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Alaska Salmon Fishery

FINAL DETERMINATION REPORT

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Glossary of Acronyms

ADF&G	Alaska Department of Fish and Game
AK	State of Alaska
AMMOP	Alaska Marine Mammal Observer Program
ANS	Amounts necessary for subsistence
AYK	Arctic-Yukon-Kuskokwim (Region)
BEG	Biological escapement goal
BOF	Board of Fisheries
CIAA	Cook Inlet Aquaculture Association
CITES	Convention on International Trade in Endangered Species
CMA	Chignik Management Area
CPF	Common property fishery
CWT	Coded-wire tag
ESA	Endangered Species Act
GSI	Genetic stock identification
IMEG	Interim management escapement goal
IMM	Intertek Moody Marine
IPI	Inseparable / Practically Inseparable
ISBF	Introduced species based fisheries
KMA	Kuskokwim Management Area
LCI	Lower Cook Inlet
LRP	Limit reference point
MBA	Migratory Bird Act
MMPA	Marine Mammal Protection Act
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
NGO	Non-governmental organisation
NMFS	National Marine Fisheries Service
NSEDC	Norton Sound Economic Development Corporation
NSI	Northern Southeast Inside
PBR	Potential Biological Removal
PI	Performance Indicator
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
PSVOA	Purse Seine Vessel Owners' Association
PWS	Prince William Sound
PWSAC	Prince William Sound Aquaculture Corporation
SEAK	Southeast Alaska
SEG	Sustainable escapement goal
SG	Scoring Guidepost
SI	Scoring Issue
SOC	Stock of concern
SRA	Spawner-recruit analysis
TAC	Total allowable catch
TRP	Target reference point
UCI	Upper Cook Inlet
UoC	Unit of Certification
USFWS	United States Fish and Wildlife Service
WASSIP	Western Alaska Salmon Stock Identification Program
WWF	World Wildlife Fund
YMA	Yukon Management Area

1 Executive Summary

The Alaska salmon fishery has been certified twice previously, first in 2000 and then again in 2007. This report now presents results of the third assessment of the fishery against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing. The client for the assessment is the Purse Seine Vessel Owners' Association (PSVOA).

This version of the assessment report is the Final Determination Report, such that the fishery assessment has already proceeded through the peer review and public consultation phases, and the fishery will be certified if no objections are now raised by stakeholders to its certification.

The Alaska salmon fishery targets five Pacific salmon species (Chinook – *Oncorhynchus tshawytscha*, sockeye – *Oncorhynchus nerka*, pink – *Oncorhynchus gorbuscha*, chum – *Oncorhynchus keta* and coho – *Oncorhynchus kisutch*). All five species are anadromous, spawning and hatching in freshwater but living and feeding in the ocean, before heading back to freshwater to repeat the spawning and hatching cycle. Pink salmon is the smallest but most numerous species, and Chinook salmon is the largest but least numerous species. All five species that occur in Alaska have strong commercial markets and varying levels of subsistence, personal use, and sport fishing importance.

Six separate gear types are utilized in the Alaska salmon fishery; these are purse seine, drift gillnet, set gillnet, troll, beach seine (Yukon River, Kodiak, Alaska Peninsula), and fishwheel (Yukon River), and these are variously used within 14 separate Units of Certification (UoC).

Table ES1: Units of Certification within the Alaska salmon fishery (target species are shaded grey).

			Target Species				
Unit	Regulatory Area	Gear types	Sockeye	Chinook	Coho	Pink	Chum
1	Southeast	Purse seine, drift gillnet, troll					
2	Yakutat	Set gillnet, troll					
3	Prince William Sound	Purse seine, drift gillnet, set gillnet					
4	Copper/Bering Districts	Drift gillnet					
5	Lower Cook Inlet	Purse seine, set gillnet					
6	Upper Cook Inlet	Drift gillnet, set gillnet					
7	Bristol Bay	Drift gillnet, set gillnet					
8	Yukon River	Beach seine, drift gillnet, set gillnet, fish wheel					
9	Kuskokwim	Drift gillnet, set gillnet					
10	Kotzebue	Set gillnet					
11	Norton Sound	Set gillnet					
12	Kodiak	Purse seine, beach seine, set gillnet					
13	Chignik	Purse seine					
14	Peninsula/Aleutian Islands ("Area M")	Purse seine, beach seine, drift gillnet, set gillnet					

The 14 UoCs are listed in the table above, and are based on Management Areas contained within the four Alaska Management Regions – Southeast Region (Southeast and Yakutat UoCs), Central Region (Prince William Sound, Copper/Bering Districts, Lower Cook Inlet, Upper Cook Inlet and Bristol Bay UoCs), Arctic-Yukon-Kuskokwim Region (Yukon River, Kuskokwim, Kotzebue and Norton Sound UoCs) and Westward Region (Kodiak, Chignik, and Peninsula/Aleutian Islands [Area M] UoCs). There is no commercial harvest of salmon in the Northern Management Area of the Arctic-Yukon-Kuskokwim Region (i.e., north of Kotzebue), and this Management Area is therefore not included as a UoC.

This reassessment of the Alaska salmon fishery was undertaken by Dr. Greg Ruggerone, Dr. Dana Schmidt and Professor Jim Seeb, who covered Principle 1 (target stock), Principle 2 (environment) and Principle 3 (management) components of the MSC Standard across the different UoCs. Site visits to Seattle, Washington (18-19 October 2012) and then to Anchorage, Alaska (22-23 October 2012) were undertaken in order to meet with scientists, fishery managers and stakeholders, as well as with representatives of the PSVOA. During the days that the team was convened, opportunities to meet with the team were provided for all stakeholders who expressed such a desire.

An important aspect of the Alaska salmon fishery is that a significant proportion of the harvest in some UoCs is made up of hatchery-reared fish. The 'hatch and catch' rearing system is intended to supplement, not supplant, the wild stock production, and takes advantage of the natural homing instinct of Pacific salmon that typically bring them back to their natal rivers to spawn after the marine feeding phase. Although the first Alaska hatcheries were established in the 1890s, a major expansion in salmon aquaculture research and production began in the 1970s, and hatchery returns in some areas now comprise a significant proportion of the total harvests.

Key strengths of the Alaska salmon fishery include the long period of time over which catch and escapement data have been collected, the strong management focus on achieving sustainable escapements of wild salmon, Alaska's relatively pristine habitats, and the knowledge and experience of the staff of the Alaska Department of Fish and Game (ADF&G).

Thirteen of the 14 UoCs are considered to meet the MSC standard with high overall scores. As such, it is recommended that these 13 UoCs are certified according to the MSC standard as being sustainable. At the present time, the assessment team considers that additional information is needed in order to conduct the assessment of the Prince William Sound (PWS) UoC. As such, the PWS UoC remains in assessment while the other 13 UoCs may proceed through the assessment process. Summary scores for each of the UoCs are provided in Table 2, below.

Table ES2: Summary table showing final Principle level scores

Unit of Certification		Principle	Score	Pass?
1	Southeast Alaska	P1 - Target Species	80.7	Yes
		P2 - Ecosystem	81.0	
		P3 - Management System	93.5	
2	Yakutat	P1 - Target Species	97.1	Yes
		P2 - Ecosystem	83.7	
		P3 - Management System	96.5	
3	Prince William Sound	P1 - Target Species	-	Still in assessment
		P2 - Ecosystem	-	
		P3 - Management System	-	

4	Copper/Bering Districts	P1 - Target Species	82.4	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	93.5	
5	Lower Cook Inlet	P1 - Target Species	91.0	Yes
		P2 - Ecosystem	86.0	
		P3 - Management System	91.5	
6	Upper Cook Inlet	P1 - Target Species	94.3	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	94.5	
7	Bristol Bay	P1 - Target Species	98.9	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
8	Yukon River	P1 - Target Species	91.7	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
9	Kuskokwim	P1 - Target Species	91.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
10	Kotzebue	P1 - Target Species	88.3	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
11	Norton Sound	P1 - Target Species	84.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
12	Kodiak	P1 - Target Species	82.5	Yes
		P2 - Ecosystem	85.3	
		P3 - Management System	93.5	
13	Chignik	P1 - Target Species	87.1	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
14	Peninsula/Aleutian Islands	P1 - Target Species	97.4	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	

Six conditions of certification were placed on the fishery across the 13 UoCs that can proceed through the assessment process at this time. In recognition of their interlinked nature and in order to minimise repetition, the text of a number of conditions was drafted to address deficiencies identified across two or more PIs.

It should be noted that the timeline for Condition 1 extends the period of time available for meeting this condition to beyond the period of the certification, due to 'exceptional circumstances' (CR 27.11.8, MSC 2013a). In this case, the exceptional circumstances relate to the life cycle of chum salmon, and therefore to the time taken for data to be collected and made available for the study, as detailed in the Condition.

The Conditions are summarised as follows:

<u>Condition 1: (UoC = 1, SEAK; Performance Indicator = 1.3.1)</u>

By the end of 2023, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) It is highly likely that the chum salmon enhancement activities in SEAK do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.

Condition 2: (UoC = 1, SEAK; Performance Indicator = 1.3.2)

By the end of the fourth year of certification, the SG 80b scoring requirements must be met for chum salmon. This will be achieved when it has been demonstrated that:

a) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).

Condition 3: (UoC = 1, SEAK; Performance Indicator = 1.3.3 and 2.5.2)

By the end of the fourth year of certification, the SG 80 scoring requirements for PI 1.3.3, and the SG80e scoring requirements for PI 2.5.2 must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks.
b) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
c) (PI 2.5.2, SG80e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.

Condition 4: (UoC = 5, Copper/Bering Districts; Performance Indicator = 1.3.1, 1.3.2 and 1.3.3)

By the end of the fourth year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon,
b) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement),
c) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock, and
d) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild sockeye stock status, productivity and diversity.

