commercial fishing in an attempt to achieve escapement goals. Conservative management in the face of uncertainty will sustain Chinook salmon stocks by reducing the risk of overfishing and inadequate escapements, but will also increase the risk of foregone harvest opportunities that can threaten the viability of social and economic system in Alaska that are highly dependent on Chinook salmon as cultural value, subsistence and income.

To address the decline, ADFG tasked a team of agency scientists and researchers with developing a comprehensive Chinook salmon research plan to address knowledge gaps and research needs. The team conducted a comprehensive review of Chinook salmon programs and developed a report entitled “Alaska Chinook Salmon Knowledge Gaps and Needs” (Gap Analysis) to identify existing knowledge gaps, identify activities that could be undertaken to narrow those gaps, and identify the range of potential costs associated. ADFG hosted the Chinook Salmon Symposium in October 2012, and invited state, federal, and academic scientists and the public, to discuss and further identify knowledge gaps and compile a list of research priorities to address specific questions informing observations of Chinook salmon abundance and productivity in Alaska. This process resulted in the Chinook salmon research plan[215].

This project will fund activities identified as needed by the Chinook salmon research plan. The plan is structured on a stock-specific, life-history basis for 12 indicator stocks from Southeast Alaska to the Arctic-Yukon-Kuskokwim, representing diverse life history and migratory characteristics across a broad geographic range. Stock assessments to be funded include, for these stocks, a complete assessment of adult escapement and stock-specific harvests in all relevant fisheries, assessment of juvenile Chinook salmon smolt, local and traditional knowledge (LTK) studies, nearshore marine surveys, and life history process

[215]ADF&G Chinook Salmon Research Plan and 2012 Symposium
www.adfg.alaska.gov/index.cfm?adfg=chinook_efforts_symposium.information

studies. The central objective of the plan implementation is to create a consistent stock assessment framework across a diversity of indicator systems in Alaska that will provide improved information for sustained yield management of Chinook salmon for a range of run sizes and productivity regimes. Linkage of improved monitoring data with process based research will provide insight into ecological and environmental mechanisms causing recent abundance declines and give managers better predictive tools.[216]

Chinook Salmon Research Initiative

The Chinook Stock Assessment and Research Plan (ADFG 2013) acknowledged that better information is needed from all life stages to improve forecasts of productivity and abundance. Additionally, that information would help improve escapement goal development and responsiveness of fisheries management to in-season changes in abundance and run timing to better balance the trade-offs between fishing mortality and future sustainability of Chinook stocks harvested in Alaska. The indicator stocks include the Unuk, Stikine, Taku and Chilkat rivers (Southeast Region); the Copper, Susitna and Kenai rivers (Central Region); the Karluk River on Kodiak Island, and the Chignik River on the Alaska Peninsula (westward Region); and, the Nushagak, Kuskokwim and Yukon rivers (Arctic-Yukon-Kuskokwim Region). The Research Plan recommends that stock assessment programs be implemented for each of 12 Chinook indicator stocks with the following features:

- Estimate annual escapement and age-size composition.
- Estimate annual total harvest.
- Estimate total production of adult equivalents.
- Estimate the number of smolts and smolts-per-spawner from 1 above.
- Estimate marine survival using CWT tagging.
- Estimate annual abundance in nearshore marine environments for forecasting.
- Update and refine production models to estimate optimal escapement levels.
- Provide forecasts of returns for improved management capability.
- Provide adequate local traditional knowledge concerning patterns and trends.

The Research Plan identifies several knowledge gaps, including elements of the Chinook life cycle and productivity changes, and notes that long-term study is needed to make any of the research effective. The Chinook Salmon Research Initiative has an implementation budgetary plan of $15, million which is partitioned into adult, juvenile, marine, subsistence, genetic monitoring, and University of Alaska Fairbanks contracted research involving detailed scale pattern analysis.

Based on the fact that ADFG is constraining significantly commercial harvests of Chinook salmon throughout Alaska in response to the current period of low production, and considering the ADFG led Chinook salmon stock assessment and research plan effort and funding allocated so far; the assessment team considers that this management response is an appropriate precautionary approach for the Chinook salmon stocks in Alaska.

Recent updates in Chinook salmon research can be found on the ADFG website under 2016 Chinook Salmon News 2016. Specifically, research in SEAK with those indicator stocks shows that the reduction in adult chinook salmon adult abundance in the last few years is due to poor marine survival roughly one half of the historic average. Research in the Yukon River has shown that Chinook salmon juvenile survival to adult is determined in between freshwater rearing and September of the first year of life in the marine

[216] Chinook Salmon Stock Assessment and Research Plan , 2013 by ADF&G Chinook Salmon Research Team http://www.adfg.alaska.gov/static/home/news/hottopics/pdfs/chinook_research_plan.pdf

environment. This seems to conform with the findings historically in salmon life history studies in Washington and Oregon that a critical survival stage is the first 6 months in the marine environment which determines the ultimate adult return.

The Alaska Hatchery Program

The second example of precautionary management by ADFG relates to the Private Non-Profit (PNP) hatchery program which produces the majority of commercially caught salmon and it is made up of regional aquaculture associations in PWS (PWSAC), SE Alaska (NSRAA an SSRAA), Kodiak (KRAA) and Cook Inlet (CIAA), as well as community development hatchery programs in Valdez (VFDA) and Juneau (DIPAC) and smaller hatchery programs In SE Alaska (PAH, BIH, PSNH and KRH). The PNP hatchery program is unique to Alaska. It is characterized by large releases of pink and chum salmon in especially in PWS and SEAK and smaller releases of sockeye, coho and chinook.

Hatchery Regulatory Environment

In terms of the regulatory environment, the PNP program is administered and regulated by ADFG with many regulatory safeguards and protocols which are a significant effort towards implementing a precautionary management system for hatcheries in Alaska.

Beginning with the inception of Alaska's hatchery program, policies, statutes, and regulations were instituted to control hatchery development and, at the same time, protect wild stocks. Rigorous genetic and fish health policies were developed to guide the program.

Law, Policy and Regulation Chronology:

- 1974 Private Non-Profit Hatchery Act
- 1974 Hatchery permitting policy
- 1975 Genetic policy
- 1976 Regional salmon planning statute
- 1978 Alaska Board of Fisheries hatchery management policy
- 1981 Fish transport and fish disease regulations
- 1985 PNP hatchery permitting regulations
- 1985 Revised genetic policy
- 1988 Fish pathology policy
- 1992 Wild stock priority statute
- 1992 Statewide salmon escapement goal policy
- 1993 Policy for the management of mixed stock salmon fisheries
- 1994 Sockeye salmon culture policy
- 1994 Fish resource permit policy
- 2000 Sustainable salmon management policy .

Specifically, there is clear policy that ensures that hatcheries are placed in areas that are least likely to risk mixing with existing wild stocks. Evaluation is based on documented environmental assessment. All hatchery release strategies are reviewed by ADFG and are ultimately under the authority of ADFG. Both economic and ecological evaluation of the release plan forms part of the decision making process. Introduction of genetic material is prohibited and hatchery stock is selected from the terminal area stock and hence, all genetic material originated from that location. Selection techniques are designed to avoid

artificial reduction in genetic material – i.e. fish are selected at random and not on external trait basis (size etc.). An extremely wide, pre-determined number of returning fish are used for stripping of eggs for hatchery rearing and release. [217]

There are very well prescribed Statutes and laws for planning of hatchery development. In particular, there is clear policy that ensures that hatcheries are placed in areas that are least likely to cause the risk of mixing with existing wild stocks. All hatchery release strategies are reviewed by ADFG and are ultimately under the authority of ADFG. Both economic and ecological evaluation of the release plan forms part of the decision making process. Introduction of genetic material is prohibited and hatchery stock is selected from the terminal area stock and hence, all genetic material originated from that location. Selection techniques are designed to avoid artificial reduction in genetic material – i.e. fish are selected at random and not on external trait basis (size, shape, color, etc.). An extremely wide, pre-determined number of returning fish are used for stripping of eggs for hatchery rearing and release. This is especially true for Pink and Chum salmon hatcheries in PWS and SEAK. Large population sizes allow for a large gene pool and decreases, over time, the likelihood of genetic loss due to inbreeding.[218]

Key Aspects of Salmon Enhancement Management in Alaska

1. Highest priority: protect and maintain wild salmon stocks, legal mandates that require wild stocks to be given priority in fishery management;
2. Vigorous habitat protection, no dams on rivers
3. Escapement-based management, no fishery targets
4. Mixed stock fisheries avoided wherever possible
5. Hatcheries supplement not replace wild stocks, mitigation of pressure on wild stocks.
6. Annual Management Plans of all hatcheries are annually reviewed by ADFG.
7. Comprehensive regional planning.
8. Utilize conservative fish culture practices.
9. A rigorous hatchery permitting process that includes genetics, pathology and fishery management reviews.
10. Statewide genetics policy to guide hatchery program and practices to allow protection of wild stocks by avoiding foreseeable negative effects.
11. Fish health and disease statutes (no disease has ever been introduced or amplified in the wild).
12. Careful siting of hatcheries, terminal harvest areas (temporal and spatial segregation from wild stocks to minimize mixed fisheries, allows harvest all the returning salmon to minimize potential interbreeding with wild salmon by straying hatchery fish. Hatchery production is not approved if there is not high confidence that the resulting salmon will be fully harvested.
13. Hatchery brood stock diversity practices (fish selected at random and not on external trait basis such as size, color or shape, 1 to 1 mating ratio, effective population sizes extremely large – especially true for pink and chum salmon in SEAK and PWS).
14. Use of local brood sources is priority.
15. Collection of broodstock for the hatcheries is stratified over spawn/run timing to maximize the heterogeneity of the gene pool.
16. Mass otolith thermal marking for real-time in-season fisheries management. All hatcheries with

[217] ADF&G Genetic Policy, 1985 http://www.adfg.alaska.gov/fedaidpdfs/fred.geneticspolicy.1985.pdf
[218] Ibid

significant production in Southeast, Central and Westward Region (apart from Kitoi Bay and Pillar Creek hatcheries, in Kodiak) thermally mark virtually all of their releases for identification of hatchery salmon during harvest.

17. Each hatchery is required to complete an annual report containing information on hatchery returns, numbers of eggs taken, and numbers of fry or smolt released, by species and stock[219,220].

The hatchery program in Alaska has evolved over time since the mid 1970's from a small program by both the ADFG Fisheries Rehabilitation Enhancement Development Division (F.R.E.D.) and the PNP sector to its current status as the largest program in North America if not the world. The history and magnitude of the program is described in the ADFG hatchery Annual Report for 2015 and can be seen graphically in Figure 1.

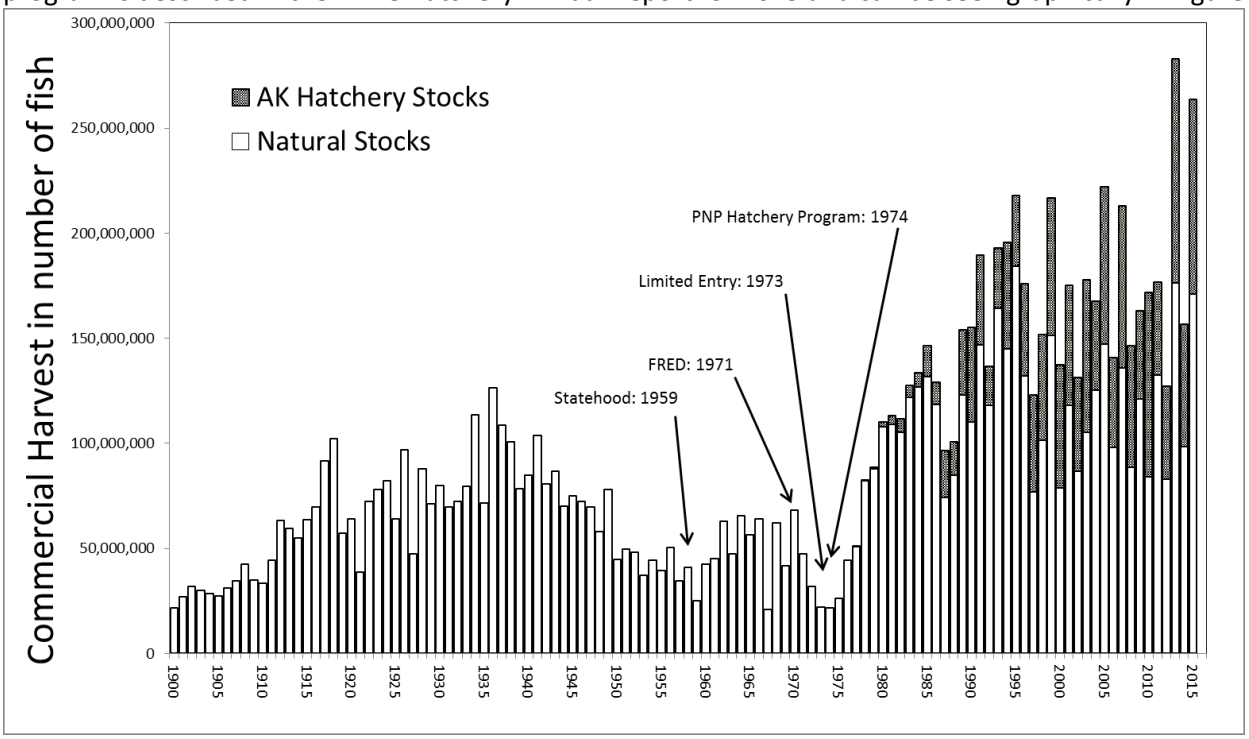

Figure 7. Alaska Commercial Salmon Catches and Value (All Species Combined) (1878-2015)

The 2015 salmon season was the 2nd highest harvest in state history—a 264 million fish commercial harvest comprised of the 3rd highest catch ever for wild stocks (170 million) and the 2nd highest catch for hatchery stocks (93 million). The state-wide ex-vessel value of the commercial hatchery harvest in 2015 was about $125 million, and the first wholesale value of the commercial hatchery harvest was about $350 million.

The largest returns of both hatchery and wild salmon stocks have largely occurred since 1980, when the first hatchery-reared salmon were returning to newly built hatcheries. Alaska's salmon fisheries are among the healthiest in the world, with the 2 highest harvests in the past 3 seasons.

[219] Overview of salmon stock enhancement in southeast Alaska and compatibility with maintenance of hatchery and wild stocks William R. Heard Environmental Biology of Fishes May 2012, Volume 94, Issue 1, pp 273-283 http://www.springerlink.com/content/25k01460326l7g38/

[220] Salmon Hatcheries in Alaska Steven McGee
http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/mcgeebrochure.pdf

The 2013 season was a record harvest overall; the 283 million fish commercial salmon harvest included the 2nd highest catch for wild stocks (176 million fish) and the highest catch for hatchery stocks (107 million fish) in Alaska's history (Figure 1). The 2015 season was the 2nd highest harvest, with a 263 million fish commercial harvest that included the 3rd highest catch for wild stocks (170 million fish) and the 2nd highest catch for hatchery stocks (93 million fish).

Southeast Alaska:
About 11 million Alaska hatchery fish were caught in the Southeast Alaska common property commercial fisheries in 2015, worth an estimated ex-vessel value of $37 million, or 42% of the total ex-vessel value for commercial salmon fisheries in the region. By species, the ex-vessel value of hatchery fish comprised 84% of the chum, 40% of the coho, 22% of the Chinook, 8% of the sockeye, and 2% of the pink salmon value of the commercial fisheries in the region. Coho salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (64,000 fish), followed by Chinook salmon (9,000 fish).

Prince William Sound:
About 74 million hatchery-produced salmon were harvested in the Prince William Sound (PWS) common property commercial fisheries in 2015, worth an estimated ex-vessel value $79 million, or 67% of the total ex-vessel value for commercial salmon fisheries in the region (Figure 6). By species, the ex-vessel value of hatchery fish comprised 96% of the chum, 74% of the pink, 52% of the sockeye and 36% of the coho salmon value in the commercial fisheries in the region.
Sockeye salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (61,000 fish), followed by coho salmon (42,000 fish) and pink salmon (11,000 fish).

Cook Inlet:
About 2.4 million hatchery-produced salmon were harvested in the Cook Inlet common property commercial fisheries in 2015, worth an estimated ex-vessel value $3.2 million, or 10% of the total ex-vessel value for commercial salmon fisheries in the region (Figure 6). By species, the ex-vessel value of hatchery fish comprised 34% of the pink, 7% of the sockeye, and 2% of the Chinook salmon value in the commercial fisheries in the region. Sockeye salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (21,000 fish), followed by coho salmon (13,000 fish) and 2,000 each pink and Chinook salmon.

Kodiak:
About 5.2 million hatchery-produced salmon were harvested in the Kodiak common property commercial fisheries in 2015, worth an estimated ex-vessel value $4.5 million, or 12% of the total ex-vessel value for commercial salmon n fisheries in the region. By species, the ex-vessel value of hatchery fish comprised 15% of the pink, 10% of the sockeye, 10% of the coho, and 5% of the chum salmon harvest value in the commercial salmon fisheries. Coho salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (1,700 fish), followed by Chinook salmon (1,400 fish).

Alaska Salmon Management and Research

In-Season Management
One of the challenges of a successful hatchery program in Alaska and along the Pacific Coast is the ability to discriminate wild and hatchery salmon in the commercial and sport fishery so as to avoid overharvesting wild stocks while providing the economic benefits of the salmon harvest of wild and hatchery origin salmon to the common property fishery and coastal communities. A major technological advance that provides a measure of management control over harvest and escapement and enables the precautionary approach by

ADFG to be realized is the technique of salmon otolith (ear bone) thermal marking of hatchery pink and chum salmon during the incubation phase within a hatchery. In order to determine which fish as adults are hatchery and wild salmon it is necessary to excise and decode the salmon otoliths in the laboratory. The PNP operators conduct this operation with chum salmon in SEAK themselves ADFG conducts the decoding for PWS pink and chum salmon.

The ADFG uses this technology in PWS as an in-season management tool to determine the proportion of hatchery pink salmon from wild salmon in a directed fishery on pink salmon in the purse seine and drift gill net fishery in PWS. This effort is designed to achieve the economic benefits of harvesting surplus hatchery pink salmon, the goal of the enhancement program, while avoiding the over exploitation of wild pink salmon as they return to the spawning grounds. This is not the only example of in-season management using technology in the commercial fishery by ADFG as it is being implemented in SE Alaska for the hatchery add-on for the chinook salmon troll fishery using CWT technology and the WASSIP program for in -season management for wild sockeye using genetic discrimination to separate stocks and predict their abundance in Bristol Bay.

In theory and in practice the application of the thermal otolith technology allows the fisheries managers in PWS with regard to pink salmon to harvest hatchery salmon in-season at levels to avoid large numbers of hatchery fish accumulating in the escapement which effectively reduces the risk of hatchery and wild stock interaction on the spawning grounds. This differential harvest of hatchery fish is a function of the degree of spatial isolation of hatchery fish in which the exploitation rate can be high or the proportion of wild stocks in a mixed stock fishery in which case it depends on the proportion of hatchery to wild stocks and the potential abundance of wild fish being harvested. So this strategy is managed on a complex of spatial and temporal realities within the season.

Research on Hatchery and Wild Pink and Chum Salmon interactions on the Spawning Grounds

By way of introduction, the Prince William Sound Science Centre (PWSSC) and its sub-contracting partner Sitka Sound Science Centre (SSSC) are engaged in scientific data collection and analysis services requested under the State of Alaska contract IHP-13-013 entitled "Interactions of Wild and Hatchery Pink and Chum Salmon in Prince William Sound and Southeast Alaska".

The plans and intentions of this contracted research are guided by two documents: 1) the ADFG RFP 2013-1100-1020, dated May 7, 2012 entitled "Interactions of Wild and Hatchery Pink and Chum Salmon in Prince William Sound and Southeast Alaska and 2) the PWSSC proposal for the project, dated June 29, 2012.

The following is the most recent update on the 2016 Hatchery Research Project and was provided by Ron Josephson of ADFG in 2016 which summarizes the Hatchery Research Project in Prince William Sound and Southeast Alaska.

Alaska Hatchery Priority Research Questions

In May of 2011 the Alaska hatchery operators along with ADFG and some local processors initiated a study on the interactions between hatchery and wild pink and chum salmon in Southeast and Prince William Sound streams

department representatives identified three top priority research questions:

1. What is the genetic stock composition of pink and chum salmon in each region? Is there a single larger population or discrete stocks?
2. How much straying is there of both wild and hatchery pink and chum stock? How much annual variation is there?
3. What is the impact on fitness (productivity) of wild pink and chum salmon stocks due to straying of

hatchery pink and chum salmon?

Background

The first 3 years have been completed for field studies focused on the variability and extent of hatchery pink and chum salmon straying in Prince Willian Sound (PWS), and chum salmon straying in Southeast Alaska. Work on genetic stock structure of pink salmon populations using DNA microsatellites for 2013 collections is preliminarily complete and the tissues are currently being analyzed for additional odd- and even-year pink salmon. The field crews have completed intensive sampling directed toward studies of the relative reproductive success of hatchery and wild fish on 6 pink salmon study streams in PWS and 4 chum salmon study streams in Southeast. This ground breaking work is based on identifying origin (hatchery/wild) of potential parents spawning in study streams using otolith marks. In subsequent years these parents and the returning adult progeny will be genotyped to identify parental origin (hatchery/wild) of returning fish. Collectively over 160,000 salmon have been sampled for this research.

Straying studies

In a systematic and well-designed manner the project has sampled representative chum salmon indicator streams in Southeast, and pink and chum indicator streams in Prince William Sound, to estimate the hatchery fraction in natural systems on a district scale. No previous study has done this. Combining this information with estimates of relative reproductive success and of hatchery and wild productivities will allow us to assess the influence, if any, of hatchery strays on wild production. Preparations are underway to publish this work now that it is completed.

Results are summarized in Table 8.

Table 8. Preliminary estimates of the proportion of hatchery-origin spawners in the wild streams. (From Ron Josepheson)

Hatchery Proportion			
PWS	2013	2014	2015
Pink Salmon	4%	15%	10%
Chum Salmon	3%	3%	3%
Southeast	2013	2014	2015
Chum Salmon	7%	5%	9%

Ocean Sampling

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 the estimates from the streams and the known removals through harvest and hatchery take provides a means to estimate: the number of wild salmon spawning in streams, the number of hatchery salmon spawning in the wild (hatchery strays), total production of hatchery salmon (including strays), total production of wild salmon (excluding hatchery strays). With knowledge of total number of fish spawning in streams and the total return of wild fish, it is a simple matter to determine the return per spawner, an important measure of productivity and fitness. It is also possible to determine the proportion of the hatchery return that spawned in wild stock systems.

Table 9. Preliminary PWS Run Size Estimates - Pink Salmon 2013-2015
(This table has some errors in numbers that will be corrected after further analysis.)
(Thousands of Pink Salmon)

Year	Wild spawners	Hatchery spawners	Total spawners	Wild run	Hatchery run	Total run
2013	15,698	701	16,399	33,096	69,888	102,985
2014	5,130	741	5,872	6,960	42,757	49,718
2015	30,074	3,178	33,252	55,632	67,720	123,353

Table 10. Preliminary PWS Run Size Estimates - Chum Salmon 2013-2015
(Thousands of Chum Salmon)

Year	Wild spawners	Hatchery spawners	Total spawners	Wild run	Hatchery run	Total run
2013	894	50	944	1,141	3,007	4,148
2014	925	49	975	1,175	1,228	2,404
2015	905	28	934	1,126	2,484	3,611

These data show that from 1% to 5% of the pink salmon hatchery returns, and 1% to 4% of the hatchery chum salmon returns in PWS during the three study years spawned in natural systems.
Preparations are underway to publish run reconstruction and straying results.

Fitness Studies

Samples have been collected from 6 pink salmon pedigree streams in PWS and 4 chum salmon streams in SEAK for studies of potential relative difference in survival of offspring between hatchery and wild fish spawning in wild stock streams. This information will allow assessment of the ecological and genetic consequences of hatchery strays on fitness of wild spawners at the drainage scale. Evaluation of this scale is important because it will provide insight into how much these consequences can vary locally (and, potentially, why). The analysis has not been initiated yet pending more funding and selection of the SNPs (single nucleotide polymorphisms) that are used to determine parentage. The SNPs are now developed and the state's Gene Conservation Lab has submitted requests for two grants to conduct initial work on PWS pink salmon fitness studies.

Funding

A finance committee has been formed with hatchery operators, a processor representative, as well as the commissioner's office and hatchery aquaculture section in the department. This team has focused attention on the essentials with a pared down program primarily directed at the questions about fitness. The current situation with State of Alaska's budget precludes additional CIP funds, however 7 of the largest hatchery corporations (SSRAA, NSRAA, DIPAC, PWSAC, VFDA, KRAA, and CIAA) have combined to provide $300,000 for the coming year's work; those funds in concert with carry forward funds, and the processor's contribution of $500,000 are adequate for this year's field work. The hatchery groups expect to increase their contribution and provide at least $350,000 each year. ADFG provides considerable in-kind support as well as seeking funds from other sources.

Future

Field work for Questions 1 and 2 has been completed, while analyses are nearing completion and therefore the scope of work for the research project has narrowed to address the fitness question. Even so, there are still significant costs. The science panel considers the fitness studies to be the most important to our long

term understanding of the hatchery wild interactions. The funding for that component of the project is now being provided by fishermen through the hatcheries via additional cost recovery, as well as the processor community through a consensus agreement. Sustained commitment by these parties is necessary for successful completion of the project. This project is expected to end in 2023 with the conclusion of the fitness analysis of chum salmon in Southeast Alaska.

In a soon to be released publication (2016) that was presented to the RFM Assessment team as a Power Point presentation, Ron Josephson and Alex Wertheimer made the following conclusions:
Hatchery production (1977-2013) of pink and chum salmon in PWS and chum salmon in SEAK have resulted in increases in commercial harvest of 6-10+ times over pre-hatchery (1965-1976) averages.
Productivity of wild stock pink salmon in PWS is at historic high levels.
Escapements of these species are at or above pre-hatchery averages, and escapement goals have been more consistently attained.

These results indicate that ADFGs management of the large scale pink and chum hatchery programs has been commensurate with sustainable wild stock productivity and is consistent with the current concept of the precautionary approach.
These conclusions were made after analysis of data found in ADFG Monitoring, Permitting and Development Reports, Commercial Fisheries PWS and SEAK Regional Reports.

Minor Non Conformance Determination
In 2012, during the FAO RFM AK Salmon 1st Surveillance Activities, one minor non-conformance was assigned under Clause 7, the precautionary approach. At the time of assessment it was unclear how ADFG planned to deal with development plans and release activities (e.g. potential requests from hatchery corporations for increased pink and chum salmon productions in PWS and SEAK) in light of the fact that potential genetic interactions between hatchery and wild salmon could already be occurring, and that research results of the genetic interactions between hatchery and wild salmon following the hatchery wild salmon multigenerational study in PWS and SEAK may take considerable time to accrue.
A corrective action plan from the client required the following clarifications and evidence:
How ADFG intended to address the issue of hatchery permit alteration (PAR) requests for pink and chum in PWS and Chum in SE Alaska; and Interim progress towards completion of the large scale hatchery salmon research study.

With regards to PAR's it should be noted that all hatchery production increases are proposed to the ADFG and they are scrutinized by a regulatory review, approved or rejected before they are introduced to the Regional Planning Team (RPT). The planning team will either approve or modify or not approve. Ultimately, the Commissioner of ADFG has the final approval authority. ADFG has full control over the process. The regulatory process is described on the ADFG website and earlier in this document. The 2015 PAR's that were approved as amended by the RPT for pink salmon in PWS and summer chum salmon in SE Alaska were;
As reported in the 4th Surveillance Assessment (2014 PAR) the only approved increase in pink salmon production in PWS was to increase the pink salmon egg take to 20 million green pink salmon eggs at the VFDA Hatchery in 2016. This particular stock of pink salmon is characterized by early adult run timing so it is temporally isolated from the majority of pink salmon in PWS. In addition, these fish have shown a low propensity for straying. ADFG has stated that this increase in production is a step wise effort that involves evaluating the fishing effects before any more increases in production. No other PAR's were approved for pink or chum salmon in PWS in 2015.

The only approved PAR for summer chum salmon in northern southeast Alaska was for the Port Armstrong

hatchery to increase the egg take by 30 million chum salmon eggs for a remote release site at Port Lucy. There were no other increases or egg take adjustments for summer chum salmon above the permitted capacity of the hatchery in SE Alaska.

The second point regarding progress towards completion of the ADFG Hatchery Research study has been satisfied by the unpreceded field effort and the significant results documented in the PWSSC Annual Reports from 2013-2015 on the ADFG website and as described earlier in this document.

Recommendation

1. Funding supporting new research plans for both Chinook salmon and hatchery-wild stock interactions with pink and chum salmon is essential for providing critical information needed for maintaining precautionary approach principles in Alaska salmon management.

2. ADFG should continue its leadership role in in-season salmon management of pink salmon in PWS. It is requested that ADFG provide a description of the procedure and the methodology used to make decisions about the rate of exploitation for hatchery and wild pink salmon and post it on the ADFG website.

3. The minor non-conformance that was rendered in the 1st Surveillance Report and continued through the 4th Surveillance Report for fundamental clause 7 should be closed based on (a) ADFG's management capacity in PWS through the use of thermal otolith marking of hatchery pink salmon to allow discrimination of hatchery from wild fish_in-season, avoiding overharvesting wild stocks of pink salmon and reducing the numerical impact of hatchery fish entering the spawning grounds. This capability allows the ADFG area management biologist to exercise control of harvest as a management tool, and (b) there is a robust ADFG Alaska Hatchery Research Project evaluating the degree straying of hatchery pink and chum salmon on the spawning grounds in PWS and SEAK and the genetic consequences as was described previously. This unprecedented and rigorous study has concluded 3 complete field seasons. In the next few years analysis by the ADFG genetic laboratory will determine the impact of hatchery strays on the fitness of wild pink and chum salmon.

4. ADFG has the management tools with thermal otolith marking and decoding in-season and quantification of hatchery fish genetic impact on wild fish over multiple generations to fully implement precautionary management in PWS and SEAK.

References:	http://www.adfg.alaska.gov/hatcheriesResearch.main 5 AAC 39.222 (a) (1); (a) (5)(A,B),) 5 AAC 39.220 http:www.adfg.alaska,gov/static/home/news/hottopics/pdfs/chinookresearchplan.pdf http://www.adfg.alaska.gov/static/fishing/pdfs/hatcheries/mcgeebrochore.pdf http://www.adfg.alaska.gov/fedaidpdfs/FMT14-12.PDF 2015 ADFG Alaska Hatchery Annual Report

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 7.1.1

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

FAO CCRF (1995) 7.5.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska State Regulation, the MSSF(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.

Evidence:

Alaska State Regulation, the MSSF (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) 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.

References:	5 AAC 39.222 (a) (1); (a) (5)(A,B),)

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 7.1.2

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

FAO CCRF (1995) 7.5.1, 12.3
FAO Eco (2009) 29.6/32

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The MSSF 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)				
Evidence: The MSSF 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)). Alaska State Constitution Section 4 states "Sustained Yield. Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses. As an example of initiating research in the absence of adequate information see 7.1 under Chinook Salmon Research Initiative.				
References:	5 AAC 39.222 (a)(5)(A)(iv) http:www.adfg.alaska, gov/static/home/news/hottopics/pdfs/chinookresearchplan.pdf			
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 7.2

In the case of new or exploratory fisheries, States shall adopt as soon as possible cautious conservation and management measures, including, inter alia, catch limits and effort limits. Such measures should remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. The latter measures should, if appropriate, allow for the gradual development of the fisheries.

FAO CCRF (1995) 7.5.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska State Regulation, the MSFF specifies "The principles and criteria for sustainable salmon fisheries shall be applied... using the best available information... ADFG will... provide the BOF with reports on the status of salmon stocks and salmon fisheries under consideration for regulatory changes, which should include... identification of any ... management actions needed... such as the ... identification of a new fishery or expanding fishery" (5 AAC 39.222 (d)(1)(D)(I)) and that the reports will be the basis for "developing a management plan...[that] will ... (A) contain goals and measurable and implementable objectives that are reviewed on a regular basis and utilize the best available scientific information; (B) minimize the adverse effects on salmon habitat caused by fishing; (C) protect, restore, and promote the long-term health and				

sustainability of the salmon fishery and habitat; (D) prevent overfishing; and (E) provide conservation and management measures that are necessary and appropriate to promote maximum or optimum sustained yield of the fishery resource...[and]...if any new fisheries or expanding fisheries, or yield concerns, stock management concerns, or stock conservations concerns exist. The BOF will... amend or develop salmon fishery management plans" ((5 AAC 39.222 (d) (2) and (3). Also, 5AAC 39.210, the Management Plan for High Impact Emerging Fisheries requires that high impact emerging fisheries be closed until an interim management plan and associated regulations are developed. In summary, while Alaska does have a regulatory process in place for new and emerging fisheries the reality is that all salmon resources are fully allocated.

Evidence:

Alaska State Regulation, the Policy for the Management of Sustainable Salmon Fisheries specifies "The principles and criteria for sustainable salmon fisheries shall be applied... using the best available information... ADFG will... provide the BoF with reports on the status of salmon stocks and salmon fisheries under consideration for regulatory changes, which should include... identification of any ... management actions needed... such as the ... identification of a new fishery or expanding fishery" (5 AAC 39.222 (d)(1)(D)(I)) and that the reports will be the basis for "developing a management plan...[that] will ... (A) contain goals and measurable and implementable objectives that are reviewed on a regular basis and utilize the best available scientific information; (B) minimize the adverse effects on salmon habitat caused by fishing; (C) protect, restore, and promote the long-term health and sustainability of the salmon fishery and habitat; (D) prevent overfishing; and (E) provide conservation and management measures that are necessary and appropriate to promote maximum or optimum sustained yield of the fishery resource...[and]...if any new fisheries or expanding fisheries, or yield concerns, stock management concerns, or stock conservations concerns exist.. The BoF will... amend or develop salmon fishery management plans" ((5 AAC 39.222 (d) (2) and (3). Also, 5AAC 39.210, the Management Plan for High Impact Emerging Fisheries requires that high impact emerging fisheries be closed until an interim management plan and associated regulations are developed. Also, the Policy for Management of mixed salmon stock fisheries (5AAC 39.220(d) requires that new or expanding fisheries be restricted for salmon stocks that are already fully allocated.

7.2.1

Provisions shall be made for the gradual development of new or exploratory fisheries while information is being collected on the impact of these fisheries, allowing an assessment of the impact of such fisheries on the long-term sustainability of the stocks.

5AAC 39.210(e)(7) Management Plan for High Impact Emerging Fisheries requires that a plan for management of emerging fisheries include a plan to determine the productivity of the species and impact of the fishery. In summary, while Alaska does have a regulatory process in place for new and emerging fisheries the reality is that all salmon resources are fully allocated.

References:	5 AAC 39.222 (d)(1)(D)(I)) 5 AAC 39.222 (d)(2) 5AAC 39.210 5AAC 39.220(d)

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 7.2.3

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

FAO CCRF (1995) 7.5.5

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

The state-wide Sustainable Salmon Policy (5AAC 39.222) mandates that escapement goals must be established for all exploited salmon stocks. This policy also requires ADFG to provide the BOF, on a regular basis, a stock status report, a review of escapement goals, and action plans that include management directives to promote recovery of any stocks of concern. During the fishing season, additional temporary fishery restrictions may be taken, by issuing Emergency Orders, to provide for escapement . The same approach can be taken for unforeseen adverse environmental changes that impact salmon returns. Escapement goals are based on the best available data and are scientifically defensible.

Evidence:

A fundamental objective of Alaska salmon fishery management is that escapement goals must be achieved. Where a fishery is allowed, the escapement goals, agreed in advance, provide the pre-determined objective to which in season temporary management responses to restrict fishery access are taken using the EO regulatory tool. The same approach can be taken for unforeseen adverse environmental changes that may impact salmon returns.

The state-wide Sustainable Salmon Policy (5AAC 39.222) mandates that escapement goals must be established for all exploited salmon stocks. This policy also requires ADFG to provide the BOF, on a regular basis, a stock status report, a review of escapement goals, and action plans that include management directives to promote recovery of any stocks of concern (examples of recent stock status and escapement goal reports presented to the BOF: Review of Salmon Escapement Goals in Bristol Bay by J. Erickson et al.2015; Review of Salmon Escapement Goals in SE Alaska by S. Heinl et al. 2014; Review of salmon Escapement Goals in Kodiak Management Area by N. Sagalkin et al. 2013; Arctic-Yukon-Kuskokim Region by J. Countz et al. 2016 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 (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 (09.360) provides management directives for the mainland fishery based on harvestable surplus of Chignik River sockeye under the 5 AAC 39.210. Management Plan for High Impact Emerging Fisheries (1(d)) ADFG shall close a high impact emerging commercial fishery once it has been designated as such by the commissioner, and may not reopen the fishery until an interim management plan and associated regulations have been adopted by the commissioner. If an interim management plan and regulations have been adopted, the commissioner may allow the fishery to continue. 8 (g) Upon completion of an interim plan, ADFG shall petition the BOF under 5 AAC 96.625 to consider adoption of the management plan and associated regulations at its next regularly scheduled meeting.

References:	Sustainable Salmon Policy (5AAC 39.222) Southeast Alaska King Salmon Management Plan (5AAC 47.055) Kenai River Late-Run Sockeye Salmon Management Plan (5AAC 21.360) Tanana River salmon management plan (05.367) Southern district management plan for the Alaska Peninsula (09.360)
Non-Conformance Number (if relevant)	**NA**

Section D: Management Measures

7.8. Fundamental Clause 8

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

FAO CCRF (1995) 7.1.1/7.1.2/7.1.6/7.4.1/7.6.1/7.6.9/12.3
FAO Eco (2009) 29.2/29.4/30
FAO Eco (2011) 36.2, 36.3

No. Supporting clauses/sub-clauses	17
Supporting clauses applicable	15
Supporting clauses not applicable	2
Non Conformances	0

Supporting Clause 8.1

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

FAO CCRF (1995) 7.1.1 Others 7.4.1/7.6.7
FAO Eco (2009) 29.2/29.4
FAO Eco (2011)36.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The MSSF (5 AAC 39.22), directs management measures to ensure sustainability of yield. The MSSF is implemented through the various fishery management plans for different fisheries in different regions and areas of the state**.**

Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of optimum utilization.

State Regulation, the MSSF (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:

Historical evolvement of fishery run data sets for fisheries and districts
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). Historical fishery runs, concerns and fluctuations and economic interest are the obvious drivers in this decision making process. Where different levels of scientific evidence are available – i.e. where confidence in datasets is lower, ADFG has developed a number of 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. Readers should also review Precautionary Approach Section C.	
References:	5AAC 39.22
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.1.1

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

FAO Eco (2009) 29.2
FAO Eco (2011) 36.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: See evidence under 8.1.				
Evidence: See evidence under 8.1.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 8.1.2

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

FAO CCRF (1995) 7.6.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The BOF has the power to 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.
Evidence: There is a Board of Fish allocation criteria[221] where the board utilizes the following specific allocation criteria when allocating between fisheries. 1)the 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 Non-residents.

References:	(AS 16.05.251,5 AAC 39 .205, 5AAC 77.007, and 5 AAC 75 .01).

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.1.3

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

FAO CCRF (1995) 7.4.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

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 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. 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.

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

[221] https://www.adfg.alaska.gov/.../find-pol-tab.

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 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[222].

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 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 [223].

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, 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 state-wide 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

[222] http://www.cfec.state.ak.us/
[223] http://www.cfec.state.ak.us/Publications/what_is_cfec.pdf.

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[224].

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 BOF 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) [225].

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 [226].

References:	See text/footnote for references.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.2

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

FAO CCRF (1995) 8.4.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

[224] http://www.cfec.state.ak.us/annrpts/AR2009.pdf
[225] http://www.cfec.state.ak.us/annrpts/AR2016.pdf.
[226] http://seagrant.uaf.edu/map/fishbiz/.

Evidence: 5AC39.150 Explosives, chemicals and poisons unlawful. The use of an explosive, chemical or poison in the taking of fish or shellfish is prohibited, except that chemical baits or lures may be used to attract shellfish.	
References:	ADFG 5AC39.150
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.3

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

FAO CCRF (1995) 7.1.2, 7.1.6, 7.6.6

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Four general classes of salmon users, commercial, subsistence recreational, and personal use , have been identified and are managed by three Divisions within ADF&G. Both state (AS 16.05.258 (b)) and federal (ANILCA Title VIII) laws prioritize subsistence uses over all other consumptive uses of fish and game. State law (16.05.251(e)) requires that "allocation decisions deal with identifying parties with a legitimate interest in the use and management of the fishery. Allocation of the harvest among users is the responsibility of a citizen panel comprised of a membership representative of all users—the BOF. The BOF receives formal proposals and advice from 82 Advisory Committees that are representative of 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.

Evidence:

Three general classes of salmon users; commercial, subsistence, recreational, and personal use harvesters, are primarily evaluated and managed by three dedicated ADFG Divisions. Regulation of the BOF number 16.05.251(e) states that "allocation decisions deal with identifying parties with a legitimate interest in the use and management of the fishery"[227].

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 Local Advisory Committees which are each comprised of a membership representative of users in each of the 82 local communities.

The BOF operates on a 3 year cycle of meetings that covers each of the major Regions and Districts of Alaska salmon (and other state managed fisheries). There are 82 appointed ACs that operates throughout

[227] http://www.adfg.state.ak.us/pubs/afrb/afrbhome.php

the State. These committee representatives provide 'the vehicle 'through which stakeholder and fishery participants can engage in the management decision process of the BOF and ADFG. The system is highly transparent (publically open) and follows a rigorous process that provides a balance between the interests of economic access to fishery (the participants) and conservation of resources- fishery and environmental conservation factors. Any individual has the entitlement to lodge a proposal to the BOF process with respect to a current plan, amendment, proposal to change/amend regulations of an allocative nature etc.

The BOF utilize the following specific allocation criteria when allocating between fisheries.

1. the 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 non-residents

Essentially, the fishery management plans- derived through the scientific research and fishery data collection process carried out annually by ADFG are presented to the BOF for discussion, adoption amendment and ratification. State Regulation, the MSSF (5 AAC 39.222) requires that "public support and involvement for sustained use and protection of salmon resources should be sought and encouraged" (principal 4) and specifies 5 criteria regarding dispute resolution, dissemination of information, open public process, proportional burden of conservation among users, public education. This Policy is implemented primarily through the communications of the BOF and its 82 Local Advisory Councils through the ADFG staff.

The BOF is analogous to the NPFMC, in that they make allocation decisions, after the conservation decisions have been made. The cycle of meetings generally occurs from October to March with all fisheries under the BOF being considered, including commercial, sports, subsistence and personal use. There is also a special petition agenda change request procedure available for the BOF to consider out-of-cycle requests.
Alaska state law defines subsistence as taking of fish, shellfish or other fisheries resources by Alaska residents for subsistence use (AS16.05.940)(31), noncommercial, customary and tradition uses . The Federal Subsistence Board (FSB) adopts subsistence fishing regulations for federal waters in Alaska in compliance with the Alaska National Interest Lands Conservation Act (ANILCA). Only eligible Alaska rural residents may participate in federal subsistence fisheries.

The meeting cycle is set out for 2015-2016 and available at http://www.boards.adfg.state.ak.us. Proposals to the BOF are published for each cycle of meetings, such as the 2015-2016. BOF's cycle at http://www.boards.adfg.state.ak.us/fishinfo/meetinfo/2015-2016-bof-prop- final.pdf.
Either an individual or a group may make a proposal to the BOF with respect to proposals for amendments to State legislature that may impact upon the interests of the proposer. A standard format and direction/advice to submitting proposals is provided by the BOF.

References:	AS 16.05.252 (e) AS 16.05.940 (31)

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.4

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

FAO CCRF (1995) 7.1.8, 7.6.3, 8.1.2, 8.1.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: See Supporting clause 8.1.3				
Evidence: See Supporting clause 8.1.3				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 8.5

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

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Types of legal gear for Alaska fisheries are listed in regulation (5 AAC39.105), and all types are strictly 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 (5 AAC39.105). Waters near spawning grounds are closed to fishing (5 AAC39.105) . In addition, state law (AS 16.10.010) prohibits Interference with salmon spawning streams and water regulation activities in and or around streams in either fresh or salt water.				
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-eighths 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, area management biologists 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 (lat, long) 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.

References:	5AAC39.105, 5AAC 06.330, 5AAC 47.140(a)

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.6

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

FAO CCRF (1995) 8.2.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

By law (AS16.05.510), all Alaska salmon fishing vessels are required to be licensed by the State of Alaska, and to display their permanent vessel license plate(AS 16.05.520). The fishing gear itself must be marked in accordance with state regulations (5 AAC 06.334)

The fishing gear itself must be marked in accordance with state regulations that are specific to each fishing region. Also, there are region-specific regulations which require how salmon fishing vessels 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.	
Evidence: By law (AS16.05.510), all Alaska salmon fishing vessels are required to be licensed by the State of Alaska, and to display their permanent vessel license plate(AS 16.05.520) , which are specific to each fishing region. Also, there are region-specific regulations which require how salmon fishing vessels must display their names and permit numbers (5 AAC 06.343) All Alaska salmon fishing, except for a very small troll fishery in Southeast Alaska, is conducted in state waters (“internal waters”). This means that it is very unlikely that any fishing gear will be encountered by vessels of other nations.	
References:	AS16.05.510.Unlicensed vessel unlawful AS 16.05.520. Number plate 5 AAC 06.334. Identification of gear 5 AAC 06.343. Vessel identification
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.7

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

FAO CCRF (1995) 7.6.10
FAO Eco (2009) 30

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Biodiversity of aquatic habitats and ecosystems is safeguarded primarily by “clean” fishing practices and by sound fisheries management. Salmon fisheries in Alaska are generally gear, area and time specific, thus resulting in fairly species-specific harvests. For many fisheries, ADFG prepares fishery-specific management plans in advance of each salmon season. The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) directs ADFG to report to the BOF on the status of salmon stocks and to Identify specific stocks that represent a concern based on yield, management, or conservation. Generally, review teams comprised of staff from the Commercial and Sport Fish Divisions examine escapement goals by region and report potential problems with stocks to the BOF at regularly scheduled meetings.				
Evidence: The biodiversity of aquatic habitats and ecosystems is safeguarded primarily by “clean” fishing practices and by sound fisheries management. Salmon fisheries in Alaska are generally gear, area and time specific, thus resulting in fairly species-specific harvests. For many fisheries, The ADFG prepares fishery-specific management plans in advance of each salmon season. For many fisheries, The ADFG prepares fishery-specific management plans in advance of each salmon				

season. The Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) directs ADFG to report to the BOF on the status of salmon stocks and to Identify specific stocks that represent a concern based on yield, management, or conservation. Generally, review teams comprised of staff from the Commercial and Sport Fish Divisions examine escapement goals by region and report potential problems with stocks to the BOF at regularly scheduled meetings. ADFG has reported the following stocks of concern to Upper the BOF at recent BOF meetings: Karluk River Chinook; Susitna River sockeye; UpperCook Inlet Chinook (Chuitna River, Lewis River, Theodore River, Alexander Creek, Willow Creek, and Goose Creek); Kvichak River sockeye; Yukon River Chinook; Norton Sound Chinook (Shaktoolik and Unalakleet subdistricts); Norton Sound chum (Nome, Golovin and Moses Point subdistricts); and McDonald Lake sockeye. As an example, ADFG identified the McDonald Lake stock of sockeye salmon as a "stock of management concern." Based on ADFG recommendations, the BOF then adopted a McDonald Lake Sockeye Salmon Action Plan which required management action to reduce the harvest of these fish in the District 6 drift gillnet fishery as well as the purse seine fishery. In addition to these fishery management actions, restrictions were also placed on the Yes Bay personal use fishery. Research programs were to be implemented to evaluate returns to McDonald Lake and to further refine future management actions to rebuild the McDonald Lake sockeye run (Davidson, et al., 2010).

ADFG management reports in other areas of the state also indicate that salmon fishery management safeguards the biodiversity of salmon by basing management on discrete stocks. For example, in Bristol Bay harvests are directed at terminal areas around the mouths of individual rivers. Each stock is managed to achieve an escapement goal for spawning (usually expressed as a range) based on the principle of sustained yield.

ADFG manages fisheries to meet escapement goals by regulating fishing time and area. Legal gear for the Bristol Bay salmon fishery includes drift gillnets of a maximum of 150 fathoms and set gillnets of up to 50 fathoms in length. However, two permit holders are allowed to fish together on a single vessel with up to 200 fathoms of gillnet (Morstad et al., 2010). These actions indicate Alaskan salmon fisheries are specifically managed to maintain the biodiversity of fish stocks and thereby maintain marine aquatic ecosystems. Management plans are based on ADFG annual preseason salmon forecasts, historical escapement data, fishery performance data, private non-profit hatchery forecasts, and input from various public Management Task Force processes. Specific area openings and fishing times are established in-season by emergency order. As an example, the 2010 Southeast Alaska Purse Seine Fishery Management Plan was developed by all the Southeast commercial fisheries area management biologists based on forecasts for pink salmon (including the NOAA forecast), together with historical escapement estimates, fishery performance data, private non- profit hatchery forecasts for chum salmon and abundance of other species (Davidson et al., 2010). Pink salmon is the primary species targeted by this fishery, based on historic data showing that since statehood 77% of the salmon harvested in Southeast Alaska commercial fisheries have been caught with purse seine gear. Thus, most management actions in the fishery are based on the abundance of pink salmon stocks. Chum salmon are specifically targeted in or near hatchery terminal areas and the majority of the chum harvest originates from hatchery production. Other species of salmon are harvested incidentally to pink and chum salmon, as indicated by the fact that over the most recent 10-year period the purse seine harvest included 87% pink salmon, 11% chum salmon, 1.3% sockeye salmon, and 0.7% coho salmon. Harvest percentages for Chinook salmon have been insignificant compared with other species. However, ADFG is required to manage the Southeast Alaska purse seine fishery for a maximum harvest of 4.3% of the annual all-gear Chinook salmon catch ceiling determined under the terms of the Pacific Salmon Treaty [5AAC 29.060 (b)(1)].

The BOF has adopted size limits [5AAC 33.392] and directed ADFG to manage the purse seine fishery such that incidental Chinook mortality from catch and release is minimized (Davidson et al., 2010). In addition, tagging studies of adult pink salmon have demonstrated that the stocks in Southeast Alaska exhibit a distinct separation between the northern and southern portions of the region. In season assessments of pink salmon run strength are determined primarily from spawning escapement information obtained from aerial surveys of terminal areas and streams, and from fishery performance data (i.e., catch and catch per unit effort, or CPUE). ADFG staff use fishery performance data and associated information to make in season evaluations of pink salmon harvests from both Northern and Southern Southeast Alaska. Staff also charter purse seine vessels to conduct test-fishing assessments of run strength in selected index areas and monitor pink salmon sex ratios in the commercial harvest to evaluate run timing. In addition, habitat and restoration efforts in freshwater are ongoing. Specifically, salmon habitat protection along the lower Kenai River and restoration of fish passage for adults and juvenile salmon through replacement of hanging culverts and either removal or control of introduced species, such as pike.	
References:	5AAC39.222, 5Aac 29.060(b)(1), 5AAC33.392
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.8

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

FAO CCRF (1995) 7.2.2, 7.6.4, 7.6.9, 8.4.5, 8.5.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Waste of salmon is covered under Alaska law (AS 16.05.831), which prohibits waste of salmon harvested. 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).				
Evidence: Waste of Salmon is covered by ADFG statutes in Chapter 93 Article 3. Salmon Use 5 AAC 93.310. Waste of Salmon. 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 trolling to protect lingcod a non-target species.

Alaska law(AS 16.05.831) prohibits waste of salmon harvested in all Alaska fisheries. 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 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.

References:	5AAC.93.310, See reference in text

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.9

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

FAO CCRF (1995) 7.2.2, 8.4.6, 8.4.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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 gillnet, or portion of a gillnet, to the local ADFG office within 15 hours of the loss.

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

[228] http://www.aykssi.org/Documents/AYKbsfa-0210_REPORT.pdf

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.	
References:	5AAC 06.331
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.10

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

FAO CCRF (1995) 8.5.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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 millimeter 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 five 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).	
References:	5 AAC 39.250, 5 AAC 39260,5 AAC 39.280, 5 AAC 39.155
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.11

Assessment and scientific evaluation shall be carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the introduction on a commercial scale of new fishing gear, methods and operations. Accordingly, the effects of such introductions shall be monitored.

FAO CCRF (1995) 8.4.7, 12.11

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence: Supporting Clause 8.11 is **NOT APPLICABLE** as any proposed fishing gear would be monitored by ADFG and before implementation must be approved by the BOF				
Evidence: Supporting Clause 8.11 is **NOT APPLICABLE** as any proposed fishing gear would be monitored by ADFG and before implementation must be approved by the BOF				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 8.12

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

FAO CCRF (1995) 8.5.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.
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 in Supporting Clause 5.4

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.13

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

FAO CCRF (1995) 8.5.3/12.10

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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.

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. In addition, see US-Canada collaboration on transboundary stock management and research discussion in Supporting Clause 5.4	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 8.14

Policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. States shall ensure that, when selecting the materials to be used in the creation of artificial reefs as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed.

FAO CCRF (1995) 8.11.1, 8.11.2

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence:				
Evidence: Supporting Clause 8.14 is not applicable for Alaskan Salmon Fisheries**.**				
References:				
Non-Conformance Number (if relevant)				**NA**

7.9. Fundamental Clause 9

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

FAO CCRF (1995) 8.1.7/8.1.10/8.2.4/8.4.5

No. Supporting clauses/sub-clauses	3
Supporting clauses applicable	2
Supporting clauses not applicable	1
Non Conformances	0

Supporting Clause 9.1

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

FAO CCRF (1995) 8.1.7/8.4.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

The Alaska Institute of Technology (formerly called Alaska Vocational Training & Education Centre), l 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 Centre is a USCG approved training facility located in Seward, Alaska, and offers USCG and international Standards of Training, Certification, & Watch keeping -compliant maritime training.

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 Centre[229]. 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)[230]. 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 –

[229] http://www.avtec.edu/AMTC.htm
[230] http://www.stcw.org/

* How to get your Merchant Mariner's Credential
* Which Course Do You Need?

U.S. Coast Guard Approved/STCW-Compliant Courses –
* Able Seaman
* Assistance Towing Operations
* Automatic Radar Plotting Aids (ARPA) Operations
* Basic Safety Training - STCW'95; includes:
  ** First Aid & CPR
  ** Personal Safety and Social Responsibility
  ** Basic Fire Fighting
  ** Personal Survival Techniques
* Bridge Resource Management (BRM)
* Global Maritime Distress & Safety System (GMDSS)
* Master Not More Than 200 Tons Program
* Meteorology
* Operator of Uninspected Passenger Vessels (OUPV)
* Proficiency in Survival Craft
* Qualified Member of Engine Department (QMED) Oiler
* Radar Observer (Unlimited), Original
* Radar Observer (Unlimited), Refresher
* Radar Observer (Unlimited), Recertification
* Rating Forming Part of a Navigational Watch
* Seafood Processor Orientation and Safety Course
* Shipboard Emergency Medicine
* Tankship – Dangerous Liquids (P.I.C.)
* Visual Communications/Flashing Lights
* Medical Care Provider

Additional AVTEC Maritime Courses

* FCC Marine Radio Operators Permit Examination

The University of Alaska Sea Grant Marine Advisory Program (MAP)[231] 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

[231] http://seagrant.uaf.edu/map/fishbiz/index.php

* financial management for fishermen * maximizing fuel efficiency In addition, MAP[232] 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, 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[233], in Kodiak, Alaska.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 9.2

States, with the assistance of relevant international organizations, shall endeavour 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.

FAO CCRF (1995) 8.1.10

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary 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 fsher understanding, are regularly attended by fishers, and by virtue of Alaska fishery statues being consistent with FAO CCRF, provide informal education on these provisions.

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

[232] http://seagrant.uaf.edu/map/
[233] http://www.sfos.uaf.edu/fitc/academicprograms

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. (https://seagrant.uaf.edu/conferences/waisc/2016/docs/WAISC-agenda-2016.pdf). 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 type information, including on the FAO Code across a whole range of fishery and fish related matters[234] – 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[235] where it describes the RFM program, the conformance criteria standard along with the FAO documents.

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[236][237]. 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.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 9.3

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

FAO CCRF (1995) 8.1.8

Evidence Rating:	Low ☐	Medium ☐	High ☑

[234] http://www.alaskaseafood.org/about/
[235] http://www.alaskaseafood.org/rfm-certification/fisheries-standard/
[236] http://www.adfg.alaska.gov/index.cfm?adfg=librarypublications.main
[237] http://www.adfg.alaska.gov/index.cfm?adfg=animals.listfish

Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary 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.				
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.				
References:	http://www.avtec.edu/AMTC.htm http://www.stcw.org/ http://seagrant.uaf.edu/map/			
Non-Conformance Number (if relevant)				**NA**

Section E: Implementation, Monitoring and Control

7.10. Fundamental Clause 10

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

FAO CCRF (1995) 7.1.7/7.7.3/7.6.2/8.1.1/8.1.4/8.2.1
FAO ECO (2009) 29.5
FAO Eco (2011) 36.6

No. Supporting clauses/sub-clauses	6
Supporting clauses applicable	3
Supporting clauses not applicable	3
Non Conformances	0

Supporting Clause 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.

FAO CCRF (1995) 7.1.7 Others 7.7.3/8.1.1
FAO Eco (2009) 29.5
FAO Eco (2011) 36.6

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The salmon management program conducted by ADFG is a responsive and adaptive program that monitors salmon abundance during the fishing season and makes continual adjustments in fishing time and area based on observed escapements, commercial fishery performance (e.g., catch per unit of effort), test fishing, biological data on age, sex and size, historical run timing curves and other data. The structure of ADFG, with management authority instilled at the area office level, allows it to monitor, control and enforce compliance with fishery regulations and emergency orders.

Evidence:
The salmon management program conducted by ADFG is a responsive and adaptive program that monitors salmon abundance during the fishing season and makes continual adjustments in fishing time and area based on observed escapements, commercial fishery performance (e.g., catch per unit of effort), test fishing, biological data on age, sex and size, historical run timing curves and other data. The structure of ADFG, with management authority instilled at the area office level, allows it to monitor, control and enforce compliance with fishery regulations and emergency orders. Area Management Biologists are on the scene to actually watch the prosecution of the fishery in their area through aerial surveys and on-the-ground observations. Area and regional staff biologists are deputized law enforcement officers trained to assist Alaska Wildlife Troopers (AWT) with law enforcement activities. ADFG has instituted an on-going training and refresher class to keep deputized staff up-to-date on enforcement techniques.

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 10.2

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

FAO CCRF (1995) 7.6.2 Other 8.1.2, 8.2.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

The Alaska Limited Entry system only allows legally permitted fishers and vessels to operate in salmon fisheries. The "right to fish" is embodied in a permit card that is issued annually. The Alaska Legislature passed legislation in 1973 to establish a "limited entry" system to allow the state to limit the number of participants in specific fisheries. 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 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. Commercial fishing vessels must have a placard with the vessel identification number clearly visible on both sides of the vessel in symbols at least 12 inches high and one inch wide that contrast with the background color (5 AAC 39.119).