Condition 5: (UoC = 12, Kodiak; Performance Indicators = 1.3.1, 1.3.3 and 2.5.2)

By the end of the 5th year of certification, the SG 80 scoring requirements for PI 1.3.1 and PI 1.3.3, and the SI 80e requirements for PI 2.5.2, must be met in full. With respect to the current hatchery programs at Pillar Creek and Kitoi Bay for Chinook, coho, pink and chum salmon, this will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) it is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.

b) (PI 1.3.3, SG80a) sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks.

c) (PI 1.3.3, SG80b) the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.

d) (PI 2.5.2, SG80e) there is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.

Condition 6: (UoC = 13, Chignik; Performance Indicator = 1.1.2)

By the end of the fourth year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.1.2, SG80a) Reference points are appropriate for the wild stock and can be estimated,

b) (PI 1.1.2, SG80b) The limit reference point (e.g., lower end of the Sustainable Escapement Goal or equivalent) is set above the level at which there is an appreciable risk of impairing reproductive capacity,

c) (PI 1.1.2, SG80c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome and,

d) (PI 1.1.2, SG80e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.

Authorship and Peer Reviewers

1.1 Assessment team

Nominations for the assessment team for this second reassessment were consulted on for 11 days from the 5th of July, 2012. Following the consultation, the assessment team was confirmed as the three salmon management and science experts listed below:

Dr. Greg Ruggerone

Greg has investigated population dynamics, ecology, and management of Pacific salmon in Alaska and the Pacific Northwest since 1979. He was the Project Leader of the Alaska Salmon Program, University of Washington, from the mid-1980s to early 1990s where he was responsible for conducting and guiding research at the Chignik and Bristol Bay field stations, preparing salmon forecasts, and evaluating salmon management issues. Most of his research involves factors that affect survival of salmon in freshwater and marine habitats, including climate shifts, habitat degradation, predator-prey interactions, and hatchery/wild salmon interactions. He is currently a member of the Columbia River Independent Scientific Advisory Board and the Independent Scientific Review Panel. He recently served as the fish ecologist on the Secretary of Interior review of dam removal on the Klamath River. During the past six years, he has evaluated salmon fisheries for sustainability using guidelines developed by the Marine Stewardship Council.

Dr. Dana Schmidt

Dana is a limnologist and quantitative fisheries biologist with 39 years of experience of which 18 were in Alaska and 14 in British Columbia. He is responsible for statistical design and analysis of many of Golder Associates Ltd. western North America fisheries and limnology studies and has directed numerous projects involving environmental assessment and investigations of population dynamics of species that are impacted by development. He spent 16 years with the ADF&G conducting fisheries research are Alaska lakes, streams, and marine habitat with much effort directed at numerous sockeye salmon lakes across Alaska. He directed stock assessment programs on all Pacific Salmon species in the westward region of Alaska during his tenure as regional research supervisor on Kodiak Island and principal limnologist for ADF&G's statewide limnology laboratory. He has been a senior reviewer of BC lake fertilization programs targeting kokanee and is currently reviewing limnological and fisheries data related to stock status on 16 Kodiak Island lakes and Chilkoot and Chilkat Lakes in Southeast Alaska. He has been recognized as the lead author of the "Most Significant Paper" in the North American Journal of Fisheries Management for his research on ecology of Karluk Lake sockeye salmon on Kodiak Island, Alaska and has authored over 50 publications and research reports on environmental impacts on aquatic systems and fisheries management. He has served as an assessment team member for the sockeye salmon component of the MSC BC salmon certification program since 2002 and the pink and chum salmon assessment programs since 2008, and is currently on the surveillance audit team for BC sockeye and pink salmon.

Professor Jim Seeb

Jim is a Research Professor at the School of Aquatic and Fishery Sciences at University of Washington. He is a principal in the Gordon and Betty Moore sponsored International Program for Study of Salmon Ecological Genetics. In his current research he uses DNA polymorphisms in Pacific salmon for study of the interaction of life history, ecology and genetics. He formerly was a senior scientist with the ADF&G where he was steward of the State's Genetics Policy and worked to interpret that and other policies to minimize the risks of hatchery/wild stock interactions.

1.2 Intertek Moody Marine assessors

In addition to the three experts who undertook the assessment, the lead assessor for the assessment was Dr. Rob Blyth-Skyrme, with technical support being provided to the assessment team by Dr. Andy Hough; their details are below:

Dr. Rob Blyth-Skyrme

Rob has worked in aquaculture and then in marine fisheries science, management and policy since 1996. Rob started his career in mariculture, before switching to a focus on wild fisheries. Following his PhD, he moved to Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he was the Environment Officer and then the Deputy Chief Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob has extensive experience of running and providing lead input to workshops and management fora at a national level, and has published a number of papers in peer-reviewed international journals. Rob now runs Ichthys Marine Ecological Consulting, a marine fisheries and environmental consultancy with offices in the UK and Hawaii, and has undertaken all facets of MSC work as a lead assessor and expert team member, including leading the assessment team that conducted the third audit in 2010 of the recertified Alaska salmon fishery, and supporting the team that conducted the fourth audit in 2011. Rob has been trained in the use of the MSC's risk-based framework.

Paul Knapman

Paul is a Lead Assessor/Auditor and is the General Manager for Intertek Moody Marine (IMM). He has extensive experience of the fishing industry in North America and Europe. He was previously Head of an inshore fisheries management organisation, a senior government advisor on fisheries and environmental issues, a fisheries officer and a fisheries consultant working in Europe and Canada.

1.3 Peer Reviews

Two suitably qualified experts were asked to conduct a peer review prior to the report proceeding to public consultation as a Public Comment Draft Report. Following a 10-day stakeholder consultation period, the following individuals were confirmed as peer reviewers:

Professor Milo Adkinson

Milo is a Professor in the Fisheries Division for the School of Fisheries and Ocean Sciences at the University of Alaska, Fairbanks. Current research interests and activities include: Pacific salmon management, especially forecasting methodologies, implications of climate fluctuations, early marine growth and survival, the economic viability of rural fishing communities; the application of decision analysis and bayesian statistics to resource management; selection methodologies for ecological, epidemiological and fisheries data series and conservation and dynamics of small populations.

Dr. Katherine W. Myers

Katherine is a fishery scientist with 35 years of experience in fishery biology, ecology, and management. For most of her career, Katherine conducted international cooperative high seas research on Pacific salmon and steelhead, including stock identification, catch, bycatch, and run-size estimation, tagging experiments, and investigations of distribution, abundance, migration, food habits, feeding ecology, bioenergetics, age and growth, competitive stock interactions, survival, and habitat and climate-change effects on fish production. She retired from the University of Washington, in December 2010, after 30 years of service as a Research Scientist. Currently, Katherine is a

Washington State advisor to the North Pacific Anadromous Fish Commission, a member of the Northwest Power and Conservation Council Fish and Wildlife Program's Independent Scientific Advisory Board, a member of the Scientific and Technical Committee of the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, and the Northwest Washington District Director of the American Institute of Fishery Research Biologists. Katherine has degrees in fishery sciences from the University of Washington (B.S.), Oregon State University (M.S.), and Hokkaido University (Ph.D.), and has authored or co-authored over 150 peer-reviewed scientific publications and technical reports.

2 Description of the Fishery

2.1 Units of Certification and scope of certification sought

Source: http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.salmonmaps_districts

Figure 1: The State of Alaska, with significant towns/cities and major rivers marked.

The Alaska salmon fishery here considered is made up of five Pacific salmon species (Chinook – *Oncorhynchus tshawytscha*, sockeye – *Oncorhynchus nerka*, pink – *Oncorhynchus gorbuscha*, chum – *Oncorhynchus keta* and coho – *Oncorhynchus kisutch*) variously targeted with five separate gear types (purse seine, drift gillnet, set gillnet, trolling and fishwheels) within 14 separate Units of Certification (UoC). The UoCs are laid out as in Table 1, below, all of which are contained within the State of Alaska, USA, and its waters.

The 14 UoCs are based on the Management Areas contained within the four Alaska Management Regions. In the Southeast Region these are Southeast and Yakutat UoCs, in the Central Region these are Prince William Sound, Copper/Bering Districts, Lower Cook Inlet, Upper Cook Inlet and Bristol Bay UoCs, in the Arctic-Yukon-Kuskokwim Region these are Yukon River, Kuskokwim, Kotzebue and Norton Sound UoCs, and in the Westward Region these are Kodiak, Chignik and Peninsula/Aleutian Islands (Area M) UoCs. There is no commercial harvest of salmon in the Northern Management Area of the Arctic-Yukon-Kuskokwim Region (i.e., north of Kotzebue), and this Management Area is not included as a UoC.

Table 1: Units of Certification within the Alaska salmon fishery (shaded boxes are target species).

			Target Species				
Unit	Regulatory Area	Gear types	Sockeye	Chinook	Coho	Pink	Chum
1	Southeast	Purse seine, drift gillnet, troll					
2	Yakutat	Set gillnet, troll					
3	Prince William Sound	Purse seine, drift gillnet, set gillnet					
4	Copper/Bering Districts	Drift gillnet					
5	Lower Cook Inlet	Purse seine, set gillnet					
6	Upper Cook Inlet	Drift gillnet, set gillnet					
7	Bristol Bay	Drift gillnet, set gillnet					
8	Yukon River	Drift gillnet, set gillnet, fish wheel					
9	Kuskokwim	Drift gillnet, set gillnet					
10	Kotzebue	Set gillnet					
11	Norton Sound	Set gillnet					
12	Kodiak	Purse seine, set gillnet					
13	Chignik	Purse seine					
14	Peninsula/Aleutian Islands (“Area M”)	Purse seine, drift gillnet, set gillnet					

The grey shaded boxes identify those species of salmon that are targeted in the different UoCs. The white boxes indicate those species that are not considered to be targeted but will be considered as inseparable/practically inseparable (IPI) stocks in this assessment. Such species were termed “insignificant catch” in the 2007 assessment. For more information on IPI stocks, see Section 2.4.3.

Eligible fishers are those who are permitted and appropriately licensed to catch any of the five Pacific salmon species in Alaska State waters. The fishery is in scope for MSC certification.

2.1.1 Scope of Assessment in Relation to Enhanced Fisheries

The Alaska salmon fishery is partially enhanced (i.e., some of the fishery is entirely based on wild runs, while the rest of the fishery is based on a ‘hatch and catch’ ranching system). The fishery meets the scope criteria for enhanced fisheries, as described by the MSC (MSC 2013a, Table C1). It is confirmed:

<u>Linkages to and maintenance of a wild stock</u>

A1: That the fishery relies upon the capture of fish from the wild environment,
A2: The five salmon species are native to the Alaska region,
A3: There are natural reproductive components of the stock from which the fishery’s catch originates that maintain themselves without having to be restocked every year, and
A4: Stocking as part of the ‘hatch and catch’ system does not form a major part of a current rebuilding plan for depleted stocks.

Feeding and husbandry

B1: The 'hatch and catch' production system operates without substantial augmentation of food supply, and feeding is used only to grow the salmon to a small size prior to release, and

B2: Is not relevant to the Alaska salmon fishery as it applies to 'catch and grow' systems.

Habitat and ecosystem impacts

C1: Any modifications to the habitat of the stock do not cause serious or irreversible harm to the natural ecosystem's structure and function (noting that salmon fry farms permitted to be in-scope).

2.1.2 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

All five Pacific salmon species (sockeye, Chinook, coho, pink and chum) are native to Alaska and so the assessment is not required to consider the fishery against the ISBF criteria.

2.2 Overview of the fishery

2.2.1 Area and history of the fishery

The following description of the history of the Alaska salmon fishery is extracted and shortened from the comprehensive publication by Clark *et al.* (2006).

In 1868, the first salmon saltery was established; a year later the first cannery was established. Some fisheries research was conducted by the U.S. Fisheries Commission but there was no attempt to manage fisheries; one treasury agent and an assistant enforced the law and monitored salmon fishing along 34,000 miles of the Alaskan coastline. By 1898, 59 canneries were operating in Alaska and by 1920, 160 canneries were operating. The annual average Alaskan commercial harvest from 1900 to 1910 was about 30 million salmon but doubled in the next decade to about 65 million salmon.

Early U.S. Fisheries Commission investigators predicted the collapse of Alaskan salmon fisheries if left unregulated and they showed particular concern over the use of barricades for harvest. In 1889, Congress adopted the Alaska Salmon Fisheries Act. In 1896, Congress amended the Alaska Salmon Fisheries Act, but fishing below mean high tide remained largely unregulated. Weekly closed fishing periods were established except in Bristol Bay, Cook Inlet, and Prince William Sound. The amended act required canneries to report harvests and to establish hatchery programs. The Alaska Salmon Fisheries Act of 1906 implemented a license tax on the salmon harvest along with a rebate to those companies operating hatcheries.

Congress adopted the White Act in 1924. This act denied the Bureau of Fisheries the power to control the amount of fishing gear and the number of participants. The White Act gave broad authority to the US Secretary of Commerce to regulate fisheries in all territorial waters including the authority to limit catch, size and type of fishing gear, and seasons. The White Act specified 36- hour weekend closures of the salmon fishery including the closure of fish traps. The act stated that not less than 50% of the salmon were to be allowed to escape the fishery in streams with weirs installed, representing one of the first attempts to regulate Alaska's salmon fishery for sustained yield.

The annual average Alaskan commercial harvest from 1920 to 1929 was about 70 million salmon. A presidential order was issued in 1933 (the Southwest Alaska Fisheries Reservation) that limited the case pack (harvest), the amount of gear that a fisherman could use, and the number of cannery

operations. The new licensing system effectively limited a fisherman to working for a specific company on an assigned boat.

Between 1930 and 1939, the Alaskan commercial harvest averaged about 90 million salmon. Industry lobbied hard in Washington D.C. to assure that new regulations restricting harvests proposed by the Bureau of Fisheries were abandoned or liberalized. In 1939, salmon runs had declined, the harvest decreased to about 75 million salmon, and attacks on the federal management program forced the Commissioner of the Bureau of Fisheries to resign. The U.S. Fish and Wildlife Service, through its Bureau of Commercial Fisheries, was responsible for management of Alaska's salmon fisheries through 1959. Between 1940 and 1949, annual Alaskan commercial harvests averaged about 75 million salmon. Industry resisted proposals to restrict fishing after the war. In an effort to rebuild overfished salmon runs, a 1951 proposal to prohibit fishing in several Kodiak Island fisheries was overturned by industry lobbyists who argued that allowing greater escapements would be wasteful. As the salmon runs declined throughout the 1950s, President Eisenhower declared parts of Alaska disaster areas. Between 1950 and 1959, annual Alaskan commercial harvests decreased to an average of about 40 million salmon and to about 25 million salmon in 1959.

The territorial legislature created the Alaska Department of Fisheries and the Alaska Fisheries Board in 1949. The department had no specific authority, but did provide a mechanism for scientific research and review of federal regulations. The lack of self-rule in salmon management and the influence of the major lower 48 canning companies on federal salmon management were primary forces in Alaska for statehood. Of the 434 fish traps licensed in 1948, only 38 (9%) belonged to Alaskan residents while 245 (56%) were owned and operated by the 8 largest canning companies.

Alaska achieved statehood in 1959 and fisheries management responsibility was transferred to the state in 1960. In June of 1960, in a speech on the floor of the U.S. Senate, Senator Ernest Gruening stated: "*Had it not been for the Federal Government's neglecting and permitting the abuse of the salmon fisheries resource of Alaska, they would today constitute a great and rich heritage for this and future generations*." In 1963, Cooley then stated: "*The State of Alaska faces a tremendous task as it attempts to rehabilitate the salmon resources to something of its former grandeur. The lack of adequate biological knowledge and the need for much more study and research has already been stressed. The state must be willing and able to invest heavily in a large-scale program of research and management with little likelihood of a significant return on the investment for many years to come. While the willingness may be there, the ability to finance it remains a crucial question, for the state must meet many new financial obligations that are concurrent with statehood*."

Authority for the management of the subsistence and commercial salmon fisheries of Alaska was primarily vested with Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries at statehood. The Alaska constitution provided policy guidance. At statehood, the Alaska legislature created the Department of Fish and Game and the Division of Commercial Fisheries and gave them a mandated fishery management mission. The Alaska legislature has passed laws since statehood providing further authority and guidance. The Alaska Board of Fish and Game and later the Alaska Board of Fisheries (BOF) has promulgated a diverse set of regulations and plans for management of Alaska's subsistence and commercial salmon fisheries that provide guidance for day-to-day management by area biologists of the Division of Commercial Fisheries.

Salmon hatcheries now provide a significant boost to Alaska salmon harvests in some regions. The first hatcheries in Alaska were developed in the early 1890s, but the modern Alaska hatchery program was initiated in the early 1970s, in response to a period of depressed commercial salmon fisheries in Alaska. In 1971, the Alaska Legislature created the Fisheries Rehabilitation, Enhancement and Development Division (FRED) of ADF&G to develop a coordinated salmon enhancement program. A major expansion in salmon aquaculture research and production began in the 1970s. The new program was intended to supplement, not supplant, wild stock production.

Formal policies and regulations were developed and enacted to minimize the potential for adverse effects of the enhancement program on wild stocks. These included a rigorous hatchery permitting process requiring location of hatcheries away from significant wild stocks and use of local brood sources, development of a genetics policy and pathology guidelines, and hatchery fish marking requirements. By the early 1980s, ADF&G was involved with construction and/or operation of about 20 additional salmon aquaculture facilities located from southern Southeast Alaska to as far north as the Noatak River near Kotzebue. Where significant enhancement activities occur in Alaska, a major responsibility of the area biologists is the management of enhanced salmon returns. Area biologists attempt to provide for the full harvest of surplus hatchery fish while providing adequate protection to wild stocks of salmon. While hatcheries play an important role in Alaska's salmon production, the practice of finfish farming, defined as raising fish to maturity in captivity for commercial purposes, is outlawed in Alaska.

2.2.2 Salmon species

Sockeye salmon – *Oncorhynchus nerka*

Text modified and figure from:
http://www.ADF&G.alaska.gov/index.cfm?ADF&G=sockeyesalmon.main (accessed Aug 2012).

Sockeye salmon are one of the smaller species of Pacific salmon, measuring 18 to 31inches in length and weighing 4-15 pounds. Sockeye salmon provide high-value commercial fisheries because they are prized for their firm, bright-orange flesh.

Like all species of Pacific salmon, sockeye salmon are anadromous, living in the ocean but entering fresh water to spawn. Sockeye salmon spend one to four years in fresh water and one to three years in the ocean. In Alaska, most sockeye salmon return to spawn in June and July in freshwater drainages that contain one or more lakes. Spawning itself usually occurs in rivers, streams, and upwelling areas along lake beaches. During this time 2,000 – 5,000 eggs are deposited in one or more redds, which the female digs with her tail over several days. Males and females both die within a few weeks after spawning.

Eggs hatch during the winter, and the young alevins remain in the gravel, living off their yolk sacs. In the spring, the fish emerge from the gravel as fry and move to rearing areas. In systems with lakes, juveniles usually spend one to three years in fresh water, feeding on zooplankton and small crustaceans, 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.

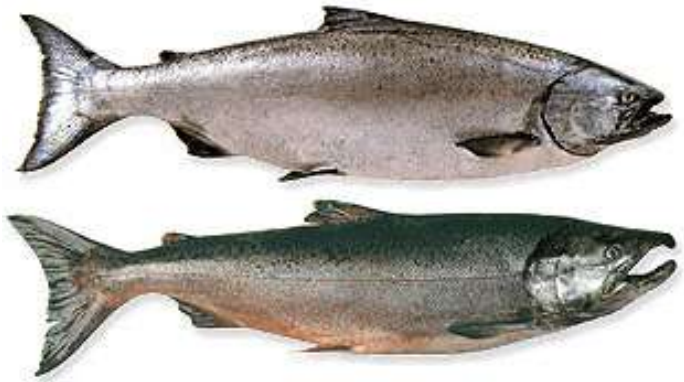
Smolts weigh only a few ounces upon entering salt water, but they grow quickly during their 1-3 years in the ocean, feeding on plankton, insects, small crustaceans, and occasionally squid and small fish. Alaska sockeye salmon travel thousands of miles during this time, drifting in the counter-clockwise current of the Alaska Gyre in the Gulf of Alaska. Eventually they return to spawn in the same freshwater system where they were hatched.