Evidence:

The Alaska Limited Entry system only allows legally permitted vessels to operate in salmon fisheries. The "right to fish" is embodied in a permit card that is issued annually. The Alaska Legislature passed legislation in 1973 to establish a "limited entry" system to allow the state to limit the number of participants in specific fisheries. 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 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[238] Commercial salmon fishing vessels are not allowed to operate in a fishery without a person onboard who has in his or her possession a limited entry permit card.

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, 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 state-wide basis, while others are valid only for certain areas of the state (e.g., Southeast, Cook Inlet and Bristol Bay). This "right to fish" is embodied in a permit card that is issued annually.

Commercial fishing vessels must have a placard with the vessel identification number clearly visible on both

[238] http://www.cfec.state.ak.us/.

sides of the vessel in symbols at least 12 inches high and one inch wide that contrast with the background color (5 AAC 39.119). Commercial charter vessels carrying and guiding sport fishers also must have specific authorization in the form of: (1) a current Alaska Sport Fish License (and a king salmon stamp if applicable), (2) a current U.S.C.G. Operator's license if operating a motorized vessel on navigable waters (determination of navigable waters is made by the U.S. Coast Guard), and a current first aid card. Sport fishing guide businesses must also have a sport fishing operator's license, and the actual guide or charter operator must have a guide license (AS 16.40.260 and AS 16.40.270). Fishing guides must also be residents of the United States, Canada, Mexico or resident aliens. Guides operating on the Kenai River must meet additional qualifications include attending a one-week orientation class. The NPFMC[239] adopted a limited entry program for the halibut sport charter industry operating in Southeast and Southcentral Alaska	
References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 10.3

States involved in the fishery shall, in accordance with international law, within the framework of sub-regional or regional fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their national jurisdiction.

FAO CCRF (1995) 8.1.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

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 fishes and ecologically-related species, including marine mammals, sea birds, and non-anadromous fish, in the high seas area of the North Pacific Ocean that are beyond national boundaries. The NPAFC coordinates salmon 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. 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 on climate change impacts.

Alaska also participates in the Pacific Salmon Treaty Process through its membership, along with other U.S. states, the U.S. federal government and Canada, on the Pacific Salmon Commission (PSC). The PSC is the body formed by the governments of Canada and the United States to implement the Pacific Salmon Treaty.

The Commission gives both countries a forum through which to resolve their difficult salmon management problems.

Evidence:

The NPAFC[240], 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 fishes and ecologically-related species, including marine mammals, sea birds, and non-anadromous fish, in the high seas area of the

[239] http://www.npfmc.org/halibut-charter-management/

[240] http://www.nmfs.noaa.gov/ia/intlagree/docs/NPAFC_IA_BOOK.pdf.

North Pacific Ocean that are beyond national boundaries. The NPAFC coordinates salmon 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. 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 on climate change impacts. 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 North Pacific Ocean. In addition, new high tech tags are being used to track the migratory behavior of salmon on the high seas The NPFMC works closely with ADFG and the BOF to coordinate fishery management programs in state and federal waters off Alaska to address fish habitat concerns, catch limits, allocation issues and other management issues. The enabling legislation for the NPFMC process was the 1976 Fishery Conservation and Management Act (aka Magnuson-Stevens Act) which was intended to: prevent overfishing; base fishery decisions on the best scientific data; manage individual stocks throughout their range; allocate fairly between residents of different states; promote efficiency, minimize costs and avoid duplication; take into account the importance of fishery resources to communities and minimize adverse impacts to them; and minimize bycatch of non-target species and the fishing mortality associated with it.

Alaska also participates in the Pacific Salmon Treaty Process through its membership, along with other U.S. states, the U.S. federal government and Canada, on the Pacific Salmon Commission (PSC). The PSC is the body formed by the governments of Canada and the United States to implement the Pacific Salmon Treaty. The Commission gives both countries a forum through which to resolve their difficult salmon management problems[241].

References:	

Non-Conformance Number (if relevant)	**NA**

[241] http://www.psc.org/index.htm.

Supporting Clause 10.3.1

States which are members of or participants in sub-regional or regional fisheries management organizations or arrangements shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants which engage in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, Port States shall also proceed, as necessary, to assist other States in achieving the objectives of the FAO CCRF (1995), and should make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State.

FAO CCRF (1995) 7.7.5/8.3.1

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence: Supporting clause 10.3.1. is NOT APPLICABLE to Alaska Salmon Fisheries as it is not a high seas fishery and there are no flagged vessels in operation.				
Evidence:				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 10.4

Flag States shall ensure that no fishing vessels entitled to fly their flag fish on the high seas or in waters under the jurisdiction of other States unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish.

FAO CCRF (1995) 8.2.2

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence: Supporting clause 10.4. is NOT APPLICABLE to Alaska Salmon Fisheries as it is not a high seas fishery.				
Evidence: Supporting clause 10.4. is NOT APPLICABLE to Alaska Salmon Fisheries as it is not a high seas fishery.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 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.

FAO CCRF (1995) 8.2.3

Evidence Rating:	Low ☐	Medium ☐		High ☐
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☐
Summary Evidence: Supporting clause 10.4.1. is NOT Applicable to Alaska Salmon Fisheries as it is not a high seas fishery.				
Evidence: Supporting clause 10.4.1 is Not Applicable to Alaska Salmon Fisheries as it is not a high seas fishery. There are no Alaskan Fisheries in Canada. Fishing in the SEAK drift gill net fisheries occur in five traditional fishing districts located in the inside waters of Southeast Alaska. Hatcheries contribute significant amounts of chum, coho and sockeye salmon to the drift gillnet fisheries. However, there are transboundary stocks on the Taku and Stikine River for Chinook salmon in May through early June under agreements with Canada on joint management and harvest sharing of the runs. Chum and sockeye salmon typically represent the highest total ex-vessel value to the drift gillnet fisheries. Similar arrangements via the U.S./Canada Pacific Salmon Treaty occur on the Yukon, although there are no high seas fisheries or flagged vessels.				
References:				
Non-Conformance Number (if relevant)				NA

7.11. Fundamental Clause 11

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

FAO CCRF (1995) 7.7.2/8.2.7

No. Supporting clauses/sub-clauses	3
Supporting clauses applicable	3
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 11.1

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Alaska's salmon fisheries are managed by ADFG, pursuant to Alaska Statutes Title 16 (AS16) and Alaska Administrative Code Title 5 (AAC5). These laws and regulations are enforced by the Alaska Department of Public Safety, Alaska State Troopers, and Division of Wildlife Troopers. The division coordinates with, and is supported by, law enforcement personnel from USCG and NMFS Office of Law Enforcement. US Forest Service and USFWS enforcement also work with the division on enforcement of fish and game regulations (both state and federal) on federal public lands and waters. Penalties for violations of Alaska salmon fisheries laws and regulations include citations, fines, forfeiture of equipment, and revocation of licenses.

Evidence: Alaska's salmon fisheries are managed by ADFG, pursuant to Alaska Statutes Title 16 (AS16)[242] and Alaska Administrative Code Title 5 (AAC5)[243]. These laws and regulations are enforced by the Alaska Department of Public Safety, Alaska State Troopers, and Division of Wildlife Troopers (AWT)[244]. AWT coordinates with, and is supported by, law enforcement personnel from USCG[245] and NMFS Office of Law Enforcement (OLE)[246]. US Forest Service and USFWS enforcement also work with AWT on the enforcement of fish and game regulations (both state and federal) on federal public land.
Here below are presented some of the statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

AS 16.05.165. Form and issuance of citations
AS 16.05.170 Power to execute warrant
AS 16.05.180 Power to search without warrant
AS 16.05.190 Seizure and disposition of equipment
AS 16.05.195 Forfeiture of equipment
AS 16.05.332 Wildlife Violator Compact

[242] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16.htm
[243] http://www.touchngo.com/lglcntr/akstats/aac/title05.htm
[244] http://www.dps.state.ak.us/awt/
[245] http://www.nmfs.noaa.gov/ole/
[246] http://www.uscg.mil/d17/

AS.16.05.410 Revocation of license AS 16.05.710 Suspension of Commercial License and Entry Permit AS 16.05.722 Strict liability commercial fishing penalties AS 16.05.723 Misdemeanour commercial fishing penalties AS 16.05.896 Penalty for causing material damage AS 16.05.901 Penalty for violations of AS 16.05.871 – AS 16.05.896. AS 16.05.030 Penalty for violation of 16.10.010-16.10.050 AS 16.10.090 Penalty for violation of AS 16.10.090 AS 16.10.220 Penalty for violation of AS 16.10-200-16.1-.210 AS 16.10.790 Fines AS 16.40.290 Penalty AS 16.34.850-895 Point system for commercial fishing violations in salmon fisheries AS 16.43.960 Commission revocation or suspension of permits AS 16.43.970 Penalties

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 11.2

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

FAO CCRF (1995) 7.7.2/8.1.9/8.2.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

The Alaska Department of Public Safety, Alaska State Troopers Division of Wildlife Troopers (AWT) in the Department of Public Safety continues to be charged with protecting the state's natural resources through reducing illegal harvest, waste and illegal sale of commercially and sport harvested fish, and by safeguarding fish and wildlife habitat. The structure of ADFG, with management authority instilled at the area office level, allows it to monitor, control and enforce compliance with fishery regulations and emergency orders. Area Management Biologists are on the scene to actually watch the prosecution of the fishery in their area through aerial surveys and on-the ground observations.

There are existing statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

Evidence:

The Alaska Department of Public Safety, Alaska State Troopers Division of Wildlife Troopers (AWT) in the Department of Public Safety continues to be charged with protecting the state's natural resources through reducing illegal harvest, waste and illegal sale of commercially and sport harvested fish, and by safeguarding fish and wildlife habitat. The structure of ADFG, with management authority instilled at the area office level, allows it to monitor, control and enforce compliance with fishery regulations and emergency orders. Area Management Biologists are on the scene to actually watch the prosecution of the fishery in their area through aerial surveys and on-the ground observations.

Here below are presented some of the statutes that enable the government to fine, imprison, and confiscate equipment for violations and restrict an individual's right to fish if convicted of a violation.

AS 16.05.165. Form and issuance of citations
AS 16.05.170 Power to execute warrant
AS 16.05.180 Power to search without warrant
AS 16.05.190 Seizure and disposition of equipment
AS 16.05.195 Forfeiture of equipment
AS 16.05.332 Wildlife Violator Compact
AS.16.05.410 Revocation of license
AS 16.05.710 Suspension of Commercial License and Entry Permit
AS 16.05.722 Strict liability commercial fishing penalties
AS 16.05.723 Misdemeanour commercial fishing penalties
AS 16.05.896 Penalty for causing material damage
AS 16.05.901 Penalty for violations of AS 16.05.871 – AS 16.05.896.
AS 16.05.030 Penalty for violation of 16.10.010-16.10.050
AS 16.10.090 Penalty for violation of AS 16.10.090
AS 16.10.220 Penalty for violation of AS 16.10-200-16.1-.210
AS 16.10.790 Fines
AS 16.40.290 Penalty
AS 16.34.850-895 Point system for commercial fishing violations in salmon fisheries
AS 16.43.960 Commission revocation or suspension of permits
AS 16.43.970 Penalties

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 11.3

Flag States shall take enforcement measures in respect of fishing vessels entitled to fly their flag which have been found by them to have contravened applicable conservation and management measures, including, where appropriate, making the contravention of such measures an offence under national legislation.

FAO CCRF (1995) 8.2.7

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Alaska's salmon fisheries are managed by ADFG, pursuant to Alaska Statutes Title 16 (AS16) and Alaska Administrative Code Title 5 (AAC5). These laws and regulations are enforced by the Alaska Department of Public Safety, Alaska State Troopers, and Division of Wildlife Troopers (AWT). AWT coordinates with, and is supported by, law enforcement personnel from USCG and NMFS.

Evidence:
Alaska's salmon fisheries are managed by ADFG, pursuant to Alaska Statutes Title 16 (AS16)[247] and Alaska Administrative Code Title 5 (AAC5)[248]. These laws and regulations are enforced by the Alaska Department of Public Safety[249], Alaska State Troopers, and Division of Wildlife Troopers (AWT)[250]. AWT coordinates with, and is supported by, law enforcement personnel from USCG[251] and NMFS[252].

The salmon management program conducted by ADFG is a responsive and adaptive program that monitors salmon abundance during the fishing season and makes continual adjustments in fishing time and area based on observed escapements, commercial fishery performance (e.g., catch per unit of effort), test fishing, biological data on age, sex and size, historical run timing curves and other data. The structure of ADFG, with management authority instilled at the area office level, allows it to monitor, control and enforce compliance with fishery regulations and emergency orders. Area Management Biologists are on the scene to actually watch the prosecution of the fishery in their area through aerial surveys and on-the-ground observations. Area and regional staff biologists are deputized law enforcement officers trained to assist Alaska Wildlife Troopers (AWT) with law enforcement activities. ADFG has instituted an on-going training and refresher class to keep deputized staff up-to-date on enforcement techniques.

The Division of Wildlife Troopers in the Department of Public Safety is charged with protecting the state's natural resources through reducing illegal harvest, waste and illegal sale of commercially and sport harvested fish, and by safeguarding fish and wildlife habitat. Wildlife Troopers cover all areas of the state with detachments and/or posts in the communities. The troopers in these locations have numerous patrol vessels, small watercraft, fixed–wing aircraft, helicopters, trucks, snow-machines, and all-terrain-vehicles for use in meeting their law enforcement responsibilities.

The U.S. Coast Guard (USCG) also enforces boating safety laws and fishing vessels are often under surveillance by AWT and the USCG during fishing operations. The US Forest Service and USFWS enforcement

[247] http://www.touchngo.com/lglcntr/akstats/Statutes/Title16.htm
[248] http://www.touchngo.com/lglcntr/akstats/aac/title05.htm
[249] http://www.cf.adfg.state.ak.us/
[250] http://www.dps.state.ak.us/awt/
[251] http://www.uscg.mil/d17/
[252] http://www.nmfs.noaa.gov/ole/

also work with AWT on the enforcement of fish and game regulations (both state and federal) on federal public land. USCG and AWT enforcement efforts are generally focused on violations that would do harm to the resource or those that create an unfair economic advantage to the violator. Trends in the incidence of these types of violations are monitored closely. The objective of regulatory enforcement is to ensure compliance. The cooperation of the public and fishing industry is cultivated through programs such as AWT's Fish and Wildlife Safeguard program, which encourages the reporting of fish and wildlife violations and increases the outreach of enforcement agencies.
11.2/11.4.

Fishing permit requirements:
By law (Alaska Statues, or AS), all Alaska salmon fishing vessels are required to be licensed by the State of Alaska, and to display their permanent vessel license plate.
The fishing gear itself must be marked in accordance with state regulations (Alaska Administrative Code, or AAC), which are specific to each fishing region. Also, there are region-specific regulations which require how salmon fishing vessels must display their names and permit numbers.
Sources of evidence –
AS 16.05.510. Unlicensed vessel unlawful
AS 16.05.520. Number plate
5 AAC 06.334. Identification of gear AAC 06.343. Vessel identification
ADFG and AWT inspect the catch and landing records of both harvesters and processers, and monitor the fishing permits required of harvesters and their crew members.
Similarly to ADFG Area Biologists, the presence of Wildlife Troopers in all major and many minor communities in the state provides them almost immediate opportunity to monitor fishing activities across the state. ADFG and AWT inspect the catch and landing records of both harvesters and processers, and monitor the fishing permits required of harvesters and their crew members.
Alaska Wildlife Troopers supplied the assessment team with information regarding the number of boardings, number of violations detected, types of violations in the past 12 months, and overall level of compliance:

- 1243 commercial salmon fishing vessel boardings – this number would generally only include vessels boarded where no offenses were charged as a result of the boarding.
- 165 incidents which document offenses charged for commercial salmon fishing regulations which are specific to the 15 salmon fishing management areas. Those areas include: Artic-Kotzebue, Norton Sound-Port Clarence, Yukon, Bristol Bay, Kuskokwim, Alaska Peninsula, Atka-Amlia Islands, Aleutian Islands, Chignik, Kodiak, Cook Inlet, Prince William Sound, Yakutat, and Southeastern Alaska Areas. The majority of offenses are related to commercial fishing in closed waters and commercial fishing during a closed period. It also includes offenses related to illegal gear.
- 83 incidents were documented on offenses related to state-wide statutes and regulations related to commercial salmon fishing. The majority of these offenses are related to licensing requirements, as well as gear marking requirements.

Commercial fishing patrol during the period June 1, 2015 through August 1, 2015. In most areas of Alaska, during this date range, commercial fishing enforcement activity is primarily focused on salmon fisheries. This data revealed 6,216 contacts with commercial fisheries participants, 393 warning given to these contacts and 384 citations issues. Calculating a violation rate from these statistics indicates violations discovered during commercial fishing contacts occur at a 12.5% rate.

References:	

Non-Conformance Number (if relevant)	**NA**

Section F: Serious Impacts of the Fishery on the Ecosystem

7.12. Fundamental Clause 12

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

FAO CCRF (1995) 7.2.3/8.4.7/8.4.8/12.11
FAO ECO (2009) 29.3/31
FAO Eco (2011) 41-41.4

No. Supporting clauses/sub-clauses	16
Supporting clauses applicable	16
Supporting clauses not applicable	0
Non Conformances	0

Supporting Clause 12.1

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

FAO CCRF (1995) 7.2.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Both policy and management explicitly recognize the influence of variable environmental conditions on salmon stocks in Alaska. The influences of climatic, oceanographic and ecological factors on salmon growth and survivorship are considered by ADF&G during development of escapement goals that are used to manage fisheries and inform recovery goals for depressed stocks.

Evidence:

Alaska's Policy for Management of Sustainable Salmon Fisheries (5 AAC 39.222) includes provisions that address the potential effects of environmental and ecological changes on target stocks, and sustainable harvest of them, in that it mandates salmon fisheries be managed to provide escapements within ranges necessary to conserve and sustain salmon production and to maintain normal ecosystem functioning. This policy further 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". Potential ecological effects on salmon stocks are considered by ADF&G during the establishment of annual escapement goals for each stock. Salmon stocks presenting less than desired abundance levels are classified at each regulatory cycle as (in order of increasing concern): yield concern, management concern and conservation concern. ADF&G fisheries managers consider these classifications and stock status changes when establishing harvest and conservation plans.

The influence of environmental variability on adult salmon returns is considered by ADF&G in their annual run forecast and harvest projections. For example, Brenner and Munro (2016) speculated that recent warm

temperature anomalies in the Gulf of Alaska and Northern Pacific may impact growth and survivorship of juvenile pink and chum salmon, and increase the uncertainty of adult return forecasts. According to their report (Brenner & Monro, 2016), Coghill Lake sockeye may similarly be affected by recent changes in ocean conditions. Munro & Volk (2016) list and describe the various methods used by ADF&G to forecast spawner recruitment. Among these is the "Zooplankton Model", which explicitly considers the influence of variable zooplankton biomass on subsequent adult recruitment for sockeye salmon.

The role of Pacific salmon in marine food webs has been and continues to be intensively studied, as further described in Supporting Clause 12.7. In brief, Pacific salmon feed on diverse species of squid, forage fish and zooplankton, and the abundance of these prey (and, consequently, the salmon that feed on them) vary significantly among years (Brodeur, 1992) in response to dynamic marine environmental conditions. The Pacific Decadal Oscillation (Mantua et al., 1997), El Niño (Beamish et al., 1999), spring transition timing (Peterson and Keister, 2003) are all known to affect marine productivity off the coast of Alaska and across broad scales. Under some conditions, prey resources may be limiting to the point that competition at sea occurs among Pacific salmon (Helle et al., 2007; Ruggerone et al., 2007; Ruggerone et al., 2012; Ruggerone and Connors, 2015) and between salmon and other species (Springer and Vliet, 2014).

References:

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.

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

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.

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

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.

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.

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. 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., 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.

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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.2

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

FAO CCRF (1995) 7.2.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska's Policy for Management of Sustainable Salmon Fisheries prioritizes the protection of freshwater and marine habitats. This policy is codified by Alaska Statutes 1605.841-871 and implemented through regulations enforced by ADFG that protect the freshwater habitats of anadromous fishes. MARPOL and U.S. policies and law provide due protections to marine habitats used by Pacific salmon.

Evidence:

Alaska's Policy for Management of Sustainable Salmon Fisheries (5 AAC 39.222) establishes the principle that wild salmon stocks and salmon habitats should be maintained at levels of resource productivity that assure sustained yields; and that salmon spawning, rearing and migratory habitats should be protected such that:

- Salmon habitats not be perturbed beyond natural boundaries of variation
- Scientific assessments of possible adverse ecological effects of proposed habitat alterations and the impacts of the alterations on salmon populations should be conducted before approval of a proposal
- Adverse environmental impacts on wild salmon stocks and the salmon's habitats should be assessed

As established by Alaska Statutes 1605.841-871, it is ADF&G's responsibility to protect freshwater anadromous fish habitat and free passage in fresh water bodies. Any individual or organization that intends to conduct an activity or project below the ordinary high water mark of an anadromous stream requires a Fish Habitat Permit, contingent upon an assessment by ADF&G that concludes the project or activity is consistent with the protection of anadromous fish. If a person or governmental agency begins construction on a project or use for which notice is required by AS 16.05.871, without first providing plans and specifications subject to the approval of the commissioner for the proper protection of fish and game, and without first having obtained written approval of the commissioner as to the adequacy of the plans and specifications submitted for the protection of fish and game, the person or agency is guilty of a misdemeanor. If a person or governmental agency is convicted of violating AS 16.05.871-16.05.896 or continues a use, work, or project without fully complying with AS 16.05.871-16.05.896, the use, work, or project is designated a public nuisance and subject to abatement. The cost of restoring a specified river, lake, or stream to its original condition shall be borne by the violator and shall be in addition to the penalty imposed by the court.

Anthropogenic impacts to the Alaskan marine environment can also adversely affect Pacific salmon, and these are assessed and corrected in accordance with MARPOL, and U.S. environmental policies and law. Moreover, Alaska's MSSF (5 AAC 39.222) states that "all essential salmon habitat in marine, estuarine and freshwater ecosystems and access of salmon to these habitats should be protected", and that "adverse

environmental impacts on wild salmon stocks and the salmon's habitats should be assessed".

The 1989 Exxon Valdez oil spill in PWS provides an extreme example of an anthropogenic environmental impact on Alaskan salmon. Vast areas of coastline were contaminated by the near 11 million gallons of crude oil spilled by the Exxon Valdez, polluting both the spawning grounds and affecting the prey base of multiple species. Following extensive litigation, Exxon has to date spent over $4.3 billion toward compensatory payments, clean-up and restoration, settlements and fines. Although many species have not yet recovered from this environmental disaster, pink and sockeye salmon were declared "recovered" in 1999 and 2002, respectively[253].

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.3

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

FAO Eco (2009) 30.4, 31, 31.4
FAO Eco (2011) 41.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The most probable impacts from the Alaskan commercial salmon fishery are potential risks from hatchery-reared salmon to and potential overfishing of wild salmon stocks. These risks are considered by managers and information is obtained through hatchery marking programs, directed research and monitoring of fishery catch contributions.

Evidence:
ADFG, NOAA Fisheries, non-governmental, university and other organizations formally consider a variety of potentially adverse impacts that Alaskan commercial salmon fisheries might cause to associated ecosystems and the environment. Foremost among concerns are potentially adverse effects from hatcheries and harvest on wild salmon stocks.

Hatcheries

Alaskan commercial salmon fisheries are enhanced through the production and harvest of pink, chum, sockeye, Chinook and coho salmon. Recent genetic pedigree studies of various Pacific salmon species have revealed that interbreeding between hatchery- and wild-origin fish can reduce the fitness of the latter (Christie et al., 2014). Such interbreeding can occur when hatchery fish stray onto spawning grounds occupied by wild fish, or when hatchery fish are intentionally allowed to supplement wild production. However, consistent with Alaska's MSSF (5 AAC 39.222) and Alaska Statute 16.10.420, most salmon

[253] Exxon Valdez Oil Spill Restoration Plan: 2010 update Injured resources and services (http://www.evostc.state.ak.us/static/PDFs/2010IRSUpdate.pdf)

hatcheries in Alaska are sited away from areas of major natural production, so as to reduce potential ecological and genetic risks from hatchery strays (Heard 2012). Even in cases where hatcheries are sited near naturally spawning populations, hatchery stray rates onto wild spawning grounds can be very low. In the Copper River no hatchery sockeye strays were found (Bidlack and Valentine, 2009). Nevertheless, in their evaluation of stray rates by Alaskan hatchery pink and chum salmon, Brenner et al. (2012) found that the level of hatchery salmon strays exceeded proposed thresholds (2-10%) in many areas of Prince William Sound. Jasper et al. (2013) used genetic analyses to evaluate the level of introgression in chum salmon mediated by hatchery strays and found evidence for shifts toward hatchery allele frequencies in some populations, but not in others. Ongoing research by the non-governmental PWSCC is investigating the effects that Alaskan hatchery pink and chum salmon may have on the fitness of wild stocks[254].

Harvest

The impacts of harvest on wild stocks of Alaskan salmon is closely monitored and managed by ADFG. This is achieved primarily through in-season assessments of wild (unmarked) fractions observed in catch and wild fish escapement estimates derived through a variety of survey and count methods, including aerial, sonar and tower. In-season test fisheries are commonly used to evaluate the strength of target and protected stocks, allowing managers to inform, direct, and restrict fishing efforts so as to meet spawner escapement goals and maintain harvests. Otolith analyses, performed by ADFG's Mark Lab, allow managers to estimate the relative contributions of wild stocks to specific fisheries. In some cases, test fisheries are coordinated with genetic analyses (e.g. Port Moller) to provide near real-time stock composition data, which ADF&G uses to direct harvest and guide other salmon fishery management decisions[255].

References:	Bidlack, A., and E. M. Valentine. 2009. Assessment of Gulkana hatchery sockey 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. 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 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. 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

Non-Conformance Number (if relevant)	**NA**

[254] http://pwssc.org/research/fish/hatchery-wild-salmon-interactions/

[255] ADF&G Gene Conservation Laboratory
http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.bbaysockeye_application

Supporting Clause 12.4

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

FAO Eco (2009) 29.3, 29.4, 31
FAO Eco (2011) 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
The potential ecological and genetic risks posed by hatchery salmon to wild populations is the subject of several ongoing research projects that are evaluating the stray and genetic introgression rates of hatchery pink and chum salmon. Potential impacts from hatchery programs and harvest on wild salmon abundance is routinely monitored through state mandated spawner escapement surveys.

Evidence:
Hatchery salmon can have potentially negative effects on wild populations through ecological and genetic interactions (Kostow 2009; Naish et al. 2008). Hatchery fish can compete for food, spawning habitat and other resources, transfer disease, and may reduce the fitness of wild fish when interbreeding occurs (Christie et al. 2014). Alaska Statute 16.10.420.10 was designed to limit ecological and genetic risk from hatchery salmon, in that it requires for permit issuance 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".

The effectiveness of Alaska's hatchery siting policy as a means to segregate hatchery and wild salmon stocks is the subject of ongoing mark and monitoring programs, and research projects. Mass otolith thermal marking of nearly all hatchery-produced salmon in Alaska allows managers to estimate the contribution of hatchery stocks to regional fisheries, and these data are made publically available by ADF&G's Mark, Tag and Age Laboratory[256]. Otolith thermal marks also provide the opportunity to estimate the proportion of hatchery salmon on spawning grounds occupied by wild conspecifics. This approach has been applied in several recent studies and hatchery evaluations (Brenner et al. 2012; Piston and Heinl 2012a, 2012b), which have generally found that the proportion of hatchery fish on spawning grounds tends to decrease with distance from the nearest hatchery. For example, in their study of chum salmon in Southeast Alaska, Piston and Heinl (2012b) 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%)". This finding was consistent with their results from previous years' findings (Piston and Heinl 2012) whereby they concluded that "the overall proportion of hatchery strays was likely less than 5%". Accordingly, Alaska's approach and policy to site hatcheries away from areas of major natural production appears to reduce ecological and genetic risks from hatchery salmon. Research on this topic has received strong state and federal support, and the Prince William Sound and Sitka Sound Science Centers continue to

[256] ADF&G Mark, Tag, and Age Laboratory https://mtalab.adfg.alaska.gov/OTO/reports.aspx

evaluate the incidence rate and potential impacts from stray hatchery salmon in Prince William Sound[257] and Southeast Alaska[258].

The impacts of harvest on wild salmon populations in Alaska are closely monitored by ADF&G through adult escapement estimates, developed with data from systematic aerial surveys, tower counts, sonar counts, and mark-recapture methods and in accordance with Alaska's Policy for the Statewide Salmon Escapement Goals (AS 16.05.251). Adult escapement sufficient to support sustained yield is the first priority of salmon management in Alaska, as directed 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 also 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. Chinook salmon currently comprise the majority of stocks of concern in Alaska[259]. These stocks are managed by ADF&G with more conservative harvest goals, frequent in-season closures or restrictions and are the subject of ongoing research and recovery efforts funded through the Chinook Salmon Initiative[260]. Escapement goals and estimates for major salmon stocks are reported annually and were recently summarized for 2007-2015 by Munro and Volk (2016), who found that for years 2007-2014 an average 75% of salmon escapement goals were met. This percentage increased in 2015 to 88%.

References:

Bidlack, A., and E. M. Valentine. 2009. Assessment of Gulkana hatchery sockey 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.