The largest sockeye salmon populations are in the Kvichak, Naknek, Ugashik, Egegik, Wood, and Nushagak Rivers that flow into Alaska's Bristol Bay. In good years, these runs can number in the tens of millions of fish.

Sockeye salmon are difficult to culture because susceptibility to the IHN virus often causes epizootics. Some hatchery culture occurs in Alaska, but most enhancement activities take the form of stream-side incubator boxes or lake fertilization. Fishways have also been effective with major runs established on barren systems where migration barriers existed.

Chinook salmon – *Oncorhynchus tshawytscha*

Text modified and figure from: http://www.ADF&G.alaska.gov/index.cfm?ADF&G=chinook.main (accessed Aug 2012).



The Chinook salmon is the largest of all Pacific salmon, typically measuring up to 36 inches in length and 30 pounds in weight. Adults are distinguished by the black irregular spotting on the back and dorsal fins and on both lobes of the caudal or tail fin.

Like all species of Pacific salmon, Chinook salmon are anadromous. They hatch in fresh water and rear in main-channel river areas for one year. The following spring, Chinook salmon turn into smolts and migrate to the salt water estuary. They then spend anywhere from 1-5 years feeding in the ocean, and return to spawn in fresh water. All Chinook salmon die after spawning. Chinook salmon may become sexually mature from their second through seventh year, and as a result, fish in any spawning run may vary greatly in size. For example, a mature 3-year-old will probably weigh less than 4 pounds, while a mature 7-year-old may exceed 50 pounds. Females tend to be older than males at maturity. In many spawning runs, males outnumber females in all but the 6- and 7-year age groups. Small Chinook salmon that mature after spending only one winter in the ocean are commonly referred to as "jacks," and are typically male. Alaska streams normally receive a single run of Chinook salmon in the period from May through July.

Chinook salmon often make extensive freshwater spawning migrations to reach their home streams on some of the larger river systems. Yukon River spawners bound for the extreme headwaters in Yukon Territory, Canada, will travel more than 2,000 river miles during a 60-day period. Chinook salmon do

not feed during the freshwater spawning migration, so their condition deteriorates gradually during the spawning run as they use stored body materials for energy and gonad development.

Each female deposits between 3,000 and 14,000 eggs in several gravel nests, or redds, which she excavates in relatively deep, fast moving water. In Alaska, 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 gradually absorb the food in the attached yolk sac. These juveniles, called fry, wiggle up through the gravel by early spring. Chinook juveniles divide into two types: *ocean type* and *stream type*. Ocean type Chinook migrate to saltwater in their first year. Stream type Chinook spend one full year in fresh water before migrating to the ocean. In Alaska, most juvenile Chinook salmon remain in fresh water until the following spring when they migrate to the ocean as smolt in their second year of life.

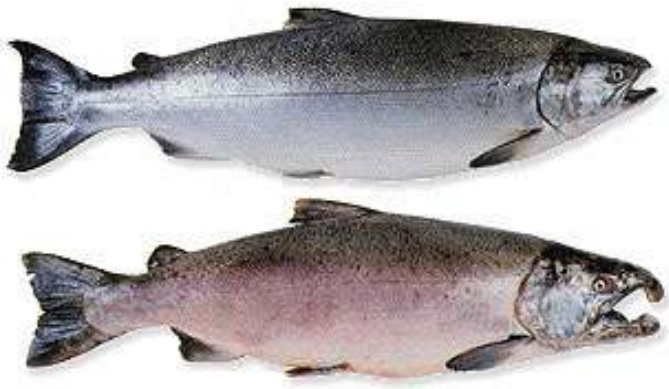
Juvenile Chinook salmon in fresh water initially feed on plankton and later feed on insects. In the ocean, they eat a variety of organisms including herring, pilchard, sandlance, squid, and crustaceans. Salmon grow rapidly in the ocean and often double their weight during a single summer season.

Fresh water streams and estuaries provide important habitat for spawning Chinook, and they also serve as nursery grounds for developing eggs, fry, and juveniles. In Alaska, Chinook salmon are abundant from the southeastern panhandle to the Yukon River. Major populations return to the Yukon, Kuskokwim, Nushagak, Susitna, Kenai, Copper, Alsek, Taku, and Stikine rivers. Important runs also occur in many smaller streams.

Chinook salmon are expensive to culture because of the requirement for long-term freshwater rearing. Hatchery enhancement occurs primarily in Southeast Alaska in support of Pacific Salmon Treaty activities that support recreational and troll fisheries. Comparatifely small hatchery realeases occur in Southcentral Alaska to support recreational fisheries.

Coho salmon – *Oncorhynchus kisutch*

Text modified and figure from:
http://www.ADF&G.alaska.gov/index.cfm?ADF&G=cohosalmon.main (accessed Aug 2012).



Adult coho usually weigh 8 to 12 pounds and are 24 to 30 inches long, but individuals weighing 31 pounds have been landed. Coho salmon enter spawning streams from July to November, usually during periods of high runoff. The female digs a redd and deposits 2,400 to 4,500 eggs. As the eggs are deposited, they are fertilized with milt from the male. The eggs develop during the winter, hatch in early spring, and the alevins remain in the gravel utilizing their egg yolk until they emerge in May or June. During the fall, juvenile coho may travel miles before locating off-channel habitat where they

pass the winter free of floods. Some fish leave fresh water in the spring and rear in brackish estuarine ponds and then migrate back into fresh water in the fall. They spend one to three winters in streams and may spend up to five winters in lakes before migrating to the sea as smolts, although rarely this long. Time spent at sea varies. Some males (called jacks) mature and return after only 6 months at sea at a length of about 12 inches, while most fish stay 18 months (one winter) before returning as full size adults. In freshwater, coho fry feed voraciously on a wide range of aquatic insects, small fishes, and plankton. They also consume eggs deposited by adult spawning salmon. Their diet at sea consists mainly of fish and squid, and some zooplankton.

Little is known about the ocean migrations of coho salmon. High seas tagging shows that maturing Southeast Alaska coho move northward throughout the spring and appear to concentrate in the central Gulf of Alaska in June. They later disperse towards shore and migrate along the shoreline until they reach their stream of origin.

The emergent fry occupy shallow stream margins, and, as they grow, establish territories which they defend from other salmonids. Coho fry live in ponds, lakes, and pools within streams and rivers, usually among submerged, woody debris- in quiet areas free of current.

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 are extremely adaptable and occur in nearly all accessible bodies of fresh water, from large trans-boundary watersheds to small tributaries.

Hatchery culture of coho salmon is similar to that of Chinook salmon: long-term freshwater rearing is required and activities are largely limited to Southeast Alaska to support Pacific Salmon Treaty activities that involve recreational and troll fisheries.

Pink salmon – *Oncorhynchus gorbuscha*

Text and figure from: http://www.ADF&G.alaska.gov/index.cfm?ADF&G=pinksalmon.main (accessed Aug 2012).

Pink salmon are the smallest of the Pacific salmon found in North America weighing on average between 3.5 and 5 pounds, with an average length of 20-25 inches. They are the most numerous Pacific salmon and have been harvested and canned commercially in Alaska since the late 1800's.

Pink salmon have the shortest lifespan of all the Pacific salmon found in North America. They mature and complete their entire life cycle in two years. This consistent two-year life cycle has created genetically distinct odd-year and even-year populations of pink salmon. Fish coming in odd years are unrelated to the individuals returning in even years. Odd-year and even-year populations do not

interbreed with each other even when they return to the same spawning grounds. Many times individual streams will tend to have one of the populations (odd-year or even-year) producing more fish. However, in some streams both odd and even years produce about the same number of pink salmon. Occasionally this will shift, and the previously weak year will become the most abundant.

As soon as pink salmon fry emerge from the gravel on the bottom of the river, they swim to the ocean. Once there, they begin feeding on plankton, larval fishes, and occasional aquatic insects. After 18 months of feeding and growing in saltwater, they reach maturity and return to the river they were born to spawn between late June and mid-October. Pink salmon generally spawn in small rivers near the coast, and in estuaries near the mouths of rivers. Most pink salmon do not travel farther than 40 miles up a river to spawn. However, in Alaska they have been known to go greater distances in larger river systems, such as the Yukon, Kuskokwim and Nushagak. In Southcentral Alaska, pink salmon have been documented going as far as 130 miles up the Susitna River. On the Mulchatna River, pink salmon have gone as far as 250 miles upstream before spawning. After young pink salmon emerge from the gravel and migrate to saltwater, they gather in schools and remain in estuaries and along the beaches. Eventually, they begin spending more time feeding in the deeper offshore waters, such as the Gulf of Alaska and Aleutian Islands.

In Alaska, pink salmon are widely distributed along the coast, with only a few in the Copper River delta and none in the upper Copper River drainage. Pink salmon are easy to culture because no freshwater rearing is required, and many hatcheries in in Southcentral and Southeast Alaska and Kodiak release very large numbers of fry annually.

Chum salmon – *Oncorhynchus keta*

Text modified and figure from:
http://www.ADF&G.alaska.gov/index.cfm?ADF&G=chumsalmon.main (accessed Aug 2012).

Chum salmon, also known as dog salmon, are the most widely distributed of all the Pacific salmon and generally occur throughout Alaska. Like most other Pacific salmon species, chum salmon spend most of their life feeding in saltwater, then return to freshwater when mature to spawn once in the fall then die. Most chum salmon populations do not travel far upstream to spawn; however, some travel up to 2,000 miles upstream to the headwaters of the Yukon River. Although generally regarded as one of the less desirable species of salmon, in Arctic, Northwestern, and Interior Alaska, chum salmon are highly prized as a traditional source of dried winter food. Since the 1980s, commercial chum salmon harvests in Alaska have more than doubled as a result of the Alaska hatchery program and increased foreign sales.