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

Kostow, K. 2009. Factors that contribute to the ecological risks of salmon and

[257] http://pwssc.org/research/fish/hatchery-wild-salmon-interactions/
[258] http://www.sitkascience.org/research/chum-project/
[259] ADF&G's Salmon stocks of special status http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks
[260] The Chinook Salmon Initiative http://www.adfg.alaska.gov/index.cfm?adfg=chinookinitiative.main

steelhead hatchery programs and some mitigating strategies. Reviews in Fish Biology and Fisheries 19(1):9-31

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.

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

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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.5

Appropriate measures shall be applied to minimize:

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

FAO CCRF (1995) 7.6.9
FAO Eco (2009) 31.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
State and federal policies and regulations serve to minimize bycatch of non-target species in Alaskan commercial salmon fisheries, and utilize non-target, incidental catch in a sustainable manner. Management of gear type, season and location are strictly enforced by ADF&G to target specific salmon stocks. Although some impacts from the Alaskan commercial salmon fishery on endangered species, including marine mammals, are expected to occur, incidents of serious injury or mortality are mandatorily reported and are subject to take limits established by the National Marine Fisheries Service and U.S. Fish and Wildlife Service in accordance with the U.S. Endangered Species Act.

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". ADF&G uses test fisheries and in-season catch information to direct harvest efforts and protect weaker stocks.

Salmon fishing gears (purse seines, gillnets, and troll gear) cause minimal impact to non-target species and bycatch is generally not considered to be a major issue in most Alaskan salmon fisheries. Regulations define when and where fisheries occur and which types of fishing gear (e.g. mesh sizes, net lengths, number of

fishing lines, rods, and gurdies, etc.) can be used. Alaska maintains specific regulations for bycatch of non-target species. For example, all groundfish incidentally taken by hand and power troll gear in the Eastern Gulf of Alaska troll fishery may be legally retained, but only in accordance with state-defined restrictions (5 AAC 28.171) and annual fishery management plans (see also Supporting Clause 12.6).

For federally managed groundfish species, trollers are limited to strict federal retainable percentages that vary by area and fishery. For example, in the Alaska East Area, all groundfish incidentally taken by hand and power troll gear being operated to take salmon (and consistent with applicable laws and regulations) can be legally retained, but with the following restrictions:

- The bycatch allowance for DSR is limited to 10 percent of the round weight of all salmon on board the vessel. All DSR in excess of 10 percent must be weighed and reported as bycatch overage on an ADFG fish ticket. DSR bycatch overages must be reported on fish tickets but may be kept for a person's own use.
- Lingcod may be taken as bycatch in the commercial salmon troll fishery only from May 16 through November 30.
- Lingcod must measure at least 27 inches from the tip of the snout to the tip of the tail, or 20.5 inches from the front of the dorsal fin to the tip of the tail.

Impacts from Alaskan commercial salmon fisheries on non-fish species are regulated or restricted by federal laws and international accords, as follows:

Seabirds

Onboard observers employed through the marine mammal protection program collect data on interactions between Alaskan salmon fisheries and seabirds, which are protected under the Migratory Bird Act (MBA) and, in some cases, the U. S. Endangered Species Act (ESA). In brief, harmful interactions with birds are relatively rare for Alaskan salmon fisheries, as compared to trawl, gillnet and long-line fisheries for other species, which can have significant impacts on seabird populations (Moore et al. 2009).

Marine mammals

Marine mammals in Alaska are protected by the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.[261] General interaction with marine mammals in the Alaska salmon fisheries is limited and not considered to be of significant negative impact.

The NOAA List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental mortality or serious injury of marine mammals:

- **I, frequent** incidental mortality or serious injury of marine mammals,
- **II, occasional** incidental mortality or serious injury of marine mammals,
- **III, remote likelihood of/no known** incidental mortality or serious injury of marine mammals.

The Marine Mammal Protection Act (MMPA) mandates that each fishery be classified by the level of serious injury and mortality of marine mammals that occurs incidental to each fishery is reported in the annual Marine Mammal Stock Assessment Reports for each stock. Those participating in a Category I or II fishery

[261] NOAA Marine Mammal Protection Act. http://www.nmfs.noaa.gov/pr/laws/mmpa/

are required to accommodate an onboard observer upon request (50 CFR 229.7) and must comply with applicable take reduction plans. NMFS may develop and implement take reduction plans for any Category I or II fishery that interacts with a strategic stock. No category I salmon fisheries are present in Alaska.

Marine mammal interaction classifications for select Alaskan salmon fisheries are as:

- AK Bristol Bay Salmon Drift Gillnet Fishery, category II.
- AK Bristol Bay Salmon Set Gillnet Fishery, category II.
- AK Kodiak Salmon Set Gillnet Fishery, category II.
- AK Kodiak Salmon Purse Seine Fishery, category II.
- AK Cook Inlet Salmon Set Gillnet Fishery, category II.
- AK Cook Inlet Salmon Drift Gillnet Fishery, category II.
- AK Cook Inlet Salmon Purse Seine Fishery, category II.
- AK Peninsula/Aleutian Islands Salmon Drift Gillnet Fishery, category II.
- AK Peninsula/Aleutian Islands Salmon Set Gillnet Fishery, category II.
- AK Prince William Sound Salmon Drift Gillnet Fishery, category II.
- AK Southeast Salmon Drift Gillnet Fishery, category II.
- AK Yakutat Salmon Set Gillnet Fishery, category II.

Other category III (remote likelihood of/no known incidental mortality or serious injury of marine mammals) fisheries in Alaska exist, but are not listed here.

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.5.1

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

FAO ECO (2011) 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Several federal policies and associated law establish management guidelines and legal protections for endangered species that might be affected by the Alaskan commercial salmon fishery. These policies include the Magnuson-Stevens Act, the Marine Mammal Protection Act and the U.S. Endangered Species Act. ADF&G provides additional protections for species and salmon stocks of concern.

Evidence:

U.S. fisheries management, including that of Alaskan salmon fisheries, must be consistent with the Magnuson-Stevens Act, the Marine Mammal Protection Act and the U.S. Endangered Species Act. Each of these establishes management guidelines, objectives and legal protections for threatened and endangered species.

Birds and Mammals

Interactions between Alaskan commercial salmon fisheries with marine mammals and birds have been documented through NMFS' Alaska Marine Mammal Observer Program[262], which reports on these interactions, including incidental take of endangered species. Under the Marine Mammal Protection Act (MMPA), all Category I and II fisheries (see Supporting Clause 12.5) must be registered in the Marine Mammal Avoidance Program and report any injuries or mortalities of marine mammals to NMFS within 48 hours. All MMPA category fisheries are liable for incidental take of any ESA-listed species.

Fish

Salmon are highly migratory species, and Alaskan commercial salmon fisheries do interact with some stocks listed as "threatened" or " endangered" under the U. S. Endangered Species Act. Interactions of some of these stocks by Alaskan fisheries is regulated by NMFS and incorporated into the Alaska salmon fishery management plan[263] (FMP), collaboratively developed by NMFS and ADF&G. With regard to take of ESA-listed Chinook salmon that originate from Pacific Northwest states, the FMP states,

> "Because fish from Chinook salmon ESUs that have been listed as threatened or endangered occur in the southeast Alaska troll fishery, NMFS reviews the fishery under Section 7 of the ESA and, in association with the Biological Opinion, issues an incidental take statement that covers the ESA listed fish that are inadvertently and unknowingly taken in the fishery. The biological assessment has found that the take of listed ESUs in the fishery has been incidental to other stocks and a small percentage of the total mortality, either on a single year or cohort basis. To date, NMFS has found that this fishery is not likely to jeopardize the continued existence or recovery of ESA-listed species".

Alaska-origin salmon, which comprise the vast majority of the state's commercial salmon catch (Meacham & Clark 1994), include no species listed as "threatened" or "endangered" under the U. S. Endangered Species Act. Nevertheless, at the state level, ADF&G designates and manages to protect fish stocks of yield, management, and conservation concern.[264] In accordance with AS 16.05.251, escapement goals and protective management actions for salmon stocks are established by ADF&G, which intensively monitors adult escapement and reports on estimates (Munro & Volk 2016).

References:	Meacham, C. P. and J. H. Clark. 1994. Pacific salmon management – The view from Alaska. Alaska Fishery Research Bulletin 1(1):76-80 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.

Non-Conformance Number (if relevant)	**NA**

[262] Alaska Marine Mammal Observer Program

[263] Fishery management plan for salmon fisheries in the EEZ off Alaska http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP114.pdf

[264] State of Alaska special status species http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.akfishstocks

Supporting Clause 12.6

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

FAO Eco (2009) 31.1
FAO Eco (2011) 41.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Incidental catch in Alaskan commercial salmon fisheries occurs at a negligible level and all catch, including incidental catch of non-target species, must be reported to ADF&G and not exceed established harvest limits. 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. The Pacific Salmon Treaty requires accounting of such bycatch and uses this information to model the status and abundance of component stocks.

Evidence:
According to the Alaska salmon Fisheries Management Plan[265], 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. While the majority of these fish survive the hooking encounter, large numbers can be hooked and substantial mortality incurred. The Pacific Salmon Treaty requires accounting for the degree of such bycatch mortality, and the CTC uses this information in modelling the status and abundance of component stocks".

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 (e.g. Skannes and Hagerman 2016a; 2016b) and regulations. Commercial catch of target and non-target species must be reported to ADF&G, which has developed and uses electronic "fish tickets" and "eLandings" reporting tools, in addition to traditional paper catch records[266].

References:

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.

Skannes, P., and G. Hagerman. 2016b. 2016 Summer troll fishery management plan. Alaska Department of Fish and Game, Regional Information Report No. 1J16-06, Douglas, Alaska.

Non-Conformance Number (if relevant)	**NA**

[265] Fishery management plan for salmon fisheries in the EEZ off Alaska http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP114.pdf
[266] Commercial Fisheries Reporting Requirements http://www.adfg.alaska.gov/static-f/license/fishing/pdfs/reporting_requirements_2016.pdf

Supporting Clause 12.7

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

FAO Eco (2009) 31.2
FAO Eco (2011) 41.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Pacific salmon in Alaska have been the subject of extensive study, and their role in marine, freshwater and terrestrial food webs is well understood. Although salmon are not typically considered a key prey species in marine environments, they may serve as keystone species in some riparian and terrestrial environments, where diverse predators and scavengers feed on adult spawners. Escapement goals and management by ADF&G serve to protect the ecological services provided by salmon in Alaska's freshwater and terrestrial environments.

Evidence:

The feeding ecology and trophic roles of Pacific salmon have been and continue to be intensively studied and are relatively well understood. Pacific salmon are dominant mid-trophic species in the north Pacific Ocean and feed on a variety of prey, including squids, diverse forage fish, euphausiids, myctophids, copepods, amphipods and other zooplankton species (Brodeur 1990; Kaeriyama et al., 2004; Pearcy et al., 1988). There is substantial diet overlap among Pacific salmon species, though coho and Chinook may utilize nearshore food resources to a greater degree than their congeners (Kaeriyama et al., 2004; Johnson & Schindler 2009). Although Pacific salmon are depredated by diverse pinnipeds, cetaceans, birds and other fish species, they are not typically considered to be a key prey for other species (Ruzicka et al. 2016), nor is their abundance known to be limiting for these predators.

In freshwater and riparian environments, adult salmon are depredated or scavenged by many organisms (Willson & Halupka 1995), including iconic species such as bears, mink, and eagles (Gende & Quinn, 2004; Ben-David et al., 1997; Elliiott et al., 2011). Pacific salmon play a key role in shaping terrestrial ecosystems by transporting and depositing rich marine-derived nutrients into freshwater and riparian environments (Schindler et al., 2003). Escapement-based management used by ADF&G serves, in part, to preserve the ecological role of Pacific salmon in these environments. Salmon harvest and human visitation restrictions have been developed by ADF&G to provide additional protections where food web dynamics are particularly unique or sensitive, such as at Pack Creek and McNeil River bear feeding grounds.

References:

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

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

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

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. 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 Ruzicka, J. J., E. A. Daly, R. D. Brodeur. 2016. Evidence that summer jellyfish blooms impact Pacific Northwest salmon production. Ecosphere 7(4) 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 Willson, M. F. and K. C. Halupka. 1995. Anadromous fish as keystone species in vertebrate communities. Conservation Biology 9(3):489-497
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.8

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

FAO CCRF (1995) 8.7.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: MARPOL 73/78, the "International Convention for the Prevention of Pollution from Ships", applies to and is enforced in Alaskan waters.				
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., 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[267, 268].				

[267] Act to Prevent Pollution from Ships, 33 U.S.C §§ 1901–1915. https://www.law.cornell.edu/uscode/text/33/1901

[268] U.S. Government Accountability Office, Washington, D.C. (2000). "Progress Made to Reduce Marine Pollution by Cruise Ships, but Important Issues Remain." Report to Congressional Requesters. Report No. RCED-00-48. http://www.gao.gov/assets/230/228813.pdf

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.9

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

FAO Eco (2009) 31.3
FAO Eco (2011) 41.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Essential fish habitats (EFHs) for Alaskan salmon include marine and freshwater environments, designated and protected by the North Pacific Fishery Management Council, NMFS and ADF&G. Fishing and gear restrictions are in place to protect designated marine areas of EFH, as described in Fisheries Management Plan for the Salmon Fisheries in the EEZ off Alaska. Alaska's Policy for the Management of Sustainable Salmon Fisheries provides guidelines for the protection of freshwater habitats used by salmon, and this policy is implemented through the regulatory capacity of ADF&G, which restricts human activities and works in rivers and streams occupied by anadromous fishes. The Catalogue of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes, maintained by ADF&G, specifies which streams, rivers and lakes are important to anadromous fishes, including salmon.

Evidence:

The Magnuson-Stevens Act requires fishery management plans to describe and identify Essential Fish Habitat (EFH), minimize to the extent practicable adverse effects of fishing on EFH, and identify other actions to conserve and enhance EFH (16 U.S.C. 1853(a)(7)). Alaska has more than 50% of the U.S. coastline and leads the United States in fish habitat area and value of fish harvested. Major research programs aim to identify habitats that contribute to the survival, growth, and productivity of salmon, and to determine how to best manage and protect these habitats. Essential fish habitat (EFH) research support is based on priorities from the EFH Research Implementation Plan for Alaska. Around $450,000 is spent on EFH research projects each year. Project results are described in annual reports and peer-reviewed literature. Study results contribute to existing Essential Fish Habitat data sets[269]. All federal agencies must consult with NMFS regarding any action they authorize, fund, or undertake that may adversely affect EFH, and NMFS must provide conservation recommendations to federal and state agencies regarding any action that would adversely affect EFH. All significant permits and actions are subject to the Environmental Impact Statement (EIS) process, which not only requires thorough review by scientists and agencies, but also mandates thorough and comprehensive public information and transparency.

In 2005, the North Pacific Fishery Management Council (NPFMC) identified the entire U.S. Exclusive Economic Zone (EEZ; 200-nautical miles from shore) as essential fish habitat (EFH) for each of the five species of Pacific salmon found in Alaska. In order to better define EFH within the U.S. EEZ for Pacific salmon

[269] NMFS Essential Fish Habitat. http://www.afsc.noaa.gov/HEPR/efh.htm

found in Alaska, Echave et al. (2012) analyzed the influence of sea surface salinity (SSS), sea surface temperature (SST), and bottom depth on salmon distribution. By calculating and mapping the coincidence of the 95% range of each environmental variable (SSS, SST, depth) for each of the five species at each maturity stage, updated EFH descriptions were used by these authors to reduce the area of designated EFH for Pacific salmon by 71.3%, on average. In brief, juvenile salmon EFH generally consists of the water over the continental shelf within the Bering Sea extending north to the Chukchi Sea, and over the continental shelf throughout the Gulf of Alaska and within the inside waters of the Alexander Archipelago. Immature and mature Pacific salmon EFH includes nearshore and oceanic waters, often extending well beyond the shelf break, with fewer areas within the inside waters of the Alexander Archipelago and Prince William Sound. According to Echave et al. (2012), this was the first time that salmon data sets from multiple surveys, agencies, and years were accumulated and formatted for Pacific salmon distribution and habitat analysis.

The Fishery Management Plan (FMP)[270] for the Salmon Fisheries in the EEZ off Alaska contains detailed descriptions of essential fish habitats (EFH) for the five Pacific salmon that occur in the state's marine waters, and habitat areas of particular concern. The FMP relates that, "The EFH regulations at 50 CFR 600.815(a)(8) provide guidance on identifying habitat areas of particular concern (HAPCs). HAPCs are meant to provide greater focus to conservation and management efforts and may require additional protection from adverse effects. Fishery management plans should identify specific types or areas of habitat within EFH as HAPCs based on one or more of the following considerations:

1. the importance of the ecological function provided by the habitat;
2. the extent to which the habitat is sensitive to human-induced environmental degradation;
3. whether, and to what extent, development activities are, or will be, stressing the habitat type; or
4. the rarity of the habitat type.

Proposed HAPCs, identified on a map, must meet at least two of the four considerations established in 50 CFR 600.815(a) (8), and rarity of the habitat is a mandatory criterion. HAPCs may be developed to address identified problems for fishery management plans species, and they must meet clear, specific, adaptive management objectives.

The Council will initiate the HAPC process by setting priorities and issuing a request for HAPC proposals. Any member of the public may submit a HAPC proposal. HAPC proposals may be solicited every 5 years to coincide with the EFH 5-year review, or may be initiated at any time by the Council. The Council will establish a process to review the proposals. The Council may periodically review existing HAPCs for efficacy and considerations based on new scientific research.
Finally, Alaska's Policy for Management of Sustainable Salmon Fisheries 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". This policy is codified by the Anadromous Fish Act (AS 16.05.871-901), associated regulations[271] and implemented through a permitting process[272] overseen by ADF&G that limits human activities in freshwater habitats occupied by anadromous

[270] Fisheries Management Plan for the Salmon Fisheries in the EEZ off Alaska http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMPfinal1212.pdf
[271] Fish habitat regulations http://www.adfg.alaska.gov/index.cfm?adfg=habitatregulations.prohibited
[272] Fish habitat permits http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main

fishes. The Catalogue of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes[273], maintained by ADF&G, specifies which streams, rivers and lakes are important to anadromous fishes.	
References:	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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.10

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

FAO CCRF (1995) 8.4.8/ 7.6.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Recent published research has identified Alaskan commercial salmon fisheries as high-ranking with respect to the "triple bottom line" of community, ecological and economic sustainability. Salmon produced by hatcheries are released into open waters and are subject to common property fisheries, allowing diverse user groups access to fisheries resources. Research on coexistence theory suggests that conflict among user groups of Alaskan salmon is likely alleviated by state fisheries regulations that promote equity.

Evidence:

Responsible fishery management fosters economic, community and ecological sustainability, coined by Elkington (1997) as the "triple bottom line". In their triple bottom line assessment of 61 fisheries from diverse regions of the globe, Anderson et al. (2015) found Alaskan salmon fisheries to rank among the top, with exceptionally high scores for ecological and stock performance indicators.

Alaska's Policy for Sustainable Salmon Fisheries states that

> "Public support and involvement for sustained use and protection of salmon resources should be sought and encouraged as follows: A) effective mechanisms for dispute resolution should be developed and used; B) pertinent information and decisions should be effectively disseminated to all interested parties in a timely manner; C) the board's regulatory management and allocation decisions will be made in an open process with public involvement; D) an understanding of the proportion of mortality inflicted on each salmon stock by each user group, should be promoted, and the burden of conservation should be allocated across user groups in a manner consistent with applicable state and federal statutes, including AS 16.05.251(e) and AS 16.05.258; in the absence of a regulatory management plan that otherwise allocates or restricts harvests, and when it is necessary to restrict fisheries on salmon stocks where there are known conservation problems, the burden of conservation shall be shared among all fisheries in close proportion to each fisheries' respective use, consistent with state and federal law; E) the board will work with the commissioner and other agencies as necessary to assure that adequately

[273] Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes https://www.adfg.alaska.gov/sf/SARR/AWC/

funded public information and education programs provide timely materials on salmon conservation, including habitat requirements, threats to salmon habitat, the value of salmon and habitat to the public and ecosystem (fish and wildlife), natural variability and population dynamics, the status of salmon stocks and fisheries, and the regulatory process."

Loring (2016) provides a recent example of research that examines the way in which different Pacific salmon user groups, including commercial fishers, of Cook Inlet co-exist, as measured through adaptability, pluralism and equity. He reports on the state's successful application of management to reduce social conflict,

> "The fisheries vary notably in terms of the gear and fishing methods employed (Fig. 1a-d) and the locations where harvest occurs (Fig. 2). However, because these fisheries occur in serial, there is the possibility that a downstream group will create a bottleneck that reduces the success of upstream fishers, and this is ostensibly at the crux of the conflict. The existing management system currently works to avoid this problem; generally, fishing openings and closures are used to ensure escapement of sufficient salmon to spawning grounds, but strategic closures are also used to ensuring that up-stream groups have access to fish by limiting downstream commercial fishing opportunities. Commercial fisheries are never opened on Fridays, for example, to allow more fish into the river system on the weekends when anglers are most active. Current management plans also limit commercial fishing for pink salmon in August and include spatially strategic closures called conservation corridors to ensure passage of salmon to rivers and anglers further north."

References:

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

Elkington, J. 1997. Cannibals with Forks: The Triple Bottom Line of 21st Century Business. Capstone, Oxford. 402 pp. ISB 1-900961-27-X.

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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 12.11

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

FAO ECO (2011) 41.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

ADF&G sets harvest limits on incidental catch of non-target species and stocks. These limits are communicated through publication of regulations and fisheries management plans.

Evidence:

The impact of Alaskan commercial salmon fisheries on non-target species is regulated through fisheries management plans and monitored through catch records reported to the state. According to the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska,

> "Bycatch in the directed commercial salmon fisheries primarily consists of groundfish species and the incidental catch of immature salmon. State and federal management measures minimize bycatch to the extent practicable and minimize the mortality of bycatch.
>
> 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. Finally, the nature of the gear utilized in the troll fishery allows for discarded species to be released with limited mortality. Additional management measures are not necessary to document bycatch interactions within salmon fisheries."

Incidental catch in commercial purse seine and gillnet fisheries is primarily limited to non-target salmon species. Harvest limits for these species are established by ADF&G and communicated through fishery regulations according to region and gear[274]. Mandatory catch reporting and ADF&G's in-season management actions are used to safeguard non-target stocks from overfishing. The efficacy of this management approach is monitored through annual stock assessments and systematic spawner escapement surveys.

References:	
Non-Conformance Number (if relevant)	**NA**

[274] ADF&G Commercial Fisheries information by area, including commercial salmon fishery regulations http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.main

Supporting Clause 12.12

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

FAO ECO (2011) 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
NMFS and the USFWS establish "take" limits on species listed as threatened or endangered under the U.S. Endangered Species Act. Exceedance of allowable take by participants in Alaskan commercial salmon fishery is subject to prosecution and severe penalties.

Evidence:
The U.S. Endangered Species Act is intended to protect species that are in danger of extinction throughout all or a significant portion of their range. The U.S. Fish and Wildlife Service (USFWS) and NMFS maintain lists of species threatened or endangered with extinction. These species receive legal protections that prohibit their "take" (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or attempt any of these) or destruction of habitat critical to their survival. Impacts from Alaska commercial salmon fisheries on threatened and endangered species is monitored and regulated by NMFS with cooperation by ADF&G. Exceedance of allowable take by participants in Alaskan commercial salmon fishery is subject to prosecution and severe penalties.

In 2006, ADF&G's Threatened, Endangered, and Diversity Program[275] developed the state's Wildlife Action Plan, which includes lists species of greatest concern, habitat descriptions, conservation goals, conservation action plans, monitoring strategies and species-specific conservation targets (ADF&G, 2006). In 2015, ADF&G drafted a revision[276] of their plan, which is currently under review by the USFWS.

References:	ADF&G (Alaska Department of Fish and Game). 2006. Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources. Alaska Department of Fish and Game, Juneau, Alaska. Xviii+824 pp. Available at http://www.adfg.alaska.gov/static-f/species/wildlife_action_plan/cwcs_full_document.pdf

Non-Conformance Number (if relevant)	**NA**

[275] Threatened, Endangered, and Diversity Program http://www.adfg.alaska.gov/index.cfm?adfg=wildlifediversity.main
[276] Draft Alaska Wildlife Action Plan 2015 http://www.adfg.alaska.gov/static-f/applications/web/nocache/species/wildlife_action_plan/draft_alaska_wildlife_action_plan_2015.pdf045BC5697BB8479ECD7A7B747C94939E/draft_alaska_wildlife_action_plan_2015.pdf

Supporting Clause 12.13

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

FAO ECO (2011) 41.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Fisheries management plans and Alaska's Policy for the Management of Sustainable Salmon Fisheries provide clear management guidelines and outcome indicators for the protection of essential salmon habitats.				
Evidence: The FMP for Salmon Fisheries in the EEZ Off Alaska[277] includes descriptions of essential fish habitats (EFH) for Pacific salmon in Alaska, descriptions of habitat areas of particular concern (HAPC), conservation and enhancement recommendations for EFH and HAPC, related fishing restrictions, and a description of the review process for EFH and associated guidelines. Alaska's Policy for the Management of Sustainable Salmon Fisheries provides a clear benchmark for the protection of essential fish habitat, stating that, "salmon spawning, rearing and migratory habitats should be protected" and that "salmon habitats should not be perturbed beyond natural boundaries of variation" such that "wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yields". Also see evidence provided for Supporting Clause 12.9.				
References:				
Non-Conformance Number (if relevant)				**NA**

[277] Fisheries Management Plan for the Salmon Fisheries in the EEZ off Alaska http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMPfinal1212.pdf

Supporting Clause 12.14

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

FAO ECO (2011) 41.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Adult escapement goals and estimates serve as a metrics to gauge the performance of management aimed to protect the productivity of wild salmon and their role as a keystone species in riparian environments.				
Evidence: Although depredated in the marine environment by species that include harbor seals (*Phoca vitulina*), salmon sharks (*Lamna ditropis*), cormorants, and other species, Pacific salmon are not typically categorized as a key prey species for any single marine predator. However, salmon likely function as keystone species in freshwater and riparian environments, providing significant food resources to bear, mink, otters, eagles and many other species (Willson and Halupka, 1995). Their ecological role in these environments is managed and protected by ADF&G through quantitative adult escapement goals (Munro and Volk, 2016), designed to ensure sustainable wild salmon production, which in turn protects dependent predators.				
References:	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. Willson, M. F., and K. C. Halupka. 1995. Anadromous fish as keystone species in vertebrate communities. Conservation Biology 9(3):489-497			
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 12.15

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

FAO ECO (2011) 36.9, 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaskan salmon fisheries are managed on the principle of sustained yield, which serves as the primary outcome indicator for achieving management objectives that seek to minimize adverse impacts of the commercial fishery and associated hatcheries on the structure, processes and function of marine and aquatic ecosystems.

Evidence:

Enhancement for Alaskan commercial salmon fisheries is achieved through hatchery production of juvenile salmon that are released into open waters and subject to common property fisheries. Alaskan hatcheries and fisheries enhancement programs are governed by a permitting system that is designed to protect wild fish stocks and ensure sustainable harvest. Hatchery construction and operation is subject to a permit approval and annual review process administrated by ADF&G. Hatchery siting, ecological and fisheries impact, pathology, program size and appropriateness of the fish stock to be used are all evaluated during the hatchery permit application and review processes.

Alaska's practice of mass marking hatchery salmon allows managers to evaluate both the contribution of enhancement programs to harvest and the impact of hatchery salmon on wild stocks that can occur through interbreeding, competition and other ecological interactions.

Among the first principles of Alaska's Policy for Sustainable Salmon Fisheries is that management by the state maintains wild salmon stocks and their habitats at levels of resource productivity that assure sustained yield, and that salmon fisheries be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning. Accordingly, regional fish management plans establish escapement goals for major salmon bearing rivers in Alaska, and comprehensive in-season monitoring programs are used to assure that that escapement goals are met. Recently, Munro and Volk (2016) reviewed ADF&G's salmon escapement goals and estimated that ~75% of these goals had been met from 2007-2014, with an increase to 88% in 2015.

References:	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.

Non-Conformance Number (if relevant)	**NA**

7.13. Fundamental Clause 13

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

FAO CCRF (1995) 9.1.2/9.1.3/9.1.4/9.1.5/9.3.1/9.3.5
FAO Eco (2011) 36.9,38, 39, 40, 41, 43

No. Supporting clauses/sub-clauses	19
Supporting clauses applicable	19
Supporting clauses not applicable	0
Non Conformances	1

Supporting Clause 13.1

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

FAO CCRF (1995) 9.1.2
FAO Eco (2011) 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Alaskan commercial salmon fisheries harvest wild and hatchery-produced salmon, the latter being produced by private non-profit hatcheries that are permitted and regulated by the Alaska Department of Fish and Game. State sponsored research has and continues to focus on potential ecological and genetic effects from Alaskan salmon hatcheries, including investigations of competition, stray rates, and genetic introgression.

Evidence:
Aquacultural enhancement of Alaska's salmon fisheries, which began in the 1960s, is based on the operation of private non-profit, state-regulated hatcheries. In 2015, these hatcheries released 1.74 billion juvenile salmon into open public waters for commercial, recreational and tribal harvest, and about 93 million salmon were harvested by the Alaska commercial salmon fishery in the same year (Stopha 2016). The number of juvenile hatchery salmon released and adults returned to hatcheries has increased markedly over the past three decades, particularly during the period from 1985-2000 (Stopha, 2016; Figure below).

In accordance with Alaska's Policy for the Management of Sustainable Salmon Fisheries and the State's Finfish Genetics Policy[278], hatcheries in Alaska are typically sited away from major natural production areas, yet use locally-sourced fish to found and, in some cases, supplement hatchery broodstocks (Heard et al. 2012). These two measures (hatchery siting and broodstock sourcing) are intended to reduce the frequency and potentially negative genetic effects of hatchery-wild interactions that may occur when hatchery salmon stray onto natural spawning grounds. Alaskan hatcheries primarily use random mating practices and spawn relatively large numbers of adult spawners to maximize effective population sizes, maintain allelic diversity and further reduce

[278] Alaska Finfish Genetics Policy http://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

genetic risks from hatchery strays on wild salmon.

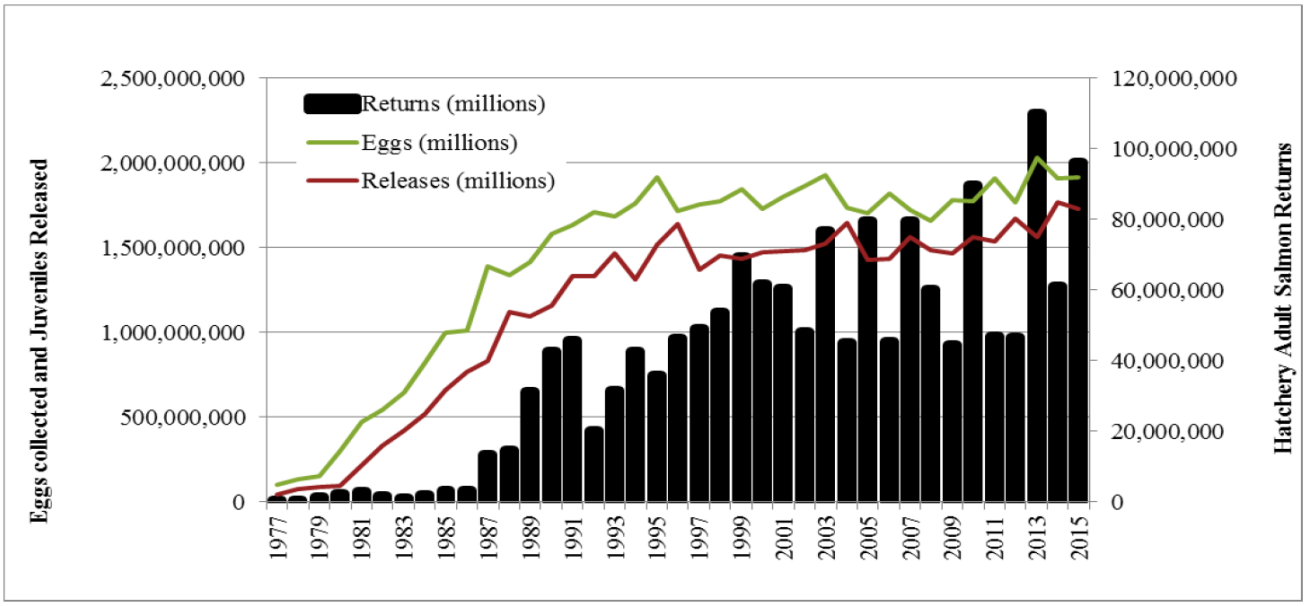

Figure 8. Total salmon eggs collected, juveniles released and adult returns for Alaska hatchery programs, 1977-2015. From Stopha (2016).

The effectiveness of Alaska's hatchery management practices toward minimizing adverse ecological and genetic effects on natural salmon populations are evaluated by Alaska Department of Fish and Game (ADF&G)[279] and partnering non-profit organizations, such as the Prince William Sound Science Center (PWSSC) and Sitka Sound Science Center (SSSC). In 2012, ADF&G organized a science panel comprised of federal and state fisheries managers, aquaculture representatives and university professors to identify critical research needed to evaluate potential impacts from pink and chum hatchery operations on wild populations. The panel proposed a series of studies, which were subsequently funded and are now providing information on the extant genetic structure of pink and chum salmon population, as well as stray and genetic introgression rates from neighboring hatchery populations[280,281]. Most recent results from these and related studies suggest that:

1. within SEAK and streams feeding into Prince William Sound, hatchery fish represent highly variable proportions of pink, chum and sockeye spawning populations, but streams within close proximity (i.e. a 20 km radius) of hatcheries contain the highest proportions of hatchery spawners (Brenner et al. 2012; Knudsen et al. 2015; Piston and Heinl 2012a, 2012b);
2. that Prince William Sound chum populations are spatially (and not interannually) structured and that
3. genetic introgression from hatchery populations appears to be better explained by overlap between hatchery and wild spawn timing than physical proximity (Jasper et al. 2013). With regard to ongoing genetic pedigree studies that evaluate potential fitness effects from stray hatchery salmon, ADF&G has stated that "as these studies provide results, we will evaluate and decide if any modifications to the [hatchery] program may be warranted"[282].

Competition is a central theme of ecology and can be defined as the negative interaction between organisms

[279] ADF&G Hatcheries Research: http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main
[280] SSSC Chum Project: http://www.sitkascience.org/research/chum-project/
[281] ADF&G Current Research: http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research
[282] Alaska Hatchery Research: http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main

that vie for a limited resource. The large scale of hatchery salmon production in Alaska has prompted questions, if not concerns, about the potential for competition among hatchery and wild salmon (Heard 1998). Several studies, some performed with state funding or collaboration, have addressed this question and provided both evidence for (Kaeriyama et al., 2004; Ruggerone et al., 2003; Ruggerone and Connors, 2012; Ruggerone et al., 2012, Knudsen et al 2015) and absence of (Sturdevant et al., 2012) competition for food among salmon in the marine environment. This topic is likely to receive continued research attention.

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

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

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.

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

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. 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., 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

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

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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.1.1

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

FAO CCRF (1995) 9.3.1
FAO Eco (2011) 36.9, 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska's Constitution, Policy for the Management of Sustainable Salmon Fisheries and Finfish Genetics Policy all serve as guiding documents for the sustainable management of Alaska's commercial salmon fisheries and associated hatchery programs. In accordance with the goal of sustainability, adult escapement is the first priority of management and is routinely monitored. Hatchery broodstocks are established with native stocks and cited away from areas of major natural production, so as to minimize genetic and ecological impacts to wild fish.

Evidence:

Section 4, Article 8 of Alaska's State Constitution states that "fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the Sate shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses". In support of this constitutional mandate, Alaska's Policy for the Management of Sustainable Salmon Fisheries (AS 5 AAC 39.222) 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 as follows:

- 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;
- Salmon escapement goals, whether sustainable escapement goals, biological escapement goals, optima 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;
- Salmon escapement goal ranges should allow for uncertainty associated with measurement techniques, observed variability in the salmon stock measure, changes in climatic and oceanographic conditions, and varying abundance within related population of the salmon stock measured;
- 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;
- Impacts of fishing, including incidental mortality and other human-induced mortality, should be assessed and considered in harvest management decisions;

- Salmon escapement and harvest management decisions should be made in a manner that protects non-target salmon stocks or species; the role of salmon in ecosystem functioning should be evaluated and considered in harvest management decisions and setting of salmon escapement goals;
- Salmon abundance trends should be monitored and considered in harvest management decisions."

Full-lifecycle cultivation of salmon for commercial purposes is prohibited in Alaska by state statute[283]. Instead, salmon fisheries in Alaska are enhanced through non-profit hatchery operations that release juvenile fish into open waters, whereby adult salmon may be harvested in recreational, commercial or tribal fisheries. In accordance with ADF&G's Genetic Policy[284], salmon produced by Alaskan hatcheries are descended 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 and thereby protect wild stocks.

Alaska's approach to salmon aquaculture likely limits many ecological risks to native fish populations, such as high parasite loads and disease, often associated captive-reared salmon. However, hatchery salmon may compete with wild salmon for food and other resources while at sea (Heard 1998; Ruggerone et al. 2003; Sturdevant et al., 2012; also see Supporting Clause 13.1). Mass marking of Alaskan hatchery salmon via otolith thermal bands facilitates evaluations of competition generated by hatchery salmon.

References:	Heard, W.R. 1998. Do hatchery salmon affect the North Pacific Ocean ecosystem? NPAFC Bulletin 1:405-411 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 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
Non-Conformance Number (if relevant)	**NA**

[283] Alaska Statute § 16.40.210: http://codes.lp.findlaw.com/akstatutes/16/16.40./03./16.40.210.
[284] State of Alaska Finfish Genetics Policy http://www.adfg.alaska.gov/static-f/fishing/PDFs/research/genetics_finfish_policy.pdf

Supporting Clause 13.2

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

FAO CCRF (1995) 9.1.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
ADF&G has the authority to issue permits for the construction, operation and modification of salmon hatcheries in the State of Alaska. The state reviews the potential ecological, fisheries and other impacts of proposed hatcheries before issuing a permit and has authority to revoke or deny permission for alterations to a permit. Hatcheries must submit annual reports of their activities to ADF&G.

Evidence:
The State of Alaska requires and ADF&G has the authority to issue (or revoke) Hatchery Permits[285] for the construction and operation of salmon hatcheries in Alaska. Hatchery Permits are obtained through an application process that includes:

- 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

Hatchery permits carry conditions to protect fish health and wild salmon stocks, such as requiring department approval of broodstock sources and release sites, and inspection of salmon before release.

According to Title 5 of the Alaska Administrative Code (5 AAC 40.820-40.830):

a) A hatchery operator shall manage the hatchery and its salmon returns in accordance with a basic management plan approved by the commissioner. Before the public hearing held under 5 AAC 40.210 on the proposed hatchery, department staff, in conjunction with the applicant, shall develop a draft basic management plan that includes a facility development schedule of no more than five years. Department staff and the applicant shall present the draft basic management plan and facility development schedule at the public hearing and shall make copies available for public review and comment at the hearing.
b) If, following the public hearing, the commissioner decides to issue a permit for the proposed hatchery, department staff shall finalize the basic management plan and facility development schedule after all comments have been considered. The final basic management plan, which includes a facility development schedule, describes the conditions under which the permit will be implemented, and is an addendum to the permit.
c) The permit holder shall notify the [Private Non-profit] coordinator when construction of the hatchery has been completed and the facility is ready for operation. The facility must be inspected

[285] ADF&G Salmon fisheries enhancement & hatcheries http://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.hatchery

and approved by the department before the permit holder may start operations.

Once a hatchery has been permitted, the permit holder may request a change to capacity, species, stock or release site through a Permit Alteration Request (PAR), typically filed by February 15th of the year in which it is to take effect. These requests are reviewed by regional planning teams that recommend their approval or denial.

Hatcheries must provide annual reports to ADF&G, documenting the numbers of brood and eggs taken, fish produced, release numbers and locations, and other pertinent data. Each hatchery must also prepare and submit an Annual Management Plan that describes eggtake, rearing and release goals. These plans are reviewed by the Regional Planning Team and require approval before execution.[286]

References:	
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.2.1

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

FAO CCRF (1995) 9.1.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
Alaska's Constitution and Policy for the Management of Sustainable Salmon Fisheries provide clear protections for common property salmon fisheries in Alaska, thereby safeguarding the livelihoods of local communities that utilize salmon as a resource. State and federal fishery management plans provide additional protections for common use of and maximum social benefit from Alaskan salmon fisheries.

Evidence:
In accordance with AS 16.10.410, a public hearing shall be held at least 30 days before the issuance of an Alaskan salmon hatchery permit. Hearings must be held in a central location in the vicinity of the proposed hatchery and announced in local media for weeks in advance. At a public hearing the permit applicant presents the plan for the proposed hatchery and members of the public are afforded the opportunity to be heard. Recommendations made by the public are recorded and ADF&G considers objections and recommendations, to which they are required to respond within a period of 10 days. This public hearings process aims, in part, to avoid or limit negative effects of salmon hatchery development on local communities.

Article 8, Section 3 of Alaska's State Constitution guarantees the common use of fisheries resources, such as ocean salmon. It states, "Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use". Following on this mandate, a primary goal of Alaska's Policy for the Management of Sustainable Salmon Fisheries is to "ensure conservation of salmon and salmon's required marine and aquatic habitats, protection of customary and traditional subsistence uses and other uses, and

[286] Annual management planning for Alaskan salmon hatcheries:
http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.annual

the sustained economic health of Alaska's fishing communities". As presented as evidence in Supporting Clause 12.10, a recent review by Anderson et al. (2015) of 61 fisheries from diverse global regions found Alaskan commercial salmon fisheries to rank very highly with respect to the triple bottom line of achieving economic, social and environmental sustainability.

The Fishery Management Plan (FMP) for Salmon Fisheries in the EEZ Off Alaska[287] further considers and manages to maximize benefits to local communities through Alaska's salmon fishery and enhancement activities. The fourth objective of the FMP is to "maximize economic and social benefits to the nation over time". The FMP states, " Economic benefits are broadly defined to include, but are not limited to: profits, income, employment, benefits to consumers, and less tangible or less quantifiable benefits such as the economic stability of coastal communities, recreational value, non-consumptive use value, and non-use value. To ensure that economic and social benefits derived for fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

- Control of fishing effort and salmon catches.
- Fair and equitable allocation of harvestable surplus of salmon.
- Economic impacts on coastal communities and other identifiable dependent groups (e.g., subsistence users).

This examination will be accomplished by considering, to the extent that data allow, the impact of management measures on the size of the catch during the current and future seasons and their associated prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits as defined in this section. Other benefits are tied to economic stability and impacts of commercial fishing, as well as, unguided and charter recreational fishing associated with coastal communities, subsistence fishing supporting traditional social and cultural 'communities,' and passive-use 'communities'."

References:	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

Non-Conformance Number (if relevant)	**NA**

[287] Fisheries Management Plan for the Salmon Fisheries in the EEZ off Alaska http://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMPfinal1212.pdf

Supporting Clause 13.3

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

FAO CCRF (1995) 9.1.5/9.2.5

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

ADF&G has the authority to issue permits for the construction, operation and modification of salmon hatcheries in the State of Alaska. The state reviews the potential ecological, fisheries and other impacts of proposed hatcheries before issuing a permit and has authority to revoke or deny permission for alterations to a permit. State statute AS 16.10.420 defines the conditions of approval for a salmon hatchery permit, which specifically considers the source, health and treatment of the cultured stock. Alaska's Finfish Genetics Policy provides additional guidelines for the establishment, maintenance and transport of hatchery salmon in Alaska.

Evidence:

Alaska statute AS 16.10.420 establishes the necessary conditions for approval of a hatchery operations permit as follows:

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 is 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.

ADF&G monitors compliance with these conditions through mandatory (annual) reporting from hatchery operators and on-site agency inspections.

Alaska's Finfish Genetics Policy is consistent with AS 16.10.420, in that it 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 to sites where the introduced stock may have significant interaction or impact on significant or unique wild stocks".

Intermingling of hatchery salmon with wild fish on spawning grounds can be quantified through survey efforts when hatchery fish are identifiable through marks or tags. As described in the next Supporting Clause (13.4), nearly all salmon produced by hatcheries in Alaska are otolith thermal marked and focused research efforts have used otolith marks to estimate stray rates of hatchery salmon stocks onto natural spawning grounds (Bidlack et al., 2009; Brenner et al., 2012; Piston and Heinl, 2012a; 2012b).

With respect to sustainable harvest management of hatchery and natural origin salmon, 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, Alaska's Policy for Statewide Salmon Escapement Goals (AS 16.05.251) charges ADF&G and the Board of Fisheries with the duty to conserve and develop Alaska's salmon fisheries on the sustained yield principle and to establish escapement goals for individual or aggregate populations, as can be reasonably enumerated by ADF&G. Munro and Volk (2016) provide a review of escapement goals and associated estimates for 2007-2015.

References:

Bidlack, A., and E. M. Valentine. 2009. Assessment of Gulkana hatchery sockey 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.

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.

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.

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 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.

FAO Eco (2011) 43

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☑	None ☐

Summary Evidence:

In most cases, hatchery salmon in Alaska are mass marked via artificial water temperature oscillations during egg incubation or early embryo stages, inducing otolith thermal bands. This procedure and subsequent sampling of harvested adult salmon allows state managers to evaluate the separate contributions of hatchery and wild salmon to the commercial fishery's catch. Kodiak Regional Aquaculture Association provides a noteworthy exception to this common practice, as it is does not mark all salmon produced at its Kitoi Bay and Pillar Creek hatcheries. Accordingly, the large numbers of chum and pink salmon produced by the Kitoi Bay facility cannot be distinguished from naturally produced salmon.

Evidence:

Otolith thermal marking is used extensively by Alaskan salmon hatcheries to allow for the identification of hatchery salmon in fisheries and on natural spawning grounds, thereby enabling managers to estimate the proportion of hatchery fish harvested in mixed-stock fisheries (Hagen et al. 1995), evaluate the influence of hatchery fish on wild salmon populations (Habicht et al. 2013), and make informed management decisions. ADF&G's Mark Recovery Laboratory analyses thousands of otoliths annually from test fisheries, commercial fisheries and escapement surveys, as well as voucher specimens from participating hatcheries. Data from these analyses are publically accessible through their website[288], which allows queries to be filtered by year, species and fishery district. Otolith thermal mark data are used by ADF&G managers to provide in-season salmon escapement estimates and adjust fisheries regulations as appropriate[289].

ADF&G also supports development and application of genetic tools which are used to assess impacts of fisheries and hatchery production on diverse stocks of Chinook, sockeye, chum and pink salmon. Studies of stock structure, genetic introgression and potential impacts of hatchery salmon on wild salmon fitness all serve to inform fisheries managers charged with upholding Alaska's statutes §16.10.400 and §16.10.420, which promote segregation and prohibit jeopardy from hatcheries on natural salmon stocks.

Stopha (2016) provided detailed hatchery contribution information for the 2015 Alaska commercial salmon fisheries of each region. The following is an excerpt from that document:

Southeast Alaska: The 8 million hatchery-produced salmon harvested in the commercial common property fishery in Southeast Alaska accounted for 18% of the total common property commercial catch in the region in 2015. By species, hatcheries contributed an estimated 81% of the chum, 30% of the coho, 20% of the Chinook, 4% of the sockeye, and 1% of the pink salmon in the common property commercial fisheries. An additional 2.5 million salmon were harvested for cost recovery. The ex-vessel value of hatchery fish to the commercial fishery (including cost recovery) was about $37 million, or 42% of the total ex-vessel value for commercial salmon fisheries in the region.

[288] ADF&G Mark Recovery Laboratory: http://mtalab.adfg.alaska.gov/OTO/default.aspx

[289] ADF&G News Release for August 13, 2014: http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/477280272.pdf

Coho salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (64,000 fish), followed by Chinook salmon (9,000 fish).

Prince William Sound: The 67 million hatchery-produced salmon harvested in the Prince William Sound commercial common property fishery accounted for 72% of the total common property commercial catch in the region in 2015. By species, hatcheries contributed an estimated 95% of the chum, 72% of the pink, 31% of the coho, and 49% of the sockeye salmon in the common property commercial fisheries. An additional 7 million salmon were harvested for cost recovery. The ex-vessel value of hatchery fish to the commercial fishery (including cost recovery) was about $79 million, or 67% of the total ex-vessel value for commercial salmon fisheries in the region.
Sockeye salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (61,000 fish), followed by coho salmon (42,000 fish) and pink salmon (11,000 fish).

Cook Inlet: The 144,000 hatchery-produced salmon harvested in the Cook Inlet commercial common property fishery accounted for 2% of the total catch in 2015. By species and number, hatchery contribution was an estimated 2% of the pink and 2% of the sockeye salmon in the common property commercial fisheries in 2015. An additional 2.2 million salmon were harvested for cost recovery. The ex-vessel value of hatchery fish to the commercial fishery (including cost recovery) was about $3.2 million, or 10% of the total ex-vessel value for commercial salmon fisheries in the region.

Sockeye salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (21,000 fish), followed by coho salmon (13,000 fish), pink salmon (2,000 fish) and Chinook salmon (2,000 fish).

It should be noted that the cost-recovery harvest of hatchery fish was larger than the common property harvest of hatchery fish in Cook Inlet because the Port Graham and Tutka Bay hatcheries both recently reopened. These facilities are rebuilding their broodstock capacity, and in 2015 only enough fish returned for broodstock and cost recovery. When these facilities reach their intended permitted production, the hatchery contribution to the common property fisheries should be more in line with the other regions of the state.

Kodiak: The 2.3 million hatchery-produced salmon harvested in the Kodiak commercial common property fishery accounted for 7% of the total catch in 2015. By species, hatchery contribution was an estimated 9% of the sockeye, 9% of the coho, 6% of the pink, and 5% of the chum salmon harvest in the common property commercial salmon fisheries. An additional 2.9 million salmon were harvested for cost recovery. The ex-vessel value of hatchery fish to the commercial fishery (including cost recovery) was about $4.5 million, or 12% of the total ex-vessel value for commercial salmon fisheries in the region.

Hatchery coho salmon contributed the most hatchery fish to the sport, personal use, and subsistence fisheries (1,700 fish), followed by Chinook salmon (1,400 fish).

Estimates of hatchery contributions to salmon fisheries, like those provided by Stopha (2016), and evaluations of hatchery impacts on wild populations, like those performed by Brenner et al., (2012), depend upon comprehensive or at least consistent mark rates by hatcheries. Although most salmon hatcheries in Alaska otolith mark all of the salmon they release, most salmon produced by the Kodiak Regional Aquacultural Association are not marked. Of these, the Kitoi Bay Hatchery produces sockeye, coho, pink and chum salmon and the Pillar Creek Hatchery produces sockeye, coho and Chinook salmon. In their 2011 evaluation of Pillar Bay Hatchery (Musslewhite, 2011a), ADF&G stated:

Unlike most regions of Alaska, hatchery salmon in the Kodiak region are not otolith marked or coded wire

tagged. However, such a program could provide valuable information to improve fisheries management and assess the success of PCH releases. For example, a marking and sampling program would help identify Spiridon Lake sockeye salmon in run reconstructions of Westside fisheries. To date, local fisheries managers have not felt that the need for marking and sampling warrants its considerable expense. Given the utility that such programs provide in other regions, the use of marking in Kodiak should continue to be considered.

ADF&G reiterated its view on the value of marking salmon in their Kitoi Bay Hatchery Evaluation (Musslewhite, 2011b):

Even though there appears to be little potential for substantial adverse effects, the lack of assessment and monitoring makes it difficult to confirm that assumption. A frequent criticism of hatcheries is the lack of concrete data with which to assess their interactions with wild fish. 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.

The use of marking and tagging programs has been a valuable source of information for assessing stock composition, stray rates, and the success of hatchery practices. However, no substantial marking or tagging programs are in use by either of the two Kodiak region hatcheries. Such programs have not been required by the department to date, largely because of the long history of production at KBH with no apparent negative effects. The benefits of marking may not be worth the considerable added expense, but a thorough examination of the costs and benefits would help in any future considerations of marking programs.

Kitoi Bay Hatchery is permitted for a capacity of 215 million pink salmon green eggs. This facility had been permitted for 28 million chum salmon eggs in 2013, but capacity was increased to 36 million eggs through a permit alteration request (PAR) to ADF&G that was approved in 2014. According to a document[290] by the Kodiak Regional Aquaculture Association, Kitoi Bay would begin otolith thermal marking chum salmon upon approval of the 2014 PAR approval. From that document:

“While there is no required marking program for chum salmon at KBH, all BY13 juveniles were marked this summer using differential water sources from Big Kitoi Lake (deep and shallow). KBH intends to mark all BY14 juveniles and acknowledges that marking will be contingent upon approval of the proposed PAR to increase permitted egg capacity at KBH to 36 million green eggs.”

KRAA will continue to thermally mark chum salmon and dry marking sockeye. There is no marking on pink or coho salmon production. The decision by the Kodiak Regional Aquaculture Association to not mark salmon produced by their hatcheries appears to be a deviation from standard practice in Alaska, clearly impacts the ability of managers to evaluate the ecological risks and fisheries benefits from hatchery salmon and constitutes the sole minor non-conformance of this assessment.

References:	Brenner, R. E., S.D. Moffitt, W. S. Grant. 2012. Straying of hatchery salmon in Prince William Sound, Alaska. Environmental Biology of Fishes 94:179-195Habicht, C., T. M. Tobias, G. Fandrei, N. Webber, B. Lewis, W. S. Grant. 2013. Homing of sockeye salmon within Hidden Lake, Alaska, can be used to achieve hatchery management goals. North American Journal of Fisheries Management 33(4):777-782

[290] 2014 Annual Management Plan for Kitoi Bay Hatchery
https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/annual_management_plans/2014_kbh_amp.pdf

	Hagen, P., K. Munk, B. Van Alen, B. White (1995) Thermal mark technology for in season fisheries management: A case study. Alaska Fishery Research Bulletin 2(2):143-155 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 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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.5

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

FAO Eco (2011) 41

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: ADF&G considers habitat alterations during its hatchery permit approval and review processes.				
Evidence: Siting and construction of salmon hatcheries in Alaska involves an extensive permitting process through ADF&G that considers potential hatchery impacts to habitat and the ecosystem. See evidence provided in Supporting Clauses 12.3, 13.1 and 13.2. Stream restoration and habitat improvement projects are performed by diverse governmental and non-governmental organizations in Alaska. In some cases, these projects are intended to increase salmon production in areas where they occur, but also serve to restore or otherwise improve ecosystem structure and function. Examples of stream restoration, as well as salmon passage and habitat improvement projects are provided by the USFWS[291], ADF&G[292], the Nature Conservancy[293], among others.				
References:				
Non-Conformance Number (if relevant)	**NA**			

[291] USFWS stream habitat projects at https://www.fws.gov/alaska/fisheries/fieldoffice/anchorage/habitat_projects.htm
[292] ADF&G fish passage projects at http://www.adfg.alaska.gov/index.cfm?adfg=fishpassage.restorationprojects
[293] The Nature Conservancy Alaska restoration at http://www.nature.org/photos-and-video/video/alaska-restoration-in-shelikof

Supporting Clause 13.5.1

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

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska state policy prohibits the use of non-native and genetically altered stocks for salmon fishery enhancement purposes.				
Evidence: Alaska's Finfish Genetics Policy establishes guidelines that limit the transport and release of non-native fish species into Alaskan waters. The policy states that salmon will not be imported from out-of-state sources, stocks will not be transported between major geographic areas, and acceptability of transport within regions will be judged on the phenotypic appropriateness of the stock and the proposed distance of the transport. Genetically altered stocks are not used in Alaskan commercial salmon fisheries enhancement.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 13.5.2

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

FAO CCRF (1995) 9.3.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Impacts from hatchery salmon on wild stock are minimized or avoided through the implementation of state statutes that prohibit "fish farming" and control the source, health and release locations of hatchery produced salmon.				
Evidence: First, "finfish farming" is prohibited by Alaska statute AS 16.40.210[294]. Second, under statute AS 16.10.420 and in accordance with a salmon 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				

[294] Alaska Statute § 16.40.210: http://codes.lp.findlaw.com/akstatutes/16/16.40./03./16.40.210

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 is 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.
11) Alaska's Finfish Genetics Policy establishes guidelines intended to safeguard hatchery populations, and those with which they interact, from deleterious genetic effects associated with inbreeding. Specifically, the Policy states that " A minimum effective population (Ne) of 400 should be used for broodstock development and maintained in hatchery stocks. However, small population sizes may be unavoidable with chinook and steelhead".

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.5.3

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

FAO CCRF (1995) 9.3.5

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska's Finfish Genetics Policy recommends research with focus to assist rehabilitation and enhancement of salmon stocks. Notwithstanding these recommendations, no salmon stocks in Alaska are currently listed as endangered or threatened under the U.S. Endangered Species Act.				
Evidence: Alaska's Finfish Genetics Policy establishes two guidelines for salmon stock rehabilitation and enhancement as follows: 1) A watershed with a significant wild stock can only be stocked with progeny from the indigenous stocks. 2) Gametes may be removed, placed in a hatchery, and subsequently returned to the donor system at the appropriate life history state (eyed egg, fry or fingerling). However, no more than one generation of separation from the donor system to stocking of the progeny will be allowed.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 13.6

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

FAO CCRF (1995) 9.2.1

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The Pacific Salmon Treaty has been in effect since 1985 and provides clear policy direction for the responsible management of salmon fisheries and related fishery enhancement activities along transboundary rivers of Alaska and Canada.				
Evidence: In 1985, the United States and Canada ratified the Pacific Salmon Treaty[295] , of which Article VII states: This Article applies to salmon originating in transboundary rivers. 1) Notwithstanding Article IV, paragraph 3(c), whenever salmon originate in the Canadian portion of a				

[295] Pacific Salmon Treaty http://www.psc.org/pubs/Treaty/Treaty%20July%202014.pdf

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.

2) On the basis of the views provided by the Panel pursuant to paragraph 2, the Commission shall recommend spawning escapements to the Parties.
3) 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 undertake 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.

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.7

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

FAO CCRF (1995) 9.2.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: The Pacific Salmon Treaty has been in effect since 1985 and provides clear policy direction for the responsible management of salmon fisheries and related fishery enhancement activities along transboundary rivers of Alaska and Canada. See (previous) Supporting Clause 13.6.				
Evidence: Salmon management in transboundary waters, including enhancement activities, is subject to international agreement established by the Pacific Salmon Treaty (see evidence for previous Supporting Clause 13.6). Species and siting are also guided by Alaska statute AS 16.10.420 and the state Finfish Genetics Policy (see evidence for Supporting Clauses 13.3 and 13.10, respectively).				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 13.8

State shall consult with their neighboring States, as appropriate, before introducing non-indigenous species into trans-boundary aquatic ecosystems.