Like other Pacific salmon species, chum salmon usually spawn in the fall. They can be found in two distinct races based on spawning-run timing: the earlier-running race is referred to as summer chum salmon, and the later-running race is called fall chum salmon. Small to medium, slow-flowing, spring-fed side channels are often their preferred spawning habitat, but they spawn in a wide variety of habitats including large muddy rivers, cold, clear headwater streams, and in the mouths of rivers below the high-tide line. As with other Pacific salmon, a female chum salmon excavates depressions (redds) in the gravel and deposits her eggs as one or more males simultaneously releases its sperm resulting in fertilization. The female then covers the fertilized eggs with gravel and guards the redd until she eventually becomes too weak to hold position in the stream.

Chum salmon embryos hatch from eggs after 3–4 months, depending on water temperature. Hatchlings (alevin) remain in the gravel while continuing to absorb nutrients from the egg yolk for an additional 60–90 days before emerging. They begin their migration to the sea within days or weeks. At sea, juvenile chum salmon spend several months near shore then disperse into the open ocean. They grow rapidly in the ocean, reaching 12 or more pounds over the next 3–4 years, with the most rapid growth taking place during their final year at sea.

Chum salmon are anadromous. As adults, they almost always return from feeding areas in the ocean to spawn in the very same stream and site where they were spawned. The distance travelled to spawning sites upriver varies greatly between populations and regions, with some individuals spawning in the mouth of their home stream, and others spawning up to 2,000 miles upriver. No freshwater-resident or landlocked populations have been found. Newly hatched chum salmon migrate, sometimes great distances, down their natal (home) rivers toward their feeding grounds in the sea.

Chum salmon are relatively easy to culture because of the comparatively short freshwater rearing requirement. Hatcheries in Kodiak, Southcentral, and primarily Southeast Alaska release very large numbes of hatchery fry.

2.2.3 Fishing gear types

Purse seine

Source: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.main#/seiner

Figure 2: A salmon purse-seine vessel with net deployed.

Purse seines are encircling nets that are deployed around schools of fish. A key feature of their design is a rope (called a 'purse line') that can be drawn in to close the bottom of the net to prevent fish from

swimming down and escaping. To set a purse seine, a small boat or 'skiff' is used to draw the net around an identified fish school, before returning the end of the net to the purse seine vessel to complete the encirclement. The top of the net is kept at the surface by buoys or corks, while a weighted lead line is used to quickly sink the bottom of the net when being set.

After drawing in the purse line, the net is winched in, either by running it up through a hydraulic block so that it can be stacked on the back deck of the main vessel, or by winding it up onto a large hydraulic drum. Once the net is almost entirely retrieved and the salmon are corralled closely beside the fishing vessel, a small dip net is used to brail the catch in to the fish hold. The main target species are pink and chum, but other species may also be taken. Purse seine vessels are limited in Alaska to a maximum of 58' length (ADF&G 2009b), and can easily be identified by their skiffs which are either carried-piggy-back style while travelling to and from the fishing grounds, or towed behind the boat.

Drift gillnet

Drift gillnets are deployed from vessels, with the gillnets being suspended at the surface with buoys or floats, such that the gear hangs down in the water column to catch fish swimming at or near to the surface. Buoys are attached along the length of the nets, but no anchors or weights are used to hold the nets in position. As such, vessels must stand by the gear so that it can be monitored and retrieved.

Source: http://www.photolib.noaa.gov/htmls/fish0749.htm

Figure 3: Salmon drift gillnetter

The size of fish being targeted can be managed effectively through using nets of specific mesh size, as the gear works by allowing the heads of the fish to pass sufficiently far through the net that they become caught on the mesh behind the gills. The fish are therefore prevented from backing out of the net, while the thicker body of the fish prevents them from swimming straight through. If the fish are too large or too small to be gilled, the catch rate declines considerably, although a small proportion of such fish that encounter the net may become entangled through being caught on fin rays or teeth and then rolling.

Set gillnet

Set gillnets are similar to drift gillnets in that fish are taken through being 'gilled', and the mesh size must be matched to the target fish size in order that the catch rate is maximised. However, set gillnets are held in position with anchors or weights, and may be fished from the shore.

Source: http://alaskafisheries.noaa.gov/protectedresources/observers/photos1.htm

Figure 4: A set net being cleared by boat.

When fished from the shore, the gear can be set out by boat, or set on a pulley and ring system so that it can be hauled in and cleared of fish from the beach, before being reset during the fishing period. The nets may also be cleared from a boat, with the net being run across or along the vessel to remove fish, before being passed back over the side to continue fishing. In this way, only the section of the net that is being cleared is out of the water during the fishing period.

Troll

Trolling is the practice of towing lures, baited hooks or a combination of both behind a moving vessel. In salmon trolling, two or more lines may be towed at the same time, with 4 or 6 lines being typical and with a number of leaders attached to each line. The gear can be worked at varying depths, from the surface to deeper in the water column. Troll vessels come in a variety of shapes and configurations, ranging from small skiffs using hand-wound gear, to large, ocean going vessels of 50' or more in length which use hydraulic reels. Trolling mainly targets Chinook and coho salmon, although other species may be taken in smaller numbers, and chum salmon have become a target species for some troll fishermen in recent seasons.

Source: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.main#/troller

Figure 5: A salmon trolling vessel

Fish wheels (Yukon River only)

Fish wheels are a legal commercial gear type throughout the Yukon River, but are typically used only on its middle and upper reaches. Fish wheels are located on floating rafts anchored near to the bank, and use flowing river water to turn a net mechanism around a central shaft. Usually, two nets are used, one on each side of the shaft, with a paddles set in alternating positions around the shaft to help drive the nets around. Salmon are caught as they migrate upriver by swimming in to the nets of the fish wheel when in the down position. As the nets rotate around, they fish are scooped up before dropping to a ramp positioned at an angle in the net, from where they slide in to a holding pool or collection box.

Source: US Fish and Wildlife Service

Figure 6: Fish wheel with nets in the horizontal position and paddles in the vertical position.

All salmon species that occur in the river may be taken, but relative species abundance in the Yukon, and the proximity of the gear to the river bank, mean that chum salmon dominate catches. Fish wheels can operate autonomously, although they are vulnerable to ice floes and floating debris.

Beach seine (Yukon River, Kodiak, Alaska Peninsula)

Beach seines are non-gilling nets with a floatline that always stays at the surface and a leadline that runs along the bottom. During deployment, one end of the net remains on shore while the body of the net is run out and around fish swimming near to the shore. This is usually accomplished using a small boat or tender. The other end of the net is then returned to the shore and the two ends are drawn in and together to bag any fish contained within the fished area. In Alaska, hydraulic power may be used to set, retrieve, or purse a beach seine.

2.3 Principle One: Alaska salmon management and Units of Certification

2.3.1 Escapement Goals

The State of Alaska does not manage its salmon fisheries using conventional limit and target reference points. Instead, ADF&G manages the salmon fisheries to achieve spawning escapement goals that are set at levels needed to provide the potential for relatively high future harvests. Typically, an escapement goal range is provided and this is the target reference point range. The lower escapement goal may be considered a limit reference point because directed fishing stops and incidental harvests are reduced before reaching the lower escapement goal. Furthermore, ADF&G and the Board of Fisheries (BOF) will establish a SOC (SOC) for stocks meeting the escapement goal but failing to consistently provide expected harvests (yield concern). The SOC designation triggers an action plan to identify potential factors of decline and to increase future abundance and harvests. A more severe SOC is identified when the stock fails to consistently meet the lower escapement goal during the 5 recent years (management concern). This management approach effectively replaces the limit reference point approach.

ADF&G uses a variety a methods to establish escapement goals, depending on the type and quality of data that are acquired. Escapement goal methods and evaluation of whether the goals were met in response to harvest management actions are reviewed in technical reports every three years in accordance with BOF Reviews. Thus, each management area has a recent escapement goal report, which also includes references to or included historical data on which the goals were developed. The technical reports are available online (www.ADF&G.alaska.gov).

2.3.2 Stocks of Concern

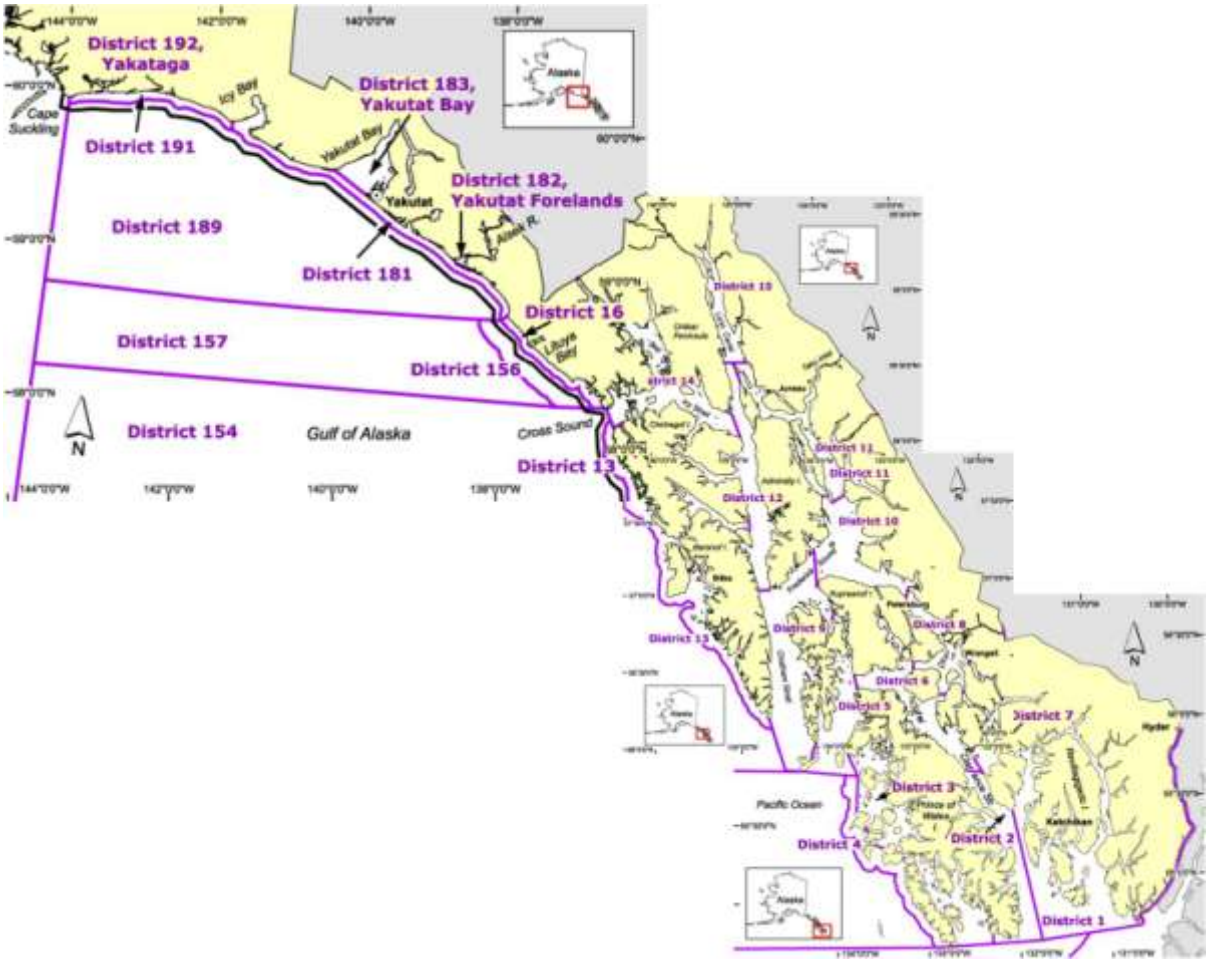
Table 2: Statewide summary of salmon stocks of concern in Alaska within the different UoCs.