FAO CCRF (1995) 9.2.3

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: See Supporting Clause 13.5.1; Alaska's Finfish Genetics Policy prohibits the introduction of non-indigenous species into trans-boundary aquatic ecosystems.				
Evidence: See Supporting Clause 13.5.1; Alaska's Finfish Genetics Policy prohibits the introduction of non-indigenous salmon species into trans-boundary (or any) aquatic ecosystems.				
References:				
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 13.9

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

FAO CCRF (1995) 9.2.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska has developed or contributes to a number of databases designed to assist with the management of Pacific salmon fisheries management, including hatchery operations. These include a variety of genetic databases, the regional coded-wire tag database (RMIS), and an otolith mark database.

Evidence:

ADF&G, USFWS and NMFS have established, maintain or otherwise contribute to numerous databases associated with the production and management of hatchery salmon. Hatchery salmon are often marked or tagged to allow for their identification. Different marks and tags allow for differing levels of assignment specificity, ranging from hatchery-origin (adipose fin clips), to population or release group (genetic, coded-wire tag, otolith thermal mark). The vast amount of data that arises from mass marking and tagging of salmon has necessitated the development of dedicated databases.

Genetic data

Baseline genetic data are generated within dedicated labs, such as ADF&G's Gene Conservation Laboratory and NMFS's laboratory at Auke Bay[296], both of which produce and share baseline genetic data for various salmon populations and species[297] (e.g. Seeb et al. 2007). Genetic tools and data are used in diverse applications, including parental-based tagging and genetic stock identification. For example, ADF&G produces rapid-response genetic data from tissue samples collected during sockeye test fisheries at Port Moller[298]. Genetic stock composition data produced through this effort are shared publically and used to inform Bristol Bay fisheries management. In another application, NMFS and ADF&G collaboratively collect genetic data for sockeye salmon harvested in Pacific Salmon Treaty delimited Northern Boundary Fisheries and provide results from these analyses to the Pacific Salmon Commission. Genetic data are also widely used to estimate the population-specific impacts of salmon bycatch in pollock and other marine fisheries.

Coded wire tag data

Depending upon the specificity chosen by the user, coded wire tags can be used to simply identify salmon as hatchery origin (blank tag), but are more commonly coded to identify the fish's hatchery or even release group. Tags are recovered through sampling within fisheries, research, at hatcheries and on spawning grounds. Tags are then delivered to state labs[299], where the microscopic codes are read and uploaded to the web-based and publically accessible Regional Mark Information System (RMIS), administrated by the Pacific States Marine Fisheries Commission. RMIS can be queried to identify the source of a tag code, retrieve release group information and obtain other fisheries relevant data.

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[296] Genetics Laboratory at Auke Bay http://www.afsc.noaa.gov/ABL/Genetics/gsi_default.php

[297] ADF&G Gene Conservation Laboratory shared data http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.publications_labdata

[298] Port Moller Test Fishery http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.bbaysockeye_application

[299] ADF&G Tag Lab https://mtalab.adfg.alaska.gov/CWT/

Otolith data

Otolith thermal marking is routinely performed by salmon hatcheries in Alaska, often as a permit requirement. Otolith thermal marks are typically hatchery-specific, although some mark redundancy occurs as result of practical constraints associated with the technology (i.e. water heating and cooling limitations, limited number of unique banding patterns, etc.). These redundancies are resolved through species and region contexts. Otoliths are collected from fish harvested in fisheries, used in hatchery broodstocks or recovered from spawning grounds. ADF&G reads otolith thermal marks at their Mark Recovery Laboratory and some regional offices and records the resultant data into an electronic database[300] that can be accessed and queried through the world wide web.

All of these tag and mark techniques can and have been used to estimate hatchery stray rates, contributions to fisheries and in-season management of Pacific salmon.

References:	L. 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

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.10

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

FAO CCRF (1995) 9.3.2

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska's Finfish Genetics Policy includes guidelines for the transport and release of salmon that restrict the importation and inter-regional translocation of stocks. These guidelines are based on widely-accepted theories of local adaptation in Pacific salmon.

Evidence:

ADF&G's Genetic Policy[301] provides clear guidelines and limits for the transfer and introduction of salmon within the State of Alaska. With regard to stock transports, the Policy states that "A) live salmonids, including gametes, will not be imported from sources outside the state, with exception of trans-boundary rivers. Stock; B) stocks will not be transported between major geographical areas: Southeast, Kodiak Island, Prince William Sound, Cook Inlet, Bristol Bay, AYK and Interior and C)acceptability of transport within regions will be judged on phenotypic suitability of the donor stock and distance to the transplant location".

The Genetic Policy justifies these transfer guidelines through the following rationale:

"A. Interstate: It is generally accepted that populations of salmonids which have existed over many

[300] Mark Recovery Laboratory online reports https://mtalab.adfg.alaska.gov/OTO/reports.aspx
[301] ADF&G Genetics Policy http://www.adfg.alaska.gov/static-/fishing/PDFs/research/genetics_finfish_policy.pdf

generations in a given watershed have evolved traits that make them adapted for survival in that environment. The greater the distance that a population is transferred from its native environment or the greater the difference in environmental conditions between the donor and stream, the less likely the genetic characteristics of the population will fit the new environment. If the fitness of the population is indeed reduced in the new environment, then the probability of the transport succeeding would be affected. In addition, interbreeding of a transferred stock with indigenous stocks could transfer gene traits that would reduce the fitness of the native populations. In many states, discrete stocks cannot be identified because excessive movement and interbreeding have already occurred. The State of Alaska, therefore, desires to protect and develop local stocks by restricting the movement of live fish or eggs into the state. There is, however, several trans-boundary rivers penetrating British Columbia, Canada, that flow into the state of Alaska. In some instances, donors from these stocks might fit a well-designed management plan.

B. Inter- Regional: The environment can vary greatly from one region to another in a state as large as Alaska. For similar reasons given in I.A. above, the transfer of fish from one region to another is restricted. Consideration may be given to regional border areas, especially when no suitable donor stock is available within a region.

C. Regional: Although it is recognized that indigenous stocks are best for donor stock development, there have been numerous successful transplants, especially if the environment at the new site is similar to that of the donor stock and distance between the sites is not great. There is insufficient scientific data to predict how far or how diverse the environment must be before a negative impact will occur. However, it is believed that within a region site matching opportunities may be available. As site matching characteristics decrease and transplant distance increases within the regional borders greater justification is required for the proposed transplant. The following should be considered when selecting a donor stock

1. Matching: Phenotypic characteristics of the donor stock should be matched to the environment at the site and to the management goals. Water chemistry and temperature profiles should be considered. Island stocks should be matched to other islands or to short rivers of comparable characteristics where possible. Time of spawning and fry emergence should be matched or compensated with the hatchery temperature required. Any deviations should be addressed and justified in the permit application or the annual management plan.

2. Migration Routes: The probable migration routes and potential user groups should be identified. The applicant must determine a probable migration route based on the migration route of the proposed stock and characteristics (topography) of the transplant site. Coded wire tagging of hatchery releases can determine the accuracy of migration route predictions as well as assess possible impact on local stocks."

ADF&G also requires a Fish Transport Permit in order to transport, possess, export from the state and release, or release into the waters of Alaska, any live fish or their eggs. Permit applicants must indicate their intended purpose, proposed stock, release location, evaluation plans and other information for review by ADF&G.

References:	

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.11

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

FAO CCRF (1995) 9.3.3, 9.3.4

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska's Finfish Genetics Policy provides restrictive guidelines for the transfer of salmon stocks into and within the State of Alaska. The Policy provides justifications for these guidelines, largely citing the importance of local adaptation in translocation success and the need to protect wild stocks from hatchery transplants.

Evidence:

Alaska's Finfish Genetics Policy provides clear guidelines for the appropriate selection and translocation limits of salmon stocks used by hatcheries and restoration efforts. The Policy states:

I. Stock Transport

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 geographic areas: Southeast, Kodiak Island, Prince William Sound, Cook Inlet, 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 stock 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.

II. Protection of Wild Stocks

A. 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 to sites where the introduced stock may have significant interaction or impact on significant or unique wild stocks.

B. Significant or unique wild stocks must be identified on a regional and species basis so as to define sensitive and non-sensitive areas for movement of stocks.

C. Stock Rehabilitation and Enhancement

1. A watershed with a significant wild stock can only be stocked with progeny from the indigenous stocks.

2. Gametes may be removed, placed in a hatchery, and subsequently returned to the donor system at the appropriate life history state (eyed egg, fry or fingerling). However, no more than one generation of separation from the donor system to stocking of the progeny will be allowed.

D. Drainage's should be established as wild stock sanctuaries on a regional and species basis. These sanctuaries will be areas in which no enhancement activity is permitted except gamete removal for broodstock development. Use of such reservoirs for broodstock development should be considered on a case-by-case basis, and sliding egg take removal schedules applied to such systems should be conservative.

E. Fish releases at sites where no interaction with, or impact on significant or unique wild stocks will occur, and which are not for the purposes of developing, rehabilitation of, or enhancement of a stock (e.g., releases for terminal harvest or in landlocked lakes) will not produce a detrimental genetic effect. Such releases need not be restricted by genetic concerns.

III. Maintenance of Genetic Variance

A. Genetic diversity among hatcheries

1. A single donor stock cannot be used to establish or contribute to more than three hatchery stocks.

2. Off-site releases for terminal harvest rather than development or enhancement of a stock need not be restricted by III.A.1, if such release sites are selected so that they do not impact significant wild stocks, wild stock sanctuaries, or other hatchery stocks.

B. Genetic diversity within hatcheries and from donor stocks

1. A minimum effective population (Ne) of 400 should be used for broodstock development and maintained in hatchery stocks. However, small population sizes may be unavoidable with chinook and steelhead.

2. To ensure all segments of the run have the opportunity to spawn, sliding egg take scales for donor stock transplants will not allocate more than 90% of any segment of the run for broodstock.

Additional policies, regulations and guidelines for the culture and disease treatment of hatchery salmon in Alaska are provided by ADF&G in Meyers (2014).

References:	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

Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.12

Enhanced fisheries may be supported in part by stocking of organisms produced in aquaculture facilities or removed from wild stocks other than the "stock under consideration". Aquaculture production for stocking purposes should be managed

and developed according to the above provisions, especially in relation to maintaining the integrity of the environment, the conservation of genetic diversity, disease control, and quality of stocking material.

FAO Eco (2011) 36.8, 40

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑
Summary Evidence: Alaska's Finfish Genetics Policy and Meyers' (2014) "policies and guidelines for Alaska fish and shellfish health and disease control" provide guidance for the conservation of diversity, disease control and protection of the environment, as related to salmon fisheries enhancement activities in Alaska. Also see Supporting Clause 13.11.				
Evidence: Alaska's Finfish Genetics Policy and Meyers (2014) describe the guidelines, regulations and policies for the selection, transport and disease prevention and treatment of salmon stocks used in Alaskan fisheries enhancement activities, with particular emphasis on salmon hatcheries. See previous Supporting Clause 13.11.				
References:	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			
Non-Conformance Number (if relevant)				**NA**

Supporting Clause 13.13

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

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

FAO Eco (2011) 38

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:
In Alaska, salmon produced by hatcheries for harvest in the commercial fishery are native to the region, supplement naturally produced components of the stock and grow in open ocean environments without supplemental feeding. All of these conditions are in accordance with state statutes, policies and regulations.

Evidence:
Alaskan commercial salmon fisheries harvest hatchery- and wild- origin Pacific salmon in marine and estuarine waters. Salmon fishery enhancement in Alaska is restricted to the use of native species, must not jeopardize the persistence of naturally spawning populations and, upon release as juveniles, hatchery salmon rely on natural food supplies of the marine environment for the growth. These conditions have been established through state statutes and policies, and are implemented with oversight from ADF&G.

Among those state statutes that govern salmon production by hatcheries, AS 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". Alaska's Finfish Genetics Policy provides additional guidance for the selection of hatchery broodstock, stating that "Live salmonids, including gametes, will, not be imported from sources outside the state" and that "Stocks will not be transported between major geographic areas". Accordingly, non-native species are not produced by Alaskan salmon hatcheries.

Alaska's Policy for the Management of Sustainable Salmon Fisheries prioritizes protection of naturally spawning salmon in Alaska. This policy states that the "wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yield" and that the "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". Abundance of wild spawning salmon populations is monitored through spawner escapement surveys and compared to escapement goals, as described by Munro and Volk (2016). Ongoing research by the Prince William Sound and Sitka Sound Science Centers are evaluating the potential impacts from stray hatchery salmon in Prince William Sound[302] and Southeast Alaska[303].

In Alaska, hatchery salmon are released as juveniles to feed and grow in natural marine environments. AS 16.10.440 states that "fish released into the natural waters of the state by a hatchery operated under AS

[302] Hatchery-wild interactions study by PWSSC http://pwssc.org/research/fish/hatchery-wild-salmon-interactions/
[303] Hatchery chum study in SEAK by SSSC http://www.sitkascience.org/research/chum-project/

16.10.400-16.10.470 are available to the people for common use and are subject to regulation under applicable law in the same way as fish occurring in their natural state until they return to the specific location designated by the department for harvest by the hatchery operator". Hatchery salmon are not fed once released into natural waters.	
References:	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.
Non-Conformance Number (if relevant)	**NA**

Supporting Clause 13.14

In the case of enhanced fisheries, "stock under consideration" may comprise naturally reproductive components and components maintained by stocking. In the context of avoiding significant negative impacts of enhancement activities on the natural reproductive components of "stock under consideration":

- naturally reproductive components of enhanced stocks shall not be overfished;
- naturally reproductive components of enhanced stocks shall not be substantially displaced by stocked components. In particular, displacement shall not result in a reduction of the natural reproductive stock component below abundance-based target reference points (or their proxies) defined for the regulation of harvest.

FAO Eco (2011) 39

Evidence Rating:	Low ☐	Medium ☐		High ☑
Non-Conformance:	Critical ☐	Major ☐	Minor ☐	None ☑

Summary Evidence:

Alaska's Policy for the Management of Sustainable Salmon Fisheries prohibits overfishing of naturally reproductive components of Alaskan salmon stocks. This policy is implemented through state and federal harvest regulations. Mass marking of hatchery fish and focused research efforts have investigated stray rates, competition effects and genetic introgression from hatchery salmon in Alaska. These results have provided evidence that some hatchery salmon stray onto wild spawning grounds, in some cases interbreed and may compete for resources in the marine environment. Nevertheless, escapement estimates produced by ADF&G strongly suggest that wild salmon populations in the state are on the whole stable and productive.

Evidence:

Alaskan commercial salmon fisheries are mixed-stock fisheries, although regulations on season, gear and location are highly effective at targeting particular stock components. Both wild and hatchery-produced salmon are harvested in commercial salmon fisheries and their relative contribution to total catch is regularly assessed and documented by ADF&G.

As described in the previous Supporting Clause 13.13, Alaska's Policy for the Management of Sustainable Salmon Fisheries states that "wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yield". Underpinning this policy, Article 8, Section 4 of Alaska's State Constitution states that "Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses". Therefore, overfishing of natural salmon stocks is prohibited by law and statute in Alaska. Total harvest of natural and hatchery salmon stocks, from 1900-2013, as depicted in the figure from Stopha (2014), below, strongly suggests that harvest of wild salmon stocks has remained relatively

constant for at least 30 years.

Alaska's Policy for Statewide Salmon Escapement Goals charges "ADF&G and the Board of Fisheries with the duty to conserve and develop Alaska's salmon fisheries on the sustained yield principle" and to collaboratively establish salmon escapement goals. Munro and Volk (2016) recently reviewed these salmon escapement goals and escapement estimates since 2007. They found that escapement goals were met for >75% of cases examined.

Displacement of wild fish by hatchery salmon in Alaska is a perennial concern, regularly addressed by research. Mass otolith marking of hatchery salmon in Alaska has allowed several research efforts to evaluate stray rates of hatchery fish onto natural spawning grounds. In at least one case, no stray hatchery sockeye salmon were observed in river reaches upstream from the hatchery (Bidlack and Valentine, 2009). But a more common pattern is that whereby higher proportions of hatchery fish occur on streams of close proximity to a hatchery or hatchery release site (Brenner et al., 2012; Piston and Heinl 2012a, 2012b). Yet, overall, most evidence to date suggests that hatchery salmon have not displaced their naturally reproducing counterparts throughout a significant portion of their ranges in Alaska (Brenner et al., 2012; Piston and Heinl 2012a, 2012b; but see Ruggerone and Connors, 2012).

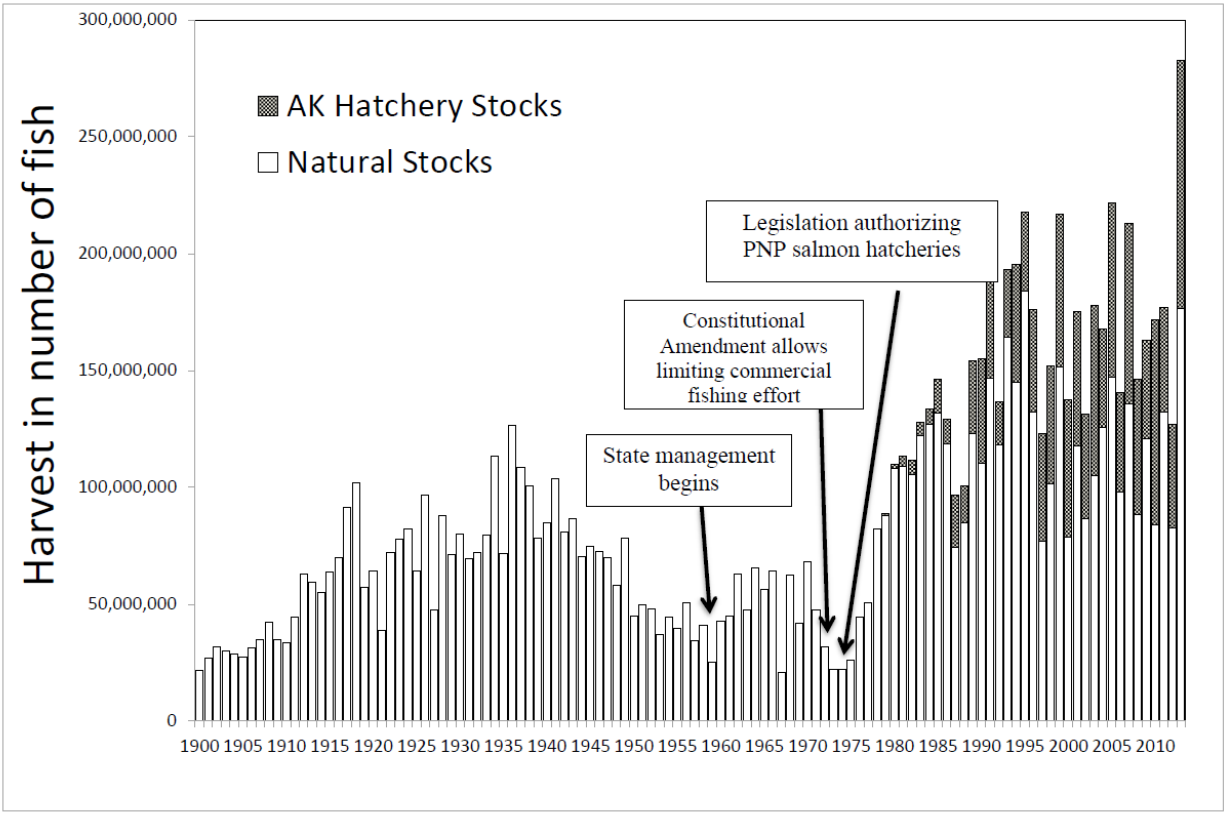

Figure 1.–Commercial salmon harvest in Alaska, 1900–2013.
Source: 1900–1976 from Byerly et al. (1999). 1977–2013 from Vercessi (2014).

Figure 9: Commercial Salmon Harvest in Alaska 1900 - 2013

References:	Bidlack, A., and E. M. Valentine. 2009. Assessment of Gulkana hatchery sockey 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.

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.

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.

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.

Stopha, M. 2014. An evaluation of the Snettisham 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 5J14-01, Anchorage.

Non-Conformance Number (if relevant)	**NA**

8. External Peer Review

8.1. Summary and Recommendation Peer Reviewer 1

Due both to its length and large amount of information, I found this report challenging to review, and made me appreciate the amount of effort that went into producing it. Realizing it is a draft document, I would still like to note that the entire report would greatly benefit from a thorough editorial review to improve wording, sentence structure, overall clarity, and overall uniformity. Overall, I had relatively few technical issues and suggestions. I found the information presented in the Background section, with a few exceptions, provided a sufficiently broad description of general history, development, management entities, and management systems used for Alaska salmon fisheries. I do think this section could be improved with additional information concerning Fish and Game Advisory Committees, the hatchery program, ADFG management areas, the Federal subsistence management program, and, possibly, coastal area management frameworks. I found the evidence presented to support the various Conformance Criteria was in most cases consistent and sufficient to support the proposed ratings and recommendation of the assessment team. However, I did note a few instances where I felt additional information was needed to support a rating, the information presented did not seem to address the supporting clause, or information was provided for a supporting clause that did not seem relevant to the fishery being assessed. I consider these issues to be relatively few and minor in relation to the far more numerous criteria I felt were sufficiently supported by the provided evidence. Therefore, I concur with the assessment team's overall finding that the salmon fisheries reviewed should be awarded continuing certification by the Alaska Responsible Fisheries Management Certification Program.

Overall Assessment Team Response:

Assessment Team thanks the reviewer for providing both an extensive and detailed review. Formatting, acronyms and spelling corrections will be corrected in the final version. Overall, the report structure is set out by procedure. This requires quite substantial evidence to be presented against each clause, although in some areas noted by the reviewer, additional clarification is provided.

8.1.1. Full Summary of Comments – Peer Reviewer 1

Background Section

Peer Review Comments:

While I find that, overall, the background section provides the reader with sufficient information on most topics; there are few instances where I think the addition of information would be beneficial. I also feel that this section, as well as the entire report, would greatly benefit from a thorough editorial review to improve wording, sentence structure, overall clarity, and overall uniformity. I have provided suggestions on how this might be done for this section in a marked-up version of the report I have provided. The following is a summary of my main suggestions:

1) The Summary and Recommendations section should include a short statement of the findings rather than directing the reader to another section of the report.

Assessment team response: Formatting comments acknowledged and welcomed. Final format edits will be undertaken prior to publication. This Report format template is standard across all fishery assessments.

Background Section

There is a balance between information presented in the background components and the more detailed evidence based sections. For this reason, the Assessment Team will confirm that specific items noted by the reviewer deemed relevant to include are included against the relevant clause but may not include in the background section.

2) The scientific name of a fish species does not need to be placed in parenthese, and the genus does not have to be fully written out after the first time it I introduced.

Assessment team response: This is more of a style issue. Some of the statements from the document are directly taken from ADFG documents and the team prefers to be consistent with the original writing.

3) Accepted common names of fishes, published by the American Fisheries Society, should be used throughout the report, although I realize these are not always used in regulations (e.g. use of king rather than Chinook salmon). Also see suggestions for Table 2 in the marked up report.

Assessment team response: This is more of a style issue. Some of the statements from the document are directly taken from ADFG documents and the team prefers to be consistent with the original writing.

4) In Figure 1, boundaries for Westward and Central regions are incomplete.

Assessment team response: This graph was taken directly from the original document and hence, appropriate for use.

5) I included additional information in the descriptions of fishing gear that I thought would provide more clarity.

Assessment team response: the team appreciate the reviewer's efforts to improve the readability of the document.

6) In Figure 2, I think the date the Magnuson-Stevens Act came into effect (1976) should be indicated. This law played an important role in restoring Alaska salmon fisheries by foreign fishing vessel interceptions. Another date that might be useful is 1999, when the federal government assumed management authority of subsistence fishing on federal public lands and waters.

Assessment team response: Again this graph was taken directly from an original document. Thus changes cannot be made to the original file.

7) I thought the State and Federal Management Regimes subsection should include a description of the Fish and Game Advisory Committees. (These committees are shown in Figure 4.) I added

Background Section

some suggested text to do this.

Assessment team response: More information has been provided on the role of advisory committees.

8) The State and Federal Management Regimes subsection is also the appropriate subsection to add text on the Federal Subsistence Program, which isn't mentioned until supporting clause 2.5. The federal government assumed subsistence fishery management authority on federal public lands and waters in Alaska (about 60% of total land in the state) in 1999. This has affected management of Alaska commercial fisheries since subsistence is the priority use, and since the Federal Subsistence Program has provided a substantial amount of funding to ADFG to continue various salmon monitoring projects that would otherwise have been discontinued under the declining state budget. The team believes that this type of information which is more technical and very specific is more suited for a particular section or subclauses rather than including it on the background section which normally includes very broad and general topics.

Assessment team response: The team believes that this type of information which is more technical and very specific is more suited for a particular section or subclauses rather than including it on the background section which normally includes very broad and general topics.

9) I think the hatchery program warrants its own section or subsection somewhere within the Background section. There is a lot of detailed information under several supporting clauses for Fundamental Clause 13 that can be used for this purpose. (This should also allow shortening of the affected Evidence sections for these supporting clauses)

Assessment team response: The team believes that this type of information which is more technical and very specific is more suited for a particular section or subclauses rather than including it on the background section which normally includes very broad and general topics.

10) Should there be a description of coastal area management frameworks somewhere within the Background Section, since this is the topic of Fundamental Clause 2.1?

Assessment team response: Again the team believes that this type of information which is more technical and very specific is more suited for a particular section or subclauses rather than including it on the background section which normally includes very broad and general topics.

11) I made several suggested edits and changes to the Escapement Goal subsection in an attempt to better organize and clarify the various goals.

Assessment team response: Changes were noted. The team appreciate the reviewer efforts throughout this sections and other as well.

Background Section
12) I have several issues with the subsection Alaska Administrative Regions. This subsection mainly provides harvest information and, in some cases, doesn't even provide mention of gear types used for harvests. There are no descriptions of the "main features" (except for some Yukon River information), which were to be provided as per the opening sentence of this subsection. This section could provide information on the number and types of fisheries in each area, including the number of permits, the communities that depend on the fisheries, a mention of infrastructure (where are harvests processed), etc. Additionally, the way in which information was presented for each region was inconsistent (e.g. Prince William Sound data was from 2014, while other aras presented 2015 data, percentages were provided from some harvest comparisons and not others, description of Yukon River but not other fishing locations, etc.). Finally, it would be useful to reference the appropriate maps in the appendix for each region. *Assessment team response: This section of the background was revised extensively to provide a more comprehensive and accessible "snapshot" of the administrative areas status by including geographical limits, common fisheries in the area etc. as well providing information on the latest production of salmon fisheries on these areas so the reader could have a descriptive picture of the fishery and its environs*. 13) Since several supporting clauses address enforcement of regulations, penalties for illegal fishing, etc. it might have proven useful to have included members from the Alaska Department of Public Safety in one or more of the on-site meetings, which does not seem to have been done. *Assessment team response: The team felt that there were other agencies such as ADFG AWT, NOAA OLE, USGC could provide better and accurate information on enforcement, compliance, sanctions etc. than any other government agencies.*

A.	**The Fishery Management System**
1.	**There shall be a structured and legally mandated management system based upon and respecting International, National and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
Peer Review Comments: The following general comments apply to all Summary Evidence and Evidence responses within the report: 1) I think a standardized response needs to be developed and used to identify all supporting clauses that are not relevant to Alaska commercial salmon fisheries. This can either be followed by another sentence explaining why this is the case for this specific clause, or it can be incorporated into the standardized sentence. *Assessment Team Response: On Subclauses that would not apply to Alaskan Salmon Fisheries, a statement 'Sub clause is NOT APPLICABLE' is noted. In most cases a short explaination is also provided.*	

A.	The Fishery Management System

2) In some cases, responses to supporting clauses reference information provided for preceding standardized clauses. I think this is a good way to shorten the report since it avoids needless repetition of the same information. However, it needs to be uniformly applied in all Summary Evidence and Evidence sections.

Assessment Team Response: Sentences referring previous and next sections were used consistently by using the statement 'Please see Section…. For more details'.

3) The use of acronyms has not been consistently applied throughout the text. In some cases different ones have been used for the same agency or law, in other cases an acronym is used without first defining what it stands for, etc. There is a list of acronyms provided at the beginning of the document. These should be the only ones used in the report. This list needs to be reviewed and edited to remove acronyms not used and to add acronyms that are used but are not currently in the list.

Assessment Team Response: Report has been revised to include any previously missing acronyms.

4) I have provided technical comments for all Summary Evidence and Evidence responses in the report. In the marked-up copy of the report, I provided editorial comments for most Summary Evidence sections responses, but did not do this for most Evidence sections due to time constraints.

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) I don't think supporting cause 1.4.1 is relevant to Alaska salmon fisheries, and. the information provided as evidence does not even appear to address this supporting clause, which speaks to "States seeking to take any action through a non-fishery organization".

Assessment Team Response: Amended previous text for clarity. The Reviewer is correct in understanding.

2) Information included for the supporting clauses under Fundamental Clause 2.1 is new to the report (i.e. not mentioned in the Background section). Should there be some mention of coastal area management frameworks in the Background section of the report?

Assessment team response: The coastal area frameworks should be described on their proper sections rather than introduced on the background. The team believes that general introduction the salmon fisheries should be included on the background section rather than include all technical and specific sections that could be used better on their specific sections.

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

Peer Review Comments:

I concur with the findings and ratings of this section.

Assessment Team Response: No comment necessary.

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

Peer Review Comments:

I concur with the findings and ratings of this section.

Assessment Team Response: No comment necessary.

B.	Science and Stock Assessment Activities
4.	**There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**

Peer Review Comments:

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) The evidence provided for supporting clause 4.6 needs to be more fully developed to support the "high" rating given to it. Of note is that no Summary Evidence was provided, and more information needs to be provided in the Evidence section to support the rating. I provided some ideas of the type of evidence and reasoning that might be used to support the rating in the Summary Evidence section in the marked-up version of the report.