UoC		System	Species	Year Designated[a]	Level of Concern	Year Last Reviewed
6	UCI	Susitna (Yentna) River	Sockeye	2007	Yield	2010
6	UCI	Chuitna River	Chinook	2010	Management	2010
6	UCI	Theodore River	Chinook	2010	Management	2010
6	UCI	Lewis River	Chinook	2010	Management	2010
6	UCI	Alexander Creek	Chinook	2010	Management	2010
6	UCI	Willow Creek	Chinook	2010	Yield	2010
6	UCI	Goose Creek	Chinook	2010	Yield	2010
8	Yukon	Yukon River	Chinook	2000	Yield	2012
11	Norton Sound	Norton Sound Sub-district 5 & 6	Chinook	2003	Yield	2012
11	Norton Sound	Norton Sound Sub-district 2 & 3	Chum	2000	Yield	2012
11	Norton Sound	Norton Sound Sub-District 1	Chum	2006	Yield	2012
12	Kodiak	Karluk River	Chinook	2010	Management	2010
14	Peninsula / Aluetians	Swanson Lagoon	Sockeye	2012[b]	Management	2012

[a] Indicates start of BOF cycle in which stock of concern was designated or last reviewed (e.g., 2011/2012 BOF cycle = 2011).
[b] The stock of concern designation for Swanson Lagoon sockeye was designated at tt the February 2013 Alaska Peninsula/Aleutian Islands BoF meeting.
Source: Munro & Volk (2013).

ADF&G and the BOF have a process in which SOCs are identified if: 1) they are 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). The BOF makes the SOC designation based on a recommendation by ADF&G. The SOC designation triggers a written action plan to identify factors of decline and develop a plan to increase abundance and harvests. This management approach effectively replaces the limit reference point approach. From an MSC viewpoint, a depleted stock might be one that is not meeting the escapement goal, e.g., management concern. However, the yield SOC is likely above the depleted stock status identified by MSC. Therefore, the ADF&G approach to depleted stocks is precautionary. Current SOC are shown in Table 2, above (Munro & Volk 2013). Six populations are considered management stocks of concern, and therefore are considered to be depleted.

2.3.3 UoCs in the Southeast Region



Source: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.salmon#/maps

Figure 7: The Southeast Region (= SEAK + Yakutat UoCs)

UoC 1 – Southeast Alaska (SEAK)

Southeast Alaska (SEAK) salmon fisheries constitute primarily of drift gillnet fisheries targeting pink, chum and sockeye salmon, with some coho and Chinook, a purse seine fishery that targets pink, chum, sockeye and Chinook, and a troll fishery which primarily targets coho and Chinook, with increasing catches of chum salmon. Escapement goals for most stocks of sockeye (early, late stocks),

Chinook, and pink (odd, even year) salmon have been met in most years, 2003-2011 (Munro & Volk 2012). Chum salmon in the Northern Southeast Inside subregion have consistently failed to meet escapement targets since they were established in 2009.

SEAK and Yakutat commercial fisheries were combined for summaries by ADF&G for the 2011 season with historic harvests provided for comparison. Total commercial harvest in 2011 was 73.6 million salmon with an initially estimated exvessel record value of $200 million. Harvest by species in 2011 included 339,000 large Chinook (i.e., Chinook that are older than jacks), 1.2 million sockeye, 2.3 million coho, 59.1 million pink, and 10.7 million chum salmon. In the purse seine fishery, 270 permit holders harvested 58.8 million salmon, including 55.2 million pink and 2.7 million chum salmon.

In the drift gillnet fishery 443 permit holders harvested 5.2 million salmon, including: 2.8 million chum, 1.6 million pink, 518,000 sockeye, 238,000 coho, and 27,000 large (non-jack) Chinook salmon. In the set gillnet fishery 121 permit holders harvested 168,000 sockeye and 126,000 coho salmon. Returning hatchery-produced salmon accounted for 10% of the salmon in the commercial common property fishery (CPF): 75% of the chum, 29% of the coho, 22% of the Chinook, 13% of the sockeye and 1% of the pink salmon can be attributed to fisheries enhancement projects. The harvest of hatchery-produced salmon contributed an estimated $43 million, or 21% of the exvessel value of salmon in the commercial CPF harvest. Hatchery organizations harvested a total of 5.1 million salmon for cost recovery, including 4.1 million chum salmon. In the 2011 personal use and subsistence fisheries, 3,308 household permits were issued in Southeast Alaska and Yakutat combined. Harvest reporting for 2011 is incomplete, and reported harvest for 2010 with 86% of permits returned is about 50,000 salmon.

The SEAK drift gillnet fisheries occur in five traditional fishing districts located in the inside waters of Southeast Alaska, and in several hatchery terminal harvest areas. Target species and stocks vary among the fishing districts. The fisheries target sockeye, pink and summer chum salmon from mid-June through mid-August and coho and fall run chum salmon thereafter through late September or early October. Targeted fishing for transboundary Taku and Stikine River Chinook salmon in May through early June was re-instituted in 2005 in districts at the mouths of the rivers, following a closure of almost 30 years to allow for stock rebuilding and finalization of negotiated 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. Hatcheries contribute significant amounts of chum, coho and sockeye salmon to the drift gillnet fisheries. Management of four of the five traditional fishing districts is affected by harvest sharing and management provisions of the U.S./Canada Pacific Salmon Treaty.

In order to implement complex international harvest sharing agreements, ADF&G operates intensive stock identification programs for sockeye (scale pattern analysis and parasite incidence) and Chinook salmon – coded wire tag (CWT) and recently genetic stock identification (GSI) – in the drift gillnet fisheries. Thermal otolith marks are used to estimate the contributions of hatchery sockeye, use of thermal marks is replacing CWT to estimate contributions of hatchery chum salmon, while CWT is used to estimate contributions of hatchery and wild indicator stocks of Chinook and coho salmon. The drift gillnet fisheries are managed through in-season assessment of run strength, although pre-season forecasts of Taku and Stikine River Chinook and Stikine River sockeye salmon guide the season's initial openings in specific districts. Managers monitor fishery performance (catch and catch-per-unit-effort), stock composition data, escapement information, test fisheries, and statistical run forecasting models to assess run strength in-season. Contribution of hatchery stocks to harvests is taken into account, particularly in areas where fishery performance is used as a primary management tool.

The large number of rivers in which spawning populations occur necessitates a strategic approach to monitoring escapement. These vary among species (Geiger & McPherson 2004). Pink salmon spawn

in 2,500 streams in the Southeast and Yakutat area. Of these 718 have been designated index streams, based on the fact that they were surveyed a minimum of 7 years between 1986 and 1997. Each of the index streams is associated with one of 45 management "stock groups". Escapement goals were developed from the dependence of aggregate production on aggregate spawners for three subregions of these, Northern Southeast Outside, Northern Southeast Inside and Southern Southeast. The escapement goals developed for each of these were divided among the 45 stock groups. Chum salmon spawn in about 1,200 streams in SEAK. Many have had aerial surveys at some time, and a few have had foot surveys. Escapement trend data is available for 82 chum populations. Mark-recapture programs and forecasting models are used to estimate escapements in the largest glacial rivers that contribute significantly to the drift gillnet fisheries (Chilkat, Taku and Stikine rivers). Weirs, aerial and foot surveys are used to monitor other escapements. Escapements of pink and chum salmon are monitored primarily by aerial surveys. Escapement goals are in place for the primary target stocks of Chinook, sockeye, coho and pink salmon that contribute to the drift gillnet fisheries.

The primary conservation interests on chum salmon centre around the straying of remote hatchery returns into wild streams (Piston & Heinl 2012a). The Northern Southeast Inside (NSI) subregion investigations by these authors indicated a subregion wide estimate of 9.8% of the escapement of wild chum salmon streams randomly selected in this area were composed of hatchery released fish, with ranges in individual stream from 0% to 65%, with Sawmill Creek and Wilson River at ~65% and ~25% respectively. The NSI area also failed to meet minimum escapement goals in 2009, 2010, and 2011 (all years since they were established). A detailed examination of the chum escapement goals provided detail as to indexed counts of Southeastern chum reference streams over approximately 30 years (Piston & Heinl 2011). The overall recent trend for NSI indicates widespread downturn in reduced escapements across the NSI as well as other parts of SEAK.

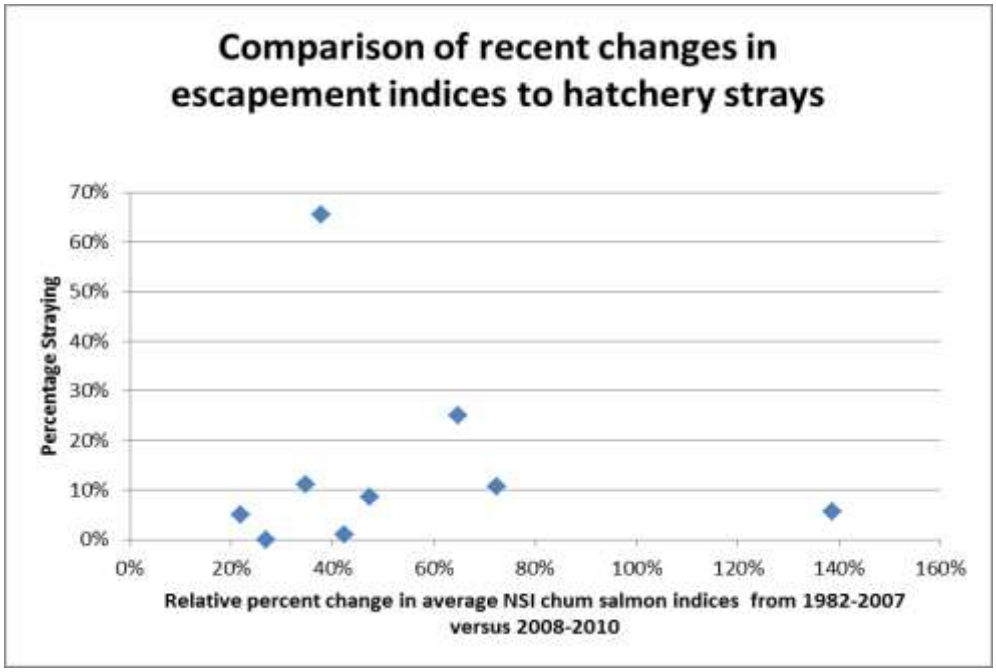


Figure 8: Comparison of straying rates from nine selected chum salmon spawning streams in the NSI subarea with relative rates of adult returns. Relative rates of returen were based on average of recent escapements (2008-2010) divided by the long term average escapements (1982-2007).

A brief examination of NSI streams with high rates of straying (e.g., Sawmill and Wilson River) versus streams with low rates of straying (Piston & Heinl 2012a, Piston & Heinl 2012b) did not

indicate that there was any correspondence of reduced wildstock return rates (Piston & Heinl 2011a), with the incidence of hatchery fish on the spawning ground (Figure 8) but did indicate most streams had depressed returns when compared with the long term average. ADF&G (2012f) are currently conducting a long term research program addressing the impacts of hatchery releases on wild stock productivity.

Hugh Smith Lake sockeye salmon are harvested in the region's drift gillnet and purse seine fisheries. The stock was classified as a SOC (management concern) in 2003, but was removed from the list in 2006 after experiencing three consecutive years of escapements above the upper end of the escapement goal range. The Hugh Smith Lake enhancement operation (sockeye were planted as smolts) ceased in 2003 and the last adults from that stocking progam returned to the lake as 3-ocean adults in 2007 (Brunette & Piston 2011).

Some of the primary documents used to assess management of the Southeast Alaska drift gillnet fisheries includes recent management reports (e.g. Bachman *et al* 2005), annual management plans (e.g. Davidson *et al* 2005) and escapement goal/stock status reports (e.g. Der Hovanisian and Geiger 2005 and ADF&G 2005). The Southeast Alaska commercial troll fishery operates in state waters of the Southeast Alaska/Yakutat area, and in federal waters of the Exclusive Economic Zone east of the latitude of Cape Spencer. We have separated the Yakutat area as a separate Unit of Certification and will be addressed in a different section of this document.

In the troll fishery 749 power troll and 345 hand troll permit holders (1,094 total fishermen) harvested approximately 2.8 million salmon in the 2011 Southeast Alaska troll fishery. The harvest included 242,121 Chinook, 5,190 sockeye, 1,313,594 coho, 496,171 pink and 702,769 chum salmon landed by 759 power troll and 372 hand troll permit holders during the calendar year. Of this, 156,864 salmon (6%) were taken by hand troll gear and 2.6 million salmon (94%) by power troll gear. The preliminary estimated Alaska hatchery contribution of Chinook salmon to the troll fishery, including hatchery terminal harvest, was 24,987 fish (10%). A total of 337,685 coho salmon produced by Alaska hatcheries were harvested by the troll fleet, which accounted for 26% of the total troll coho salmon harvest. Chinook and coho salmon escapements for Southeast Alaska rivers were generally within the desired escapement goal ranges. The troll fishery targets Chinook and coho salmon, and, with few exceptions, other species are harvested incidentally and comprise much smaller portions of the fishery's total exvessel value. Pink and chum salmon are targeted in a small fishery in Cross Sound during June, and hatchery chum salmon are targeted in and near terminal harvest areas in Sitka Sound and Neets Bay. Annual troll fishery harvests over the 1996-2005 period averaged 1.64 million coho, 239,000 Chinook, 302,000 pink, 259,000 chum and 10,000 sockeye salmon (Bachman *et al* 2005). Hatchery chum have become increasingly important over the last 15 years. The Chinook salmon troll fishery is separated into winter and summer seasons. During the October – April winter season, trolling is limited to the inside waters of the region. The summer season lasts from May through September and is further divided into spring and summer fisheries. The spring fisheries, which occur primarily in inside waters near hatchery release sites or along migration routes of returning hatchery fish, are intended to increase the harvest of Alaska hatchery Chinook salmon. The majority of the annual troll harvest of Chinook salmon is taken during the summer fishery which opens in early July.

The harvest of Chinook salmon in Southeast Alaska fisheries is controlled by the Pacific Salmon Treaty, with annual harvest quotas determined by the Pacific Salmon Commissions' Chinook Technical Committee based on forecasts of the aggregate abundance of Chinook salmon stocks in Southeast Alaska. Quotas do not include Alaska hatchery Chinook salmon above a pre-Treaty base level of 5,000 fish. Alaska BOF regulations allocate the region's total Chinook harvest to commercial troll, gillnet and purse seine fisheries and sport fisheries. The troll fishery is the primary harvester of Chinook salmon in Southeast Alaska. Coho harvest is managed for conservation and allocation among user groups in accordance with BOF Regulations. Chum harvest occurs primarily in terminal harvest areas associated with the Medvejie, Hidden Falls, and Neets Bay hatcheries. In-season management of

the commercial troll fishery is accomplished through monitoring harvest and fishing effort, CWT data that provides information on run strength of wild indicator stocks and hatchery stocks, and escapement monitoring programs.

Chinook salmon in SEAK are managed on the basis of assessments of 11 indicator stocks. Three of these are major systems (escapements in the tens of thousands), seven are medium systems (escapements in the thousands) and one is a minor system (escapements in the hundreds). Seven are outside rearing stocks and four are inside rearing stocks (i.e., streams flow into the Pacific Ocean vs. the inside passageway). Weirs, mark-recapture programs and helicopter surveys are used to monitor escapements and wild stock CWT programs have been conducted on most of the rivers to estimate harvests. Biological escapement goals based on productivity data are in place for all eleven index systems.

Coho salmon in SEAK are believed to spawn in 2,500 streams, and these are managed on the basis of indicator stocks. Indicator stocks are distributed geographically across the region and assessments are categorized as full indicator stocks (juvenile CWT and adult harvest and escapement monitoring) or escapement indicator stocks. There are currently seven full long-term indicator stock programs in the region, the majority of which were established in the early 1980s. Escapement indicator stocks include 14 streams near Ketchikan, six near Sitka, five near Juneau and four near Yakutat. Escapement goals, most based on stock recruit analyses, are currently in place for 13 individual stocks or aggregated stock groups.

Chum salmon spawn in about 1,200 streams in SEAK. Many have had aerial surveys at some time, and a few have had foot surveys. Escapement trend data is available for 82 chum populations. ADF&G biologists have recommended that the escapement surveys for chum salmon in SEAK not be used for establishing biological escapement goals (BEGs) because neither escapement nor harvest are reliably measured on a system-specific basis (Heinl *et al.*, 2004). However, managers do make use of average past escapement counts as a goal in managing the drift gillnet fishery.

There is limited exploitation of sockeye, pink, or wild chum salmon in the Southeast Alaska troll fishery. The recent 10-year average catch of sockeye is 10,000 or 0.5 % of the total Southeast Alaska all gear catch. The recent 10-year average catch of pink salmon is 49,000 or 0.1 % of the total Southeast Alaska all gear catch. The catch of chum salmon is 257,000; however 93% of this is from terminal harvest areas for the Medvejie, Hidden Falls, and Neets Bay hatcheries. Wild chum salmon are not a target species for the troll fishery with a few minor exceptions. During the 1996-2005 period, the troll fishery harvested an average of only 2% of the region's total commercial harvest of chum salmon (Bachman *et al.* 2005). The catch of chum salmon in the traditional troll fishery is only 18,000, or roughly 0.15% of the all gear catch. The stock composition of these fish is a broad mixture of stocks migrating through the troll fishing area. Some of the primary documents used to assess management of the Southeast Alaska troll fishery include recent management reports (e.g. Bachman *et al.* 2005), annual management plans (e.g., Lynch & Skannes 2005) and escapement goal/stock status reports (e.g., Der Hovanisian & Geiger 2005; ADF&G 2005).

UoC 2 – Yakutat

There are no hatcheries in the Yakutat area. Set net fisheries in the Yakutat UoC target sockeye salmon during June and July and coho salmon during August through September, with the exception of a targeted sockeye salmon fishery on the East Alsek River that typically occurs from late July through August (Woods & Zeiser 2012a). Historically, the harvest of pink salmon and very small numbers of chum was incidental. Increasing prices in 2011 provided economic incentive to target pink salmon. Chum salmon is therefore considered to be the only inseparable or practically inseparable (IPI) retained species in the Yakutat UoC.

Set gillnetting is largely restricted to the intertidal areas of the rivers and streams where BEGs are established with the exception of two (goals for Lost River coho and sockeye salmon are considered sustainable escapement goals – SEGs). As such, the fishery is managed to meet 19 escapement goals for sockeye, Chinook, coho and pink salmon (Munro & Volk 2011, Woods & Zeiser 2012a).