Assessment Team Response: Amendments have been made to the supporting clause in order to provide greater clarification on the High evidence rating.

2) Support clause 4.7 does not seem relevant to Alaska fisheries, unless the federal government still conducts ocean research on Alaska salmon using their own vessels. If this clause does not apply, then the only text needed is a short standard statement that this is the case.

B.	Science and Stock Assessment Activities

Assessment Team Response: Assessment team concurs with the reviewer. Added text Supporting Clause 4.7 is NOT APPLICABLE because….

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

Peer Review Comments:

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) I don't think the Evidence statement speaks to supporting clause 5.1.1, which is directed at use of a precautionary approach for "small scale or low value" fisheries. If any Alaska commercial salmon fisheries fit this definition, they need to be identified and briefly discussed. If there are none, then this supporting clause is not relevant.

Assessment Team Response: Assessment team agrees with the reviwer comment regarding small scale/low value in this context. Added text Supporting Clause 5.1.1 is NOT APPLICABLE because…….

2) As mentioned previously under evidence is provided for some supporting clauses by referencing information for other supporting clauses. I don't have any problem using this procedure to shorten the text and the report. However, it should either be consistently done throughout the report, as appropriate, or not used at all.

Assessment Team Response: Sentences referring previous and next sections were used consistently using this sentence. Please see Section…. For more details

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

Peer Review Comments:

I concur with the findings and ratings of this section.

Assessment Team Response: No response required.

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

C.	The Precautionary Approach

Peer Review Comments:

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) The Evidence section for supporting clause 7.1, particularly in comparison to all preceding Evidence sections, is overly long and detailed. There is a lot of valuable information provided, but it should be presented in a more condensed form here, with details to be found in the provided references. Consideration should also be given to including some of the information here in the Background section of the report.

Assessment team response: Assessment team determines that it is necessary to provide details of the background of the non conformance that had been raised in the original assessment timeline. It was deemded important in order to justify the context of the previous minor no-conformance rating for this clause. That is to say, it is important for the reader to understand the rationale with sufficient detail on one location rather than having to read previous surveillance reports.

2) The Evidence statement for supporting clause 7.1.2 does not speak to the supporting clause, which concerns initiating research in the absence of adequate information. Supporting evidence for this could include the Chinook Salmon Research Initiative developed by ADFG, which I think resulted in a legislative appropriate of $15 million for studies.

Assessment team response: the following text has been added to the report - *As an example of initiating research in the absence of adequate information see 7.1 under Chinook Salmon Research Initiative*

3) The Evidence section for support clause 7.2 can probably be considerably shortened. Alaska does has a regulatory process in place for dealing with new or exploratory fisheries, which are documented here in, what I think, is too much detail. However, all salmon resources are fully allocated, so there are no, and most probably will not be, new or exploratory Alaska salmon fisheries. (The only possible future potential for new or exploratory salmon fisheries may be presented by expansion of spawning of Chinook and other species into Arctic Ocean tributaries, which do not currently support runs, in response to global warming.) Some consideration should also be given to just stating this supporting clause is not relevant, since all salmon resources are known and fully allocated.

Assessment team response: the following text has been added to the report - In *summary, while Alaska does have a regulatory process in place for new and emerging fisheries the reality is that all salmon resources are fully allocated.*

D.	Management Measures

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

Peer Review Comments: I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) Information on state and federal priorities for subsistence uses needs to be included as evidence for supporting clause 8.3, since this is an important aspect relating to the clause.

Assessment team response: the following text has been added to the report - *Alaska state law defines subsistence as taking of fish, shellfish or other fisheries resources by Alaska residents for subsistence use (AS16.05.940)(31), non-commercial, customary and tradition uses . The Federal Subsistence Board (FSB) adopts subsistence fishing regulations for federal waters in Alaska in compliance with the Alaska National Interest Lands Conservation Act (ANILCA). Only eligible Alaska rural residents may participate in federal subsistence fisheries.*

2) Evidence for supporting clause 8.7 can be improved in reference to habitat protection and restoration. For example, mention of efforts to restore and protect salmon habitat along the lower Kenai River, efforts to protect and restore salmon passage through replacement of hanging culverts, removal and control of introduced species (e.g. pike), etc.

Assessment team response: the following text has been added to the report - *In addition, habitat and restoration efforts in freshwater are ongoing. Specifically, salmon habitat protection along the lower Kenai River and restoration of fish passage for adults and juvenile salmon through replacement of hanging culverts and either removal or control of introduced species, such as pike.*

3) Evidence for supporting clause 8.9 can be strengthened to support a rating of "high". While some types of allowed gear for salmon do not pose much of a ghost fishing threat (purse seines, troll gear, and fish wheels), gilll net gear can potentially pose such a problem and is widely used in Alaska . The evidence presented only cites a regulation for one fishing area. Are there similar regulations for other gill net fishing area? Are gill nets constructed in such a way to avoid ghost fishing (e.g. degradable hanging twine on the head or lead lines)?

Assessment team response: the following text has been added to the report - *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*

D.	Management Measures

(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 commercial fisheries.

To our knowledge gill nets have not changed to biodegradable twine. It is the team opinion that Alaska's salmon gill net fishery is operated differently than high seas gill netting. The method of operating drift gill nets is to fish only during the period of ADFG mandated openings with fishermen always attending the nets to bring aboard the fish and during the closures fishermen are required to remove the nets from the water thus reducing the risk of losing the net. More specifically, the nets are expensive and are judiciously taken care of.

4) Summary Evidence text is longer than Evidence section text for supporting clause 8.12. Additionally, the evidence provided would be strengthened by (1) providing specific references for cooperative research studies concerning gear selectivity, or fishing methods and strategies, and (2) also including mention of any research conducted cooperatively with Canada in relation to transboundary salmon stocks.

Assessment team response: the following text has been added to the report - *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 in Supporting Clause 5.4*

5) Evidence for supporting clause 8.13 needs to be improved. Similar to changes suggested for supporting clause 8.12, this could be done by (1) providing specific references for collaborative work, and (2) also including mention of such work conducted with Canada in relation to transboundary salmon stocks. Finally, information presented concerning the Commercial Fisheries Entry Commission and the Arctic-Yukon-Kuskokwim Sustainable Salmon initiative does not seem relevant to this supporting clause. It should either be omitted or rewritten to show its relevance.

Assessment team response: the following text has been added to the report - *In addition, see US-Canada collaboration on transboundary stock management and research discussion in Supporting Clause 5.4.*

6) The assessors seem to feel that supporting clause 8.14 is not relevant to Alaska salmon fisheries, but then include (1) a descript of artificial reef projects, which were not done to enhance salmon or salmon fisheries, and should be omitted; and (2) the placement of large woody debris, which does benefit salmon, but which may or may not be considered to be "artificial structures". Other

D.	Management Measures
	types of artificial structures may be relevant to this supporting clause, including construction of spawning channels and, possibly, stream bank stabilization. So, I think the evidence needs to be revisited for this supporting clause. If no relevant information is available, then a very short standardized response should be inserted, rather than lengthy non-relevant information. Assessment team response: the following text has been added to the report - *Supporting Clause 8.14 is NOT APPLICABLE for Alaskan Salmon Fisheries relevant.*
9.	**Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.**
Peer Review Comments: I generally concur with the findings and ratings of this section, but have the following comments and concerns: 1) There is no mention in the Evidence information for supporting clause 9.2 of any "assistance from international organizations" or mention of whether FAO CCFR provisions are provided to anyone engaged in fishing operations. If neither of these occurs, can the rating still be "high". Assessment Team Response: Whilst, there are no international organizations of relevance per se, to this clause; there is a considerable amount of evidence of outreach, education, training and dissemination of information of Alaska fisheries in practical, technical, scientific and management aspects of Alaska salmon fisheries which can be described as consistent with the objectives, principles and provisions of the FAO CCRF. Furthermore, a sentence was added for the supporting clause *Evidence of "FAO CCFR provisions provided to anyone engaged in fishing operations" and interested parties can be found on the website of ASMI where it describes the RFM program, the conformance criteria standard along with the FAO documents.* Clarification has been provided in the clause evidence to support the teams' high confidence rating 2) Evidence for supporting clause 9.3 should be strengthened to justify a rating of "high". More detail on the type of data on fishers collected and maintained is needed. *Assessment Team* Response: Further clarification is provided in the evidence section in support of the rating.	

E.	Implementation, Monitoring and Control
10.	An effective legal and administrative framework shall be established and compliance ensured through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.
Peer Review Comments:	

E.	Implementation, Monitoring and Control

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) It is not clear whether supporting clause 10.3.1 is relevant to Alaska salmon fisheries, and the information provided as evidence does not reference any Alaska fisheries. Some Alaska salmon fisheries are conducted under treaty obligations with Canada, Would these fall under this supporting clause?

Assessment Team Response: Whilst the team understands the Reviewer comment since there are no flagged fishing vessels operating in Alaska salmon fisheries and hence, clause is not applicable. Further clarification is provided in the evidence section in support of the rating.

2) It is not clear whether supporting clauses 10.4 and 10.4.1 are relevant to Alaska salmon fisheries, and the information provided as evidence does not reference any Alaska fisheries. I think there is only one, small Alaska salmon fishery in Southeast Alaska that fishes in Canadian waters? Should information on that fishery be included here rather than all the other information that does not seem relevant?

Assessment team response: Fishing in the SEAK drift gillnet fisheries occur in five traditional fishing districts located in the inside waters of Southeast Alaska. Hatcheries contribute significant amounts of chum, coho and sockeye salmon to the drift gillnet fisheries. However, there are transboundary stocks on the Taku and Stikine River for Chinook salmon in May through early June under agreements with Canada on joint management and harvest sharing of the runs. Chum and sockeye salmon typically represent the highest total ex-vessel value to the drift gillnet fisheries.

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

Peer Review Comments:

While I generally concur with the findings and ratings of this section, I had a difficult time with the wording of many of the supporting clauses, many of which seem focused on high sea fishing operations. This made it somewhat difficult to determine whether the presented information targeted the intent of the supporting clause, since Alaska commercial salmon fishing (with one minor exception in Southeast Alaska?), occurs within state waters. Overall, I would agree that Alaska salmon fisheries are operated within a legal framework that adequately encourages compliance to laws and regulations and discourages violations.

Assessment team Response: The Alaska RFM Standard is not Alaska salmon specific as its scope is for all Alaska fisheries. Some clauses are therefore more or less applicable depending on the fishery under evaluation.

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

Peer Review Comments:

I generally concur with the findings and ratings of this section, but have the following comments and concerns:

1) While I do not disagree with the "high" rating for supporting clause 12.1, I wonder whether the size selective effects of gillnets should be mentioned here. Various studies have indicated that size selectivity of gillnets may affect the age and size composition of salmon spawning populations and resulting runs. However, a fairly study suggested that "biologically robust escapement goals and prevention of harvest of the largest individuals may help prevent negative effects of size-selective harvest" (Kendall, Hardy and Quinn 2009 Evolutionary Applications 2(4): 523–536). So, the way in which most Alaska salmon fisheries are managed probably helps prevent size-selective impacts from gillnet fisheries.

Assessment Team Response: The team interpretation of this sub clause is that it evaluates whether, or not, management accounts for the effects of the natural environment on the abundance of the target stock and dependent stocks. While the team have provided evidence that does include some language about harvest, the team do not believe that it would be appropriate to focus here on potential effects from a particular gear type. Accordingly, the team has not modified this section of the text but, instead, maintained focus on ADF&G's management practices and research that consider the effects of environmental variation on Alaskan salmon stocks.

2) I don't think the Evidence statement speaks to supporting clause, 12.13 which is directed at outcome indicators and management objectives for essential habitat damage from fishing practices. I don't think Alaska salmon fisheries damage essential habitat. I think the Evidence Summary and Evidence sections need to be rewritten.

Assessment Team Response: It is unclear to the team why the reviewer is concerned that the evidence presented does not relate to the supporting sub clause, or how the section should be "rewritten". The team is confident that the evidence presented speaks directly to the topic of the sub clause, and does not propose to modify the text. We concur with the reviwers note that Alaska salmon fisheries do not damage essential habitat. However, the evidence the team have provided here and under sub clause 12.9 (as referenced) demonstrates that "Alaska's Policy for the Management of Sustainable Salmon Fisheries provides a clear benchmark for the protection of essential fish habitat" as stipulated by the subclause's condition that "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

F.	Serious Impacts of the Fishery on the Ecosystem

certification."

3) I don't think the Evidence statement speaks to supporting clause 12.15, which is directed at outcome indicators and management objectives. For Alaska salmon fisheries, the outcome indicator for achieving management objectives are escapement goals rather than sustained yield, which is really an overall goal. I think both the Evidence Summary and Evidence sections need to be rewritten.

Assessment Team Response: As written, the evidence the team have provided references both the constitutional mandate of sustained yield and the management tool of wild salmon escapement goals. Specifically, the evidence states that "regional fish management plans establish escapement goals for major salmon bearing rivers in Alaska, and comprehensive in-season monitoring programs are used to assure that that escapement goals are met". This subclause "is directed at outcome indicators and management objectives" and "the outcome indicator for achieving management objectives *are* escapement goals" and consistent with supporting [sub]clause 12.15. The determines no change to the text is required.

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

Peer Review Comments:

I generally concur with the findings and ratings of this section, but have the following comments:

1) Evidence information provided for supporting clause 13.1 on the hatchery product of salmon is quite extensive; you may wish to consider moving some of this into the Background section rather than presenting all of it here.

Assessment team response: The team believes that the information provided in this section is relevant in supporting evidence for subclause 13.1 and is properly located in the document which is consistent with Alaska RFM procedure. No changes made.

2) Evidence information for supporting clause 13.2.1 should be better focused on how local communities' livelihoods and access to fishing are protected by the state when permitting and reviewing hatchery developments and operations.

Assessment team response: The last paragraph of this section has now been expanded to address the reviewer's comment. It now references and briefly describes the annual planning process.

3) Evidence information provided for supporting clause 13.5 could be expanded to more fully address this supporting clause.

Assessment team response: Added the following text: "Stream restoration and habitat improvement projects are performed by diverse governmental and non-governmental organizations in Alaska. Projects are intended to restore or otherwise improve ecosystem structure and function, and may be used to

F.	Serious Impacts of the Fishery on the Ecosystem
increase salmon production in areas where they occur."	

8.2. Summary and Recommendation Peer Reviewer 2

The information presented in the December 2016 draft Reassessment and Certification Report for the US Alaska Salmon Commercial Fisheries provides strong evidence supporting the recommendation of the Global Trust certification review team that the Fishery continue certification against the Alaska Responsible Fisheries Management Certification Program.

The Alaska salmon management system is very robust from an administrative and regulatory standpoint. It is clearly demonstrated that the ADF&G's management foundation is based on establishing defensible escapement goals and managing to achieve these goals as its highest priority.

There is no clear rational provided for selection of the proposed units of assessment and certification provided in Table 6. This suggests a process where each unit of certification is independently evaluated against the 13 fundamental clauses and commensurate subclauses. In practice it appears that the Global Trust assessment team's approach was more broad brush, looking at all five species of salmon from a state-wide perspective, while drilling down in detail to management area or watershed (district) level to address specific aspects of a specific stock or "stock under consideration" at a finer level of detail that the unit of certification.

Assessment response: This was a reassessment report that has re-evaluated the fishery that was certified initially in 2011. The circumstances of the original units of assessment have not changed, and hence, there was no need to re-examine again as this process was done during the initial validation and justification of the chosen units of assessment, largely based on State management regional approach.

SC 13.4 has a Medium Evidence Rating with Minor non-conformance. The Medium rating is well supported and an action plan was provided to the peer reviewer to demonstrate KRAA efforts and timeline for coming into compliance with the mass marking and evaluation program for enhanced fish production.

Significant progress has been made by ADF&G, the PWS Science Center and the Sitka Sound Science Center and others addressing the interactions of hatchery was wild salmon stocks in PWS and SEAK. The application of an in-season stock identification management tool is particularly noteworthy. While I concur with the assessment team's recommendation to close out the minor non-conformance from the prior certification, the issue should remain on the radar for future assessment and audit teams as additional genetic information of wild stock fitness comes to light**.**

Assessment response: This was a reassessment report who evaluated the fishery that was certified on 2011. There is no need to re-examine again the selection of the proposed units of assessment and certification as this process was done during the validation report and first full assessment. Annual surveillance audits will be used to evaluate ongoing and future research on the issue of the genetic information of wild stock fitness and management measures that may be developed based on this science.

8.2.1. Full Summary of Comments – Peer Reviewer 2

Background Section

Peer Review Comments:

The background sections of the report provide an adequate foundation for the balance of the report. In general it could benefit from some additional detail. The fishery location and methods section would be improved by more complete description of the diverse geography and ecosystems that make up each of the four regional divisions, providing some contrast between the uniqueness of each. For example the complex coastal islands of Southeast Alaska, large glacial river systems of AYK and the extensive lake systems of Bristol Bay each provide different habitats for salmon productivity and challenges for stock assessment and harvest management. The fishing methods section is lacking a description of fish wheels used in the Upper Yukon. The administrative regions would benefit for more detail of the management areas and districts. While summary harvest data is presented for the regional and in some cases area descriptions there is no analogous summary of escapement which is clearly stated to be the primary management objective of the fishery management program. The historical enhanced salmon production presented in SC 7.1 might better be incorporated in the background section.

Assessment team response: A more detailed description of each administrative region is included on the revised document that describes salmon production and common characteristics of the region. The team felt that the a more comprehensive documentation of the enhanced salmon production presented on section7.1 fits better in that section that on the background. Maps are included on the appendix III.

There is no clear rational provided for selection of the proposed units of assessment and certification provided in Table 6. This suggests that each unit of certification is independently evaluated against the 13 clauses and commensurate subclauses. In practice it appears that the assessment team's approach was broader based looking at all five species of salmon from a state-wide perspective, while drilling down in detail to management area or watershed (district) level to address specific aspects of a specific stock or "stock under consideration".

Assessment team response: Since this is a reassessment report which evaluated the fishery that was certified on 2011, there was need to re-examine again the selection of the proposed units of assessment and certification as this process was done during the validation report and first full assessment.

The entire background section would benefit from a rigorous editing to correct typos, and improve sections that are rough and disjointed. References should be checked, for example reference to Woodby et.al. 2005 is not found in footnotes or in the reference section. Acronyms such as BoF are not defined at first use. There a numerous acronyms used throughout the report that are not included in the acronym list.

Assessment team response: Thanks the reviewer for the comment and notes that the report will be formatted and spell checked pior to publication. An updated list of acronyms is included on the new version.

Background Section
Stock assessment activities should include genetic stock ID, mark and recapture. *Assessment team response: The team felt these research topics are of technical nature and should be specifically located on their respective sections rather than included on the background section.*

A.	**The Fishery Management System**
1.	**There shall be a structured and legally mandated management system based upon and respecting International, National and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.**
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that the Fishery Management System meets the high conformance standard of Clause 1 and the applicable 10 subclauses. The Alaska salmon management system is very robust from an administrative and regulatory standpoint. While it is clearly demonstrated that the ADF&G's management foundation is based on establishing defensible escapement goals and managing to achieve these goals as its highest priority is not clear what the ADF&G's track record is in achieving these goals. This information is presented in subsequent SC 6.2. Because there is considerable overlap in the evidence presented for the Clauses & Supporting Clauses, directing the reader to the narrative in other SC's as is done elsewhere in the report may be beneficial in this section. *Assessment Team Response: Sentences referring previous and next sections were used consistently using this sentence. Please see Section…. For more details.*	
2.	**Management organizations shall participate in coastal area management institutional frameworks, decision-making processes and activities related to the fishery and its users, in support of sustainable and integrated resource use, and conflict avoidance.**
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that coastal area management frameworks meet the high conformance standard of Clause 2 and the applicable 10 Supporting Clauses. SC 2.8 fails to include the Yukon River in the list of transboundary systems. *Assessment Team Response: Yukon River was included on the list on the revised section.*	
3.	**Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.**
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that the management objectives and planning aspects of the Fishery Management System	

A.	The Fishery Management System

meet the high conformance standard of Clause 3 and the applicable 8 subclauses.

SC 3.2.1- Evidence section 3rd sentence: "…, no commercial fishermen may operate in a *distressed* fishery without first obtaining… "Wrong word???

Assessment team response: Sentence changed to To that end, no commercial fisherman may operate in the salmon fishery without first obtaining an entry permit.

SC 3.2.4 - The IUCN Red List classification of "Vulnerable" for Nass Skeena Estuary North of Nass could use some clarification. It is stated that there are no stocks with ADF&G established escapement goals in this area, but the "vulnerability" of these stocks is not clearly addressed in terms of any state managed fisheries operating in the area and the existence of proxy streams.

Assessment team response: Paragraph deleted . New Text was provided as
. 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……..

B.	Science and Stock Assessment Activities
4.	**There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.**

Peer Review Comments:
The information presented provides strong evidence supporting the findings of the review team that the fishery data collection and analysis systems aspects of the Science and Stock Assessment Activities meet the high conformance standard of Fundamental Clause 4 and the applicable 10 subclauses.
SC 4.6 The evidence supporting the High Evidence Rating for this supporting clause states: "While traditional knowledge has been documented in some areas, the fisheries are managed to achieve escapement goals. There are no small scale commercial salmon fisheries that are managed using traditional knowledge." This suggests that traditional knowledge (TK) is not applicable to sustainable fisheries conservation, management and development. I would argue that TK can provide useful qualitative information to fishery managers and suggest that the concluding sentence be revised as follows:
There are no small scale commercial salmon fisheries that are managed solely using traditional knowledge.

Assessment Team Response: Concluding sentence was modified as reviewer suggested.

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

B.	Science and Stock Assessment Activities

Peer Review Comments:

The information presented provides strong evidence supporting the findings of the review team that the stock assessment aspects of the Science and Stock Assessment Activities meet the high conformance standard of Fundamental Clause 5 and the 7 applicable subclauses.

Assessment Team Response: No response warranted.

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

Peer Review Comments:

The information presented, specifically the Policy for Statewide Escapement Goals 5 AAC 39.223 provides strong evidence supporting the findings of the review team that the biological reference points and harvest control aspects of the Precautionary Approach meet the high conformance standard of Clause 6 and the applicable 4 subclauses.

Assessment Team Response: No response warranted.

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

Peer Review Comments:

The information presented provides strong evidence supporting the findings of the review team that management actions and measures, aspects of the Precautionary Approach meet the high conformance standard of Fundamental Clause 7 and the 5 applicable subclauses.

SC 7.1 Two issues are highlighted from prior surveillance Reports; 1) depressed returns of Chinook salmon state-wide and 2) hatchery origin pink and chum salmon interactions with wild stocks in PWS and SEAK. Both issues are addressed very thoroughly. The discussion of hatchery and wild stock interactions is very lengthy and contains some historical sections that might better be incorporated in the background section of the report. There is also a paragraph under the heading “Hatchery Regulatory Environment” that is repeated and should be removed. Significant progress has been made by ADF&G and the PWS Science Center and the Sitka Sound Science Center. The application of an in-season stock identification management tool is particularly noteworthy. While I concur with the assessment team’s recommendation to close out the prior minor non-conformance, the issue should remain on the radar for future assessment and audit teams as additional genetic information of wild stock fitness comes to light.

C.	The Precautionary Approach
Assessment Team Response: The assessment team acknowledges the comment. The certification period will include 4 annual surveillance audits which will monitor progress as noted.	

D.	Management Measures
8.	**Management shall adopt and implement effective management measures designed to maintain stocks at levels capable of producing maximum sustainable yields, including harvest control rules and technical measures applicable to sustainable utilization of the fishery and be based upon verifiable evidence and advice from available scientific and objective, traditional sources.**
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that Management Measures designed to maintain stocks at MSY meet the high conformance standard of Fundamental Clause 8 and the applicable 15 subclauses. *Assessment Team Response: No response warranted.*	
9.	**Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards and guidelines and regulations.**
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that Management Measures including standards of fishing operations meet the high conformance standard of Clause 9 and the 2 applicable subclauses. *Assessment Team Response: No response warranted.*	

E.	Implementation, Monitoring and Control
10.	An effective legal and administrative framework shall be established and compliance ensured through effective mechanisms for monitoring, surveillance, control and enforcement for all fishing activities within the jurisdiction.
Peer Review Comments: The information presented provides strong evidence supporting the findings of the review team that Implementation, Monitoring and Control measures including an effective legal and administrative framework meet the high conformance standard of Clause 10 and the applicable 5 subclauses. *Assessment Team Response: No response warranted.*	

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

Peer Review Comments:
The evidence presented for Clause 11 and the applicable 3 subclauses supports the high evidence rating that Implementation, Monitoring and Control measures including sanctions for violations and illegal activities, support compliance and discourage violations.

Assessment Team Response: No response warranted.

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

Peer Review Comments:
The evidence presented under Fundamental Clause 12 and the applicable 16 subclauses supports the high conformance finding that Serious Impacts of the Fishery on the Ecosystem shall be considered using best available science, local knowledge (traditional knowledge), and a risk based management approach.

Assessment Team Response: No response warranted.

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

Peer Review Comments:
The evidence presented under Fundamental Clause 13 and the applicable 19 subclauses supports the high conformance rating that serious impacts of the fishery on the ecosystem shall be considered using best available science, local knowledge (traditional knowledge), and a risk based management approach. This is the only fundamental clause in which one of the 19 supporting/sub-clauses did not meet the high evidence rating. SC 13.4 has a Medium Evidence Rating with Minor non-conformance. The Medium rating is well supported and an action plan was provided to the peer reviewer to demonstrate KRAA efforts and timeline for coming into compliance with the mass marking and evaluation program for enhanced fish production.

Assessment Team Response: No response warranted.

SC 13.4 In Lower Cook Inlet, the Tutka Bay and Port Graham hatcheries recently reopened and are struggling to rebuild brood stock. Clarification should be provided as to whether these facilities have marking capacity for

F.	Serious Impacts of the Fishery on the Ecosystem

hatchery releases.

Assessment Team Response: The 2016 Annual Management Plan for the Tutka Bay Lagoon Hatchery is available at: https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/annual_management_plans/2016/2016_tblh_amp.pdf This plan states that "all fish" will be thermally marked (see page 5 of plan).

The 2016 Annual Management Plan for the Port Graham Hatchery is available at: http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/annual_management_plans/2016/2016_pgh_amp.pdf This plan states that "all fish" will be thermally marked (see page 3 of plan).

It is the assessment team understanding that these facilities do have the capacity to thermal mark fish, in accordance with their management plans. That these facilities mark the fish they produce is in accordance with standard practice in Alaska, as described in the Assessment, and therefore do not warrant special mention. Instead, the Assessment calls attention to the exception to the norm presented by Kodiak Island hatcheries, which do not thermal mark the majority of fish they produce.

It is the view of the assessment team that a description of the norm and exceptions from it, with regarding to hatchery marking practices, is a more concise and direct presentation of information than case-by-case descriptions of each hatchery's marking capacity. No change to the text has been made.

SC 13.2 could be strengthened by referencing and describing the annual management planning process conducted by the ADF&G, hatchery operators and Regional Planning Teams. These annual hatchery management plans lay out harvest management strategies addressing specific hatchery and wild stock forecasts; wild stock escapement needs and commensurate exploitation rates; and hatchery cost recovery and brood stock requirements.

Assessment Team Response: The last paragraph of this section has now been expanded to address the reviewer's comment. It now references and briefly describes the annual planning process.

SC 13.5 Modifications to habitat for enhancing salmon production such as fish ladders that provide passage to fish habitats above barrier falls and creation of spawning channels are not addressed by the hatchery permitting and review process. Examples are found in PWS administered by the USFS.

Assessment Team Response: Added the following text: "Stream restoration and habitat improvement projects are performed by diverse governmental and non-governmental organizations in Alaska. Projects are intended to restore or otherwise improve ecosystem structure and function, and may be used to increase salmon production in areas where they occur."

9. Non-Conformances and Corrective Actions

Non-conformances are categorized as minor, major and critical non-conformances. Where the Assessment Team concludes that the available evidence does not meet the 'high' confidence rating for a specific clause of the Conformance Criteria, and on further clarification with fishery management organizations, the outcome remains unchanged; a non-conformance may be raised against that particular clause.

Low Confidence Rating (Critical Non-Conformance level)
Information/evidence is completely absent or contradictive to demonstrating compliance of an element of a fishery to the given requirements of a supporting clause. In these cases, a low confidence rating, equivalent to a critical non-conformance is assigned. Alternatively, any non-conformance assigned to any Section A to F, above the designated maximum permitted of 1 major non-conformance or 3 minor non-conformances will also result in the assignment of a critical non-conformance (at Section level). A critical non-conformance will essentially stop the assessment (not allowing for certification) unless the applicant is able to provide information/evidence that demonstrates a better state of the fishery than previously assessed. The Validation Report activities are designed to determine if critical non-conformances within the Applicant Management System are likely before proceeding with the assessment. Notwithstanding this, the option of assigning critical non-conformances remains available to the Assessment Team if there is merit for this decision to be taken.

Medium Confidence Rating (at Major Non-Conformance level)
Information/evidence is limited that demonstrates compliance of an element of the fishery to the given requirements of a supporting clause. In these cases a major improvement is needed to achieve high conformance and for a medium confidence rating at this level, a "major non-conformance" is assigned.

Medium Confidence Rating (at Minor Non-Conformance level)
Information/evidence is broadly available that demonstrates conformity to a clause although there are some gaps in information/performance that if available would clarify aspects of conformity and allow the Assessment Team to assign a higher level of confidence. In these cases a minor improvement is needed to achieve high conformance and for a medium confidence rating at this level, a "minor non-conformance" is assigned.

High Level of Confidence
Where the Assessment Team agrees that sufficient information/evidence is available to demonstrate conformance/performance to a given supporting clause, a high level of confidence is assigned. Sufficient evidence is that which allows, through expert opinion of the collective team, substantiation that a given element of a fishery, complies fully with the FAO-Based Responsible Fisheries Management Conformance Criteria.

Non Conformances Identified:

The assessment team appointed to undertake the re assessment of the Alaska Salmon fishery has identified one Minor Non-Conformance:

A medium confidence rating and consequent minor nonconformance has been issued under:

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.

Details of Non-Conformance:
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

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.
- 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).
- Global Trust 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.

Action Plan submission from 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

	Beginning of Audit Year									Entity Responsible
Actions & Auditable Tasks	**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

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Letter of Support from KRAA (1st page) received on December 8 2016.

KODIAK REGIONAL AQUACULTURE ASSOCIATION
104 Center Avenue, Suite 205
Kodiak, AK 99615

Phone: 907-486-6555
Fax: 907-486-4105
www.kraa.org

Julie Decker
Alaska Fisheries Development Foundation
P.O. Box 2223
Wrangell, AK 99929-2223

8 December, 2016

Dear Ms. Decker:

This letter serves to confirm the assent and participation of the Kodiak Regional Aquaculture Association (KRAA) in the Alaska Responsible Fisheries Management (RFM) sustainability certification process. KRAA's Board of Directors met most recently on December 6, 2016, and authorized by consent the penning of this letter indicating KRAA's commitment to implementation of a marking and evaluation program for pink salmon at Kitoi Bay Hatchery and the path set out in the Action Plan provided by AFDF, the Pacific Seafood Processors Association (PSPA), and KRAA.

Though KRAA has participated in a number of site visits with RFM assessment teams in recent years, we first became aware of a minor non-conformance regarding marking pink salmon at KRAA's Kitoi Bay hatchery facility on August 12, 2016 when you forwarded the letter from Global Trust dated August 2. The letter provided 30 days in which to develop an Action Plan to address the minor non-conformance. This notice and the timeline were both unexpected developments in the RFM sustainability process. We appreciate that AFDF sought an immediate extension of the 30 day response period given that the salmon season was still underway, and further, that AFDF worked with KRAA to convene a meeting of the KRAA Board of Directors on September 23, 2016 which included a presentation by representatives from AFDF and PSPA.

During that meeting, KRAA presented materials related to the issue identified as the cause of the minor non-conformance—lack of identifiable marking of enhanced pink salmon produced by Kitoi Bay Hatchery and the current inability to determine the proportion of hatchery produced fish in the commercial harvest and in local streams. For that meeting, the Alaska Department of Fish & Game (ADF&G) also provided a draft memo related to management of the pink salmon fishery in Kodiak and the potential information that could be derived from evaluation of marked enhanced production. The results of that meeting were as follows:

- KRAA's Board of Directors authorized funds that would allow for completion of final engineering design and plans for a marking system and attendant plumbing.
- The client group was to provide a report on cost-benefit related to sustainability certification in order to support and aide the search and application process to provide alternate funding for the potential purchase and installation of marking equipment and the evaluation of future marked fish.

Letter of Support from KRAA (2nd page)

- KRAA's Board of Directors authorized its Executive Director to work with AFDF's Executive Director and the contracted Technical Facilitator to provide current information and a draft Action Plan related to the minor non-conformance.
- KRAA's Board of Directors also discussed estimated costs associated with the purchase of equipment and implementation of marking and evaluation programs for pink salmon at Kitoi Bay Hatchery as well as KRAA's financial position following a disastrous 2016 salmon season and the long-term effects of that failed return. As a result, the KRAA Board agreed that funding outside of KRAA's typical funding streams (cost recovery and Salmon Enhancement Tax) would be required in order to implement otolith marking and evaluation of pink salmon at Kitoi Bay Hatchery. As a result, they further authorized the KRAA Executive Director to work with AFDF to identify and pursue potential funding sources upon completion of the cost-benefit report.

Following the September 23, 2016 meeting, KRAA worked with AFDF to provide the RFM Assessment Team with the draft Action Plan. AFDF has coordinated with the Assessment Team and KRAA through minor revisions, and a this letter will accompany the final version of that Action Plan.

The Association's acknowledgement of the minor non-conformance and participation in creation of the Action Plan to correct it reveal commitment to the path of eventual marking at Kitoi Bay Hatchery. While by regulation and permit, KRAA is not required to conduct a program of marking and evaluation for pink salmon at Kitoi Bay Hatchery, the Board of Directors has acknowledged the importance of both defending the sustainability of KRAA's enhancement programs and the growing importance of sustainability marketing schemes in the modern marketplace. Within a period of 4 months from the date KRAA was notified of this minor non-conformance, there exists plans to obtain final engineering on the necessary systems, KRAA's Research & Monitoring staff has collaborated with local ADF&G staff to prepare preliminary operational plans and budgets for Common Property contribution and straying evaluation, and the Board of Directors has taken action to authorize and approve KRAA's participation and collaboration in this process. These are all significant advances, in a short period of time, toward the aims expressed by Global Trust and the assessment team in their letter of August 2, 2016.

If you or the Assessment Team has any further questions, please feel free to contact me any time.

Tina Fairbanks
Executive Director

10. Recommendation

Following significant consultation and clarification with the client fishery and Board member at KRAA with the assessment team on the corrective actions and timelines presented to close out the minor non-conformance found on clause 13.4, the re-assessment team recommends that the management system of the applicant fishery, US Alaska Commercial Salmon Fisheries continued certification to the Alaska RFM Standard.

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12. Appendices

12.1. Appendix 1 – Assessment Team

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.

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.

12.2. Appendix 2 – Peer Reviewers Information

Steve Fried

Currently serve as a Science Editor for Fisheries, a publication of the American Fisheries Society.

Office of Subsistence Management Fisheries Division Chief, U.S. Fish and Wildlife Service at US Fish and Wildlife Service

2000 - 2013 (13 years)

Office of Subsistence Management is located within U.S. Fish and Wildlife Service, and coordinates federal subsistence management responsibilities among five federal agencies - Bureau of Indian Affairs, Bureau of Land Management, Forest Service, National Parks Service, and Fish and Wildlife Service Fisheries Division Chief, Office of Subsistence Management (GS 15) - Responsible for Fisheries Resource Monitoring Program, Partners for Fisheries Monitoring, Regional Advisory Councils and Federal Subsistence Board support, and Fisheries Division staff supervision Regional Fish Biologist, Office of Subsistence Management (GS 14) - Regional responsibilities varied and included Southcentral, Bristol Bay, Kodiak/Aleutians, Seward Peninsula, North Slope, and Northwest Arctic Commercial Fisheries Central Region Research Supervisor at Alaska Department of Fish and Game

1978 - 2000 (22 years) Alaska Department of Fish and Game manages about 750 fisheries throughout the state. The Central Region of the Commercial Fisheries Division is composed of four management areas: Bristol Bay, Prince William Sound and Copper River, Upper Cook Inlet, and Lower Cook Inlet. This region includes the largest sockeye salmon fishery in the world (Bristol Bay), the largest herring fishery in the state (Bristol Bay - Togiak), and many small and diverse groundfish and shellfish fisheries. Southcentral (Copper River, Prince William Sound, Cook Inlet, Bristol Bay) Regional Research Supervisor, Commercial Fisheries Division, Anchorage, AK Exxon Valdez Oil Spill Coordinator, Commercial Fisheries Division, Anchorage, AK Bristol Bay Salmon Research Lead Biologist, Commercial Fisheries Division, Anchorage, AK Bristol Bay Area Biologist for Fisheries Rehabilitation, Enhancement and Development Division, Dillingham, AK

Peer Reviewer 2: James Brady.

James Brady has been involved in fisheries and aquatic resources for over 35 years. He worked for 25 years as a fisheries biologist and Regional Supervisor for the Alaska Department of Fish and Game. While he worked for other fisheries divisions of the department, the majority of his career was with the Division of Commercial Fisheries where he supervised stock assessment and harvest management programs throughout much of the state including some of the state's largest salmon and herring fisheries. He oversaw salmon escapement monitoring and research projects in diverse watersheds ranging from short coastal streams to large transboundary glacial river systems. Working at a time when the state's salmon aquaculture program was beginning to see its first significant returns, he developed the run timing data curves and harvest strategies to preserve wild stock escapements while providing for a robust common property harvests and cost recovery needs of the hatchery operators. Working through regulatory bodies such as the Alaska Board of Fisheries as well as industry and stakeholder groups, he established harvest policy for new developing fisheries, and established management plans to address stocks of concern in highly utilized commercial, recreational and subsistence fisheries. As a private consultant for the past 12 years James led environmental assessments of aquatic resources for small and large scale hydroelectric projects in Alaska under FERC licensing requirements. He assisted clients in developing innovative escapement monitoring programs involving acoustics, fish wheels and video systems. He has participated in projects addressing research needs for the North Pacific Research Board and the Alaska Sustainable Salmon Initiative. He served on a team tasked with conducting the annual performance audits for Alaska's MSC salmon certification. In 2016 he was a volunteer for the USAID Farmer to Farmer Program assisting the South Sudanese Ministry of Fisheries develops a harvest monitoring and data management system for the fisheries of the White Nile.

12.3. Appendix 3 - Fishery

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.

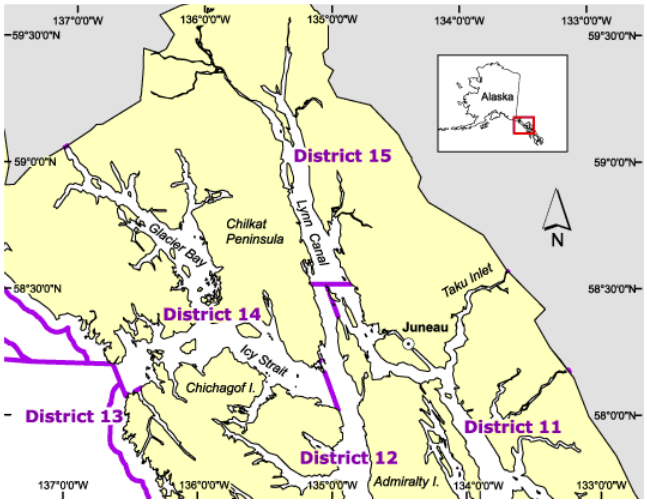

Figure 10. Juneau & Northern Southeast Alaska Salmon Districts

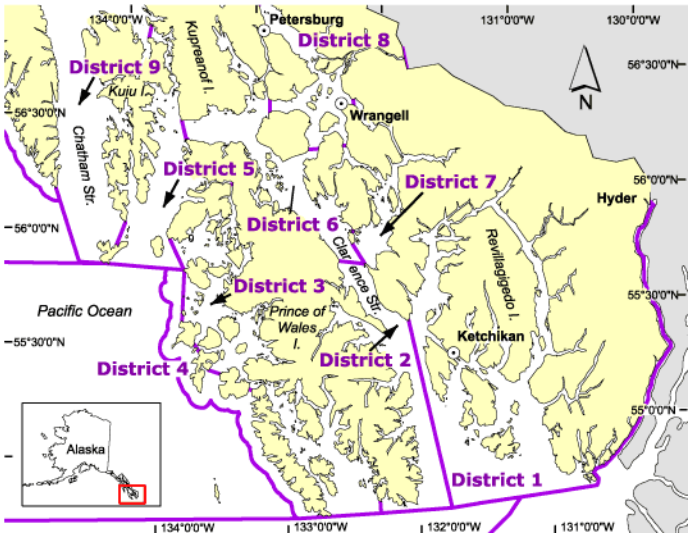

Figure 11. Ketchikan & Southern Southeast Alaska Salmon Districts

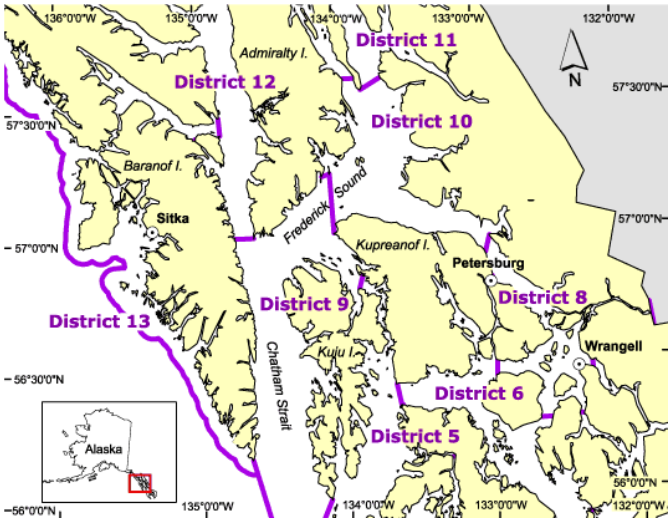

Figure 12. Sitka and Central Southeast Alaska Salmon Districts

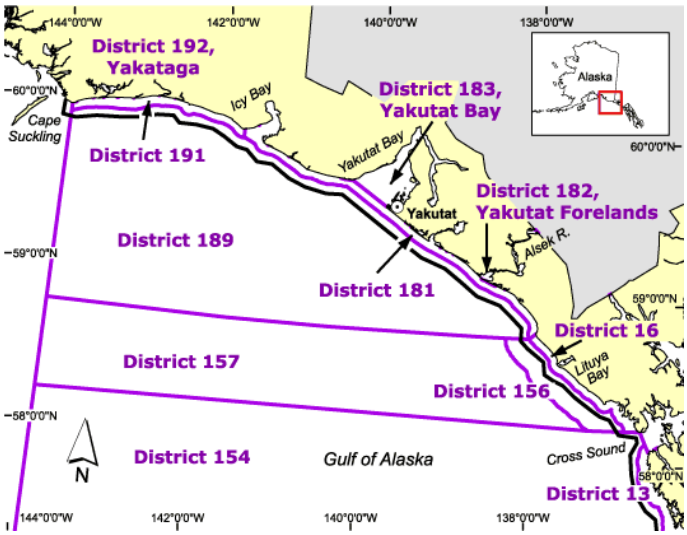

Figure 13. Yakutat and NW Southeast Alaska Salmon Districts

Region 2. Central : Prince William Sound, Cook Inlet and Bristol Bay area.

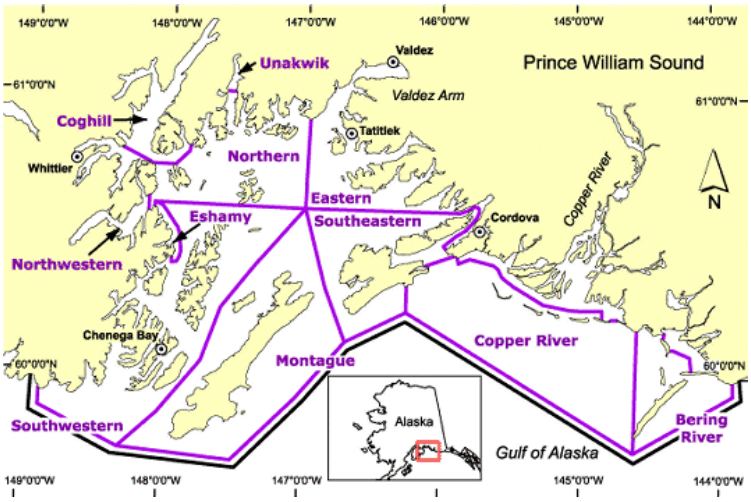

Figure 14. Prince William Sound Salmon Districts

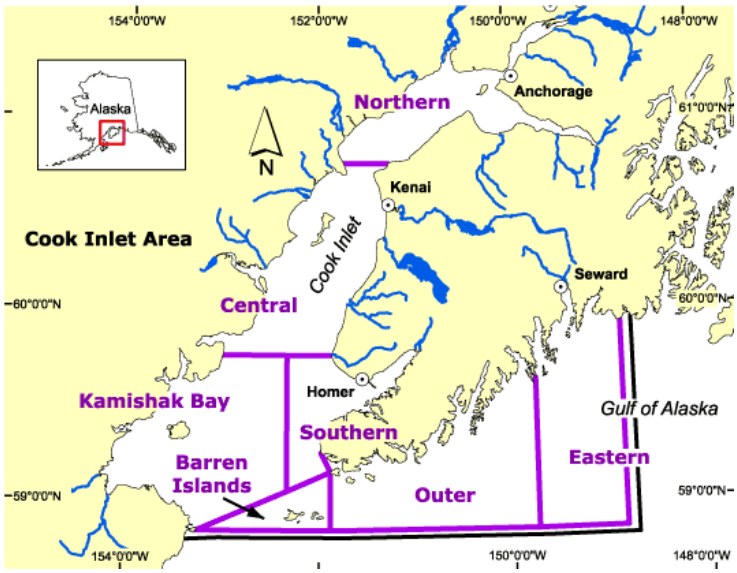

Figure 15. Cook Inlet Salmon District

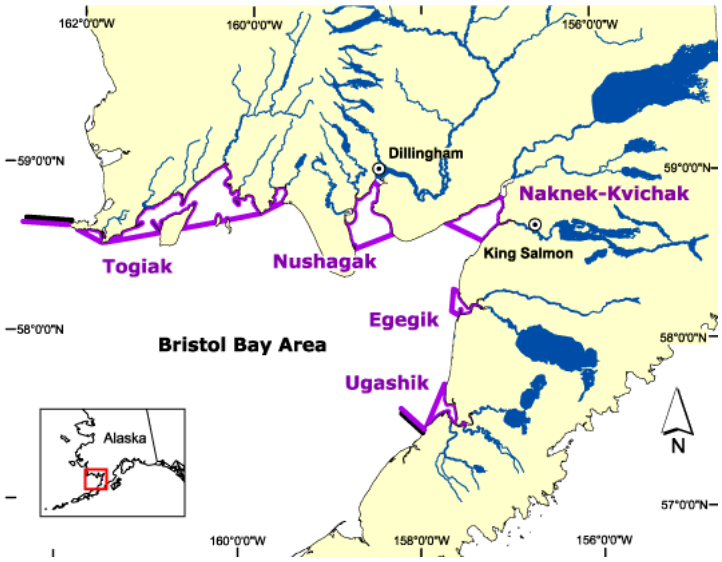

Figure 16. Bristol Bay Salmon Districts

Region 3. Arctic-Yukon-Kuskokwim area.

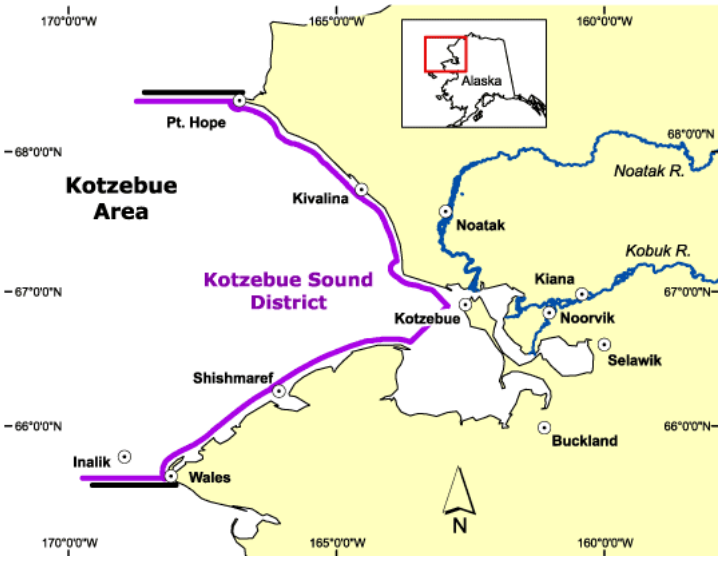

Figure 17. Kotzebue Area Salmon District

Figure 18. Norton Sound-Port Clarence Area Salmon Districts.

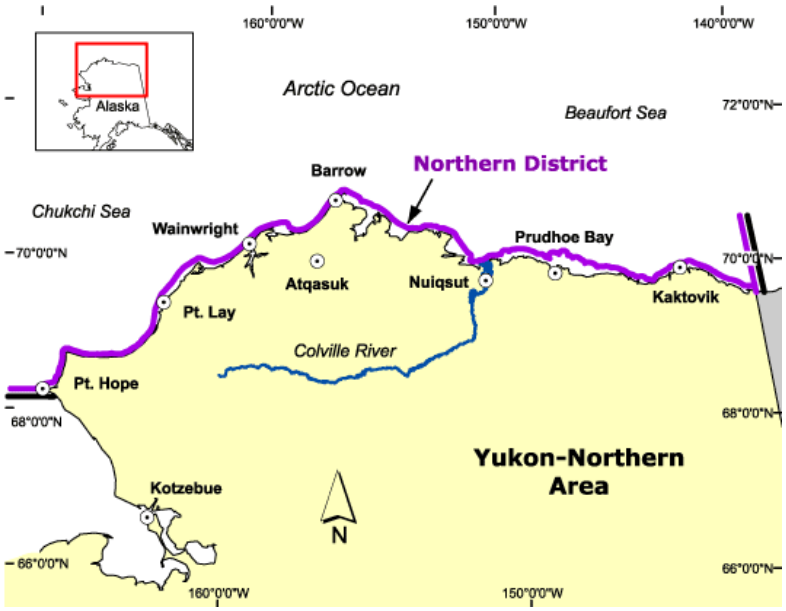

Figure 19. Yukon-Northern Area Salmon District

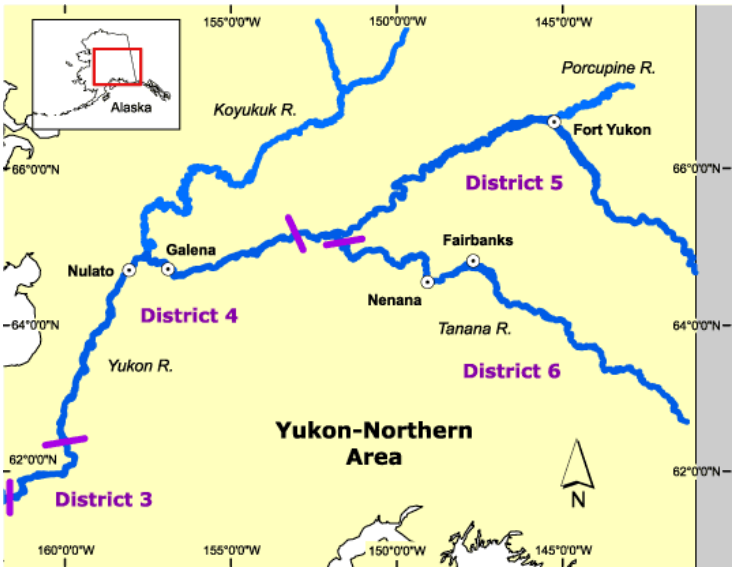

Figure 20. Upper-Yukon Area Salmon Districts.

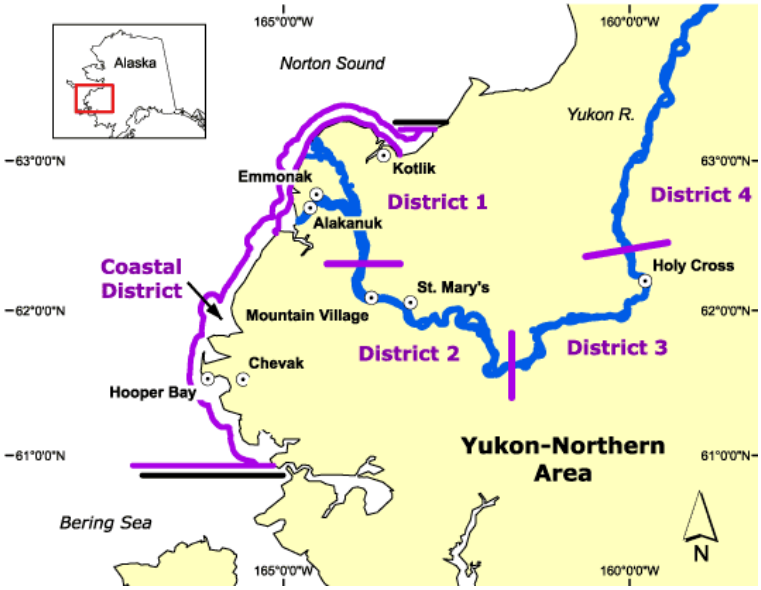

Figure 21. Lower-Yukon Salmon Districts

Figure 22. Kuskokwim Area Salmon Districts

Region 4. Westward: Kodiak, Aleutians and Chignik area.

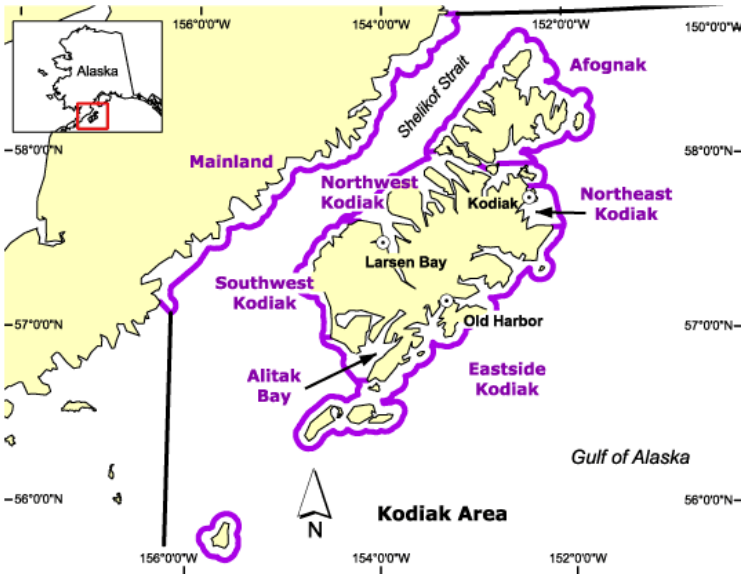

Figure 23. Kodiak Area Salmon District.

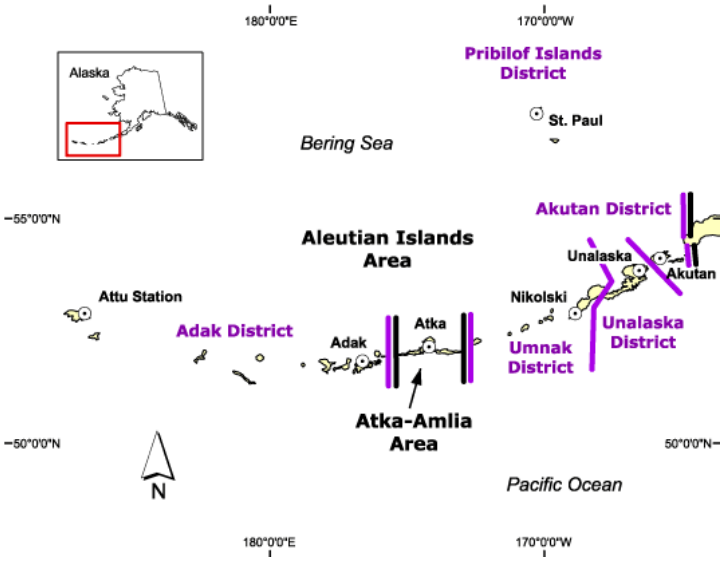

Figure 24. Aleutian Islands Area Salmon Districts

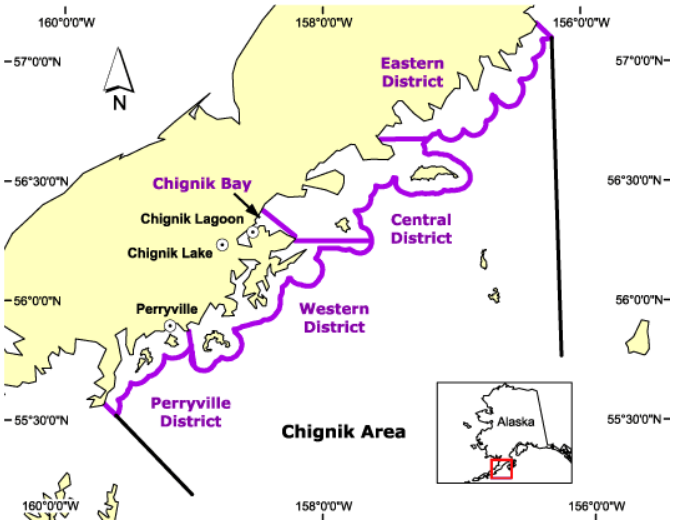

Figure 25. Chicknic Area

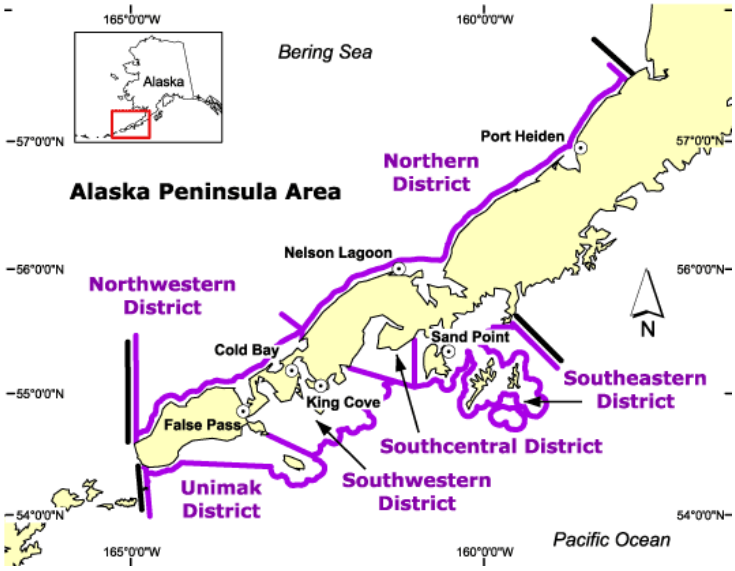

Figure 26. Alaska Peninsula Area