The set gill net fisheries are managed primarily through in-season escapement monitoring, including weirs on the Situk River and aerial, boat or foot surveys of other systems. Monitoring of catch and catch-per-unit effort is used for glacial systems where visual enumeration of escapement is difficult (Woods & Zeiser 2012a). A weir is also operated by the Canadian Department of Fisheries and Oceans (DFO) to count escapement into the Klukshu River, a Canadian headwater index tributary for the transboundary Alsek River.

During the last 10 years the annual set gill net harvests have averaged 137,000 coho salmon, 120,000 sockeye salmon, 70,000 pink salmon, 2,000 Chinook salmon and 1,000 chum salmon. Escapements have bounced around the goals and are largely above the goals, sometimes very much so (Munro & Volk 2011). Yakutat Area troll fisheries are managed and reported as a part of the activities in the Southeast Alaska Region (Skannes *et al*. 2012) and are addressed primarily in the assessment of the SEAK UoC.

2.3.4 UoCs in the Central Region

Source: http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southcentral

Figure 9: The Central Management Region

UoC 3 – Prince William Sound (PWS)

The assessment team concluded that the Prince William Sound (PWS) Unit of Certification should remain under assessment pending further analysis of 1) an ADF&G multi-year study relating to hatchery wild salmon stock interactions and how outcomes might influence future management practices, and 2) evidence relating to hatchery releases on the productivity of PWS herring.

The 2007 recertification of the Alaska salmon fishery placed conditions on PWS centered on Performance Indicators under Principle 1 and evaluation of whether the high levels of hatchery pink salmon straying, and to a lesser extent chum salmon straying, into PWS streams and the likely change in diversity and genetic composition is detrimentally impacting wild stocks. A corollary was to

account for strays when developing target reference points and evaluating spawning escapement goals.

Based on recent straying studies (Brenner *et al*. 2012, Habicht *et al*. 2012), ADF&G has initiated a large-term data collection and analysis program for PWS pink and Southeast chum salmon. A program objective is to answer key questions about the effects of high straying in PWS streams on subsequent offspring survival and "fitness" compared to offspring in PWS streams known to have low stray rates. However, the program materials made available to the assessment team did not include a detailed study design.

The assessment team will need additional information, to be gathered at a site visit in due course, to determine how this long-term program can be successfully incorporated into the PWS management framework. Beyond consideration of existing and future research studies, the assessment team will need to be in a position at this site visit to determine whether any future ADF&G management practice can reasonably address scoring indicators in the MSC Standard. The PWS hatcheries annually release ~815 million juveniles and provide 45 million adult salmon for harvest, primarily pink salmon. Hatchery fish contribute upwards of 90% of the salmon harvest and in some years provide harvest opportunity when wild stocks might not.

Current ADF&G management practices do not consider or alternatively exclude hatchery fish when developing PWS escapement goals. It is well documented that 50% of the PWS streams contain more than 10% hatchery pink salmon and in some cases may account for up to 80% of the escapement. This level of straying occurs even though ADF&G management does everything available to harvest all hatchery fish while achieving adequate escapement. Contrast these straying rates with the PWS hatchery planning document that identifies a 2% stray rate objective.

The assessment team has therefore concluded that additional time is needed for the consideration and development of measures that account for strays in escapement goals and to determine how such measures in conjunction with research and innovative management can evaluate impacts on productivity and effectively reduce straying levels in the streams.

There is some evidence to suggest that PWS enhancement activities may cause detrimental ecological impacts that negatively impact PWS herring (Deriso et al. 2008, Pearson et al. 2012) in addition to wild pink salmon (Hilborn and Eggers 2000, 2001; Wertheimer et al. 2001, 2004). Specifically, exceptionally high levels of pink salmon hatchery releases may cause density dependent mortality of herring that inhibits the recovery of herring abundance in PWS. Much of the evidence on herring was developed during and after litigation flowing from the *Exxon Valdez* oil spill. NOAA scientists dispute the published studies, but they have yet to publish alternative explanations for the inability for herring to recover. Additional time is, therefore, also needed to further evaluate the ecological effects of large hatchery production on PWS herring productivity.

UoC 4 – Copper/Bering Districts

Copper/Bering gill net fisheries target sockeye, Chinook, and coho salmon (Botz *et al*. 2012, Botz & Somerville 2011). Pink and chum salmon are taken incidentally in the Copper/Bering Districts and are addressed in this assessment as IPI retained catch.

Sockeye and Chinook salmon are among the earliest seasonally-available commercial salmon and have established a high-value market. The 10 most recent annual harvests for the Copper/Bering Districts averaged 1.2 million sockeye, 300,000 coho, 32,000 Chinook, 20,000 chum, and 9,000 pink salmon (Botz *et al*. 2012).

Substantial runs of sockeye, coho, and Chinook salmon are produced by the Copper River, and there are escapement goals (SEG) for each (Fair *et al.* 2011). The much smaller Bering River produces sockeye and coho salmon, and there are also escapement goals (SEG) for each (Fair *et al.* 2011). Escapements of sockeye, coho, and Chinook salmon are monitored at multiple index sites for each species using enumeration tools that include sonar, aerial surveys, mark-recapture, and genetics (Botz *et al.* 2012, Botz & Somerville 2011). Recent research has identified significant stock structure within the Chinook salmon and sockeye salmon runs and ADF&G uses these results to identify the components of mixed stock fisheries (Ackerman 2010, Ackerman *et al.* 2011, Templin *et al.* 2011a).

Copper River fisheries occur in terminal areas at the mouth of the river and the district includes 6 subdistricts distributed inside and outside a series of barrier islands (Botz *et al.* 2012). Sockeye and Chinook salmon are also harvested in subsistence and personal use dip net and fish wheel fisheries, and Chinook and coho are also subject to significant sport fisheries in some tributaries; the numbers of fish harvested are closely documented (Botz *et al.* 2012).

The Gulkana Hatchery is the only commercial hatchery system in the Copper/Bering Districts UoC. It is a stream-side incubation facility that currently releases a combined total of approximately 20 million sockeye fry per year into three lakes, and these fish dominate sockeye catches during the latter part of the season. About 10% of hatchery fish are otolith marked for later identification and evaluation. This is an integrated hatchery project, with almost half of the broodstock used annually coming from local wild stocks. In 2010, the most recent year reported, 57% of the sockeye salmon entering the Copper River District originated from upriver wild stock systems, 17% from wild stock systems in the Copper River delta, and 26% came from the Gulkana Hatchery.

UoC 5 – Lower Cook Inlet

The Lower Cook Inlet (LCI) Management Area includes waters west of the longitude of Cape Fairfield, north of the latitude of Cape Douglas, and south of the latitude of Anchor Point. The freshwater drainages are coastal streams dominated by pink salmon. There are five fishing districts with the Barren Islands District being the only fishing district where no salmon fishing occurs. The other four districts (Southern, Outer, Eastern, and Kamishak Bay) are separated into approximately 40 subdistricts and sections to facilitate management of discrete stocks of salmon. All Pacific salmon species are harvested in LCI waters, with chum and sockeye being the most valuable. Coho and Chinook harvests are very limited and local stocks are small and not targeted. These are considered against the MSC's IPI criteria and are addressed under Principle 2. Fisheries enhancement has been important in LCI over the past 30 years and has contributed up to 90% of the harvest.

A summary of the commercial fishery in 2010 and 2011 has been extracted from Hammarstrom & Ford (2011) and Hollowell *et al*. (2012). The 2010 LCI all-species commercial salmon harvest of 468,200 fish was the lowest since 1976, representing less than 28% of the recent 10-year average of 1.69 million. The overall harvest in 2010 was very low due to the low harvests of natural runs of pink salmon and very poor runs of sockeye salmon to nearly all enhancement project sites in the management area. Commercial harvests of chum salmon at nearly 95,000 fish were greater than the recent 10-and 20-year averages. Returns of pink salmon, usually the dominant species in numbers of commercially harvested salmon in LCI, were considered fair to poor in 2010 with a catch of 278,200 fish. The total pink salmon harvest in 2010 represents less than one-quarter of the average over the past two decades, which were dominated by LCI hatchery production. All of the returning sockeye salmon to the LCI hatchery stocks were required for brood stock and cost recovery.

Purse seines and set gill nets are legal gear in LCI. Seine fishing effort was low with only 14 of 85 permit holders making deliveries in 2010. The number of active set gillnet permits in 2010 was 21, slightly exceeding the recent 10-year average of 20. The 2011 harvest was comprised of 362,000 pink, 393,000 sockeye, 32,000 chum, 155 coho, and 141 Chinook salmon. Approximately 77.1% of the

harvest, 628,000 fish, was common property harvest and 158,000 fish were sold for hatchery cost recovery.

LCI commercial salmon harvests in 2010 were not dominated by hatchery and enhanced fish production following a five year trend. No pink salmon returned to Tutka Hatchery or to Port Graham Hatchery where operations were suspended after 2004 and 2007 respectively. Hatchery production contributed to sockeye salmon catches, with 75% of LCI sockeye salmon harvest attributed to the Cook Inlet Aquaculture Association (CIAA) lake stocking, fertilization, and/or remote release projects at Leisure and Hazel Lakes, Tutka Bay Lagoon, Kirschner Lake and Bear Lake. Trail Lakes Hatchery Sockeye Salmon Management Plan enacted by the BOF dictated that all CIAA Special Harvest Areas in LCI be managed primarily to achieve CIAA's corporate cost recovery and brood stock goals. Sockeye salmon returning to CIAA's stocking projects were so poor in 2010 that virtually all common property fishing targeting these runs was precluded for the second straight season. The Port Graham Hatchery Corporation did not contribute any sockeye salmon to LCI commercial catches in 2010 despite an ongoing project. The overall area-wide commercial harvest of sockeye salmon in LCI was about 93,000 fish. This was the lowest for this species since 1980 and represented less than one-third of the recent 10-year average of 303,000 fish.

The Trail Lakes facility primarily produces sockeye salmon, with minor production of coho and Chinook salmon. Most of the production from this facility benefits LCI fishermen. Review of the hatchery operations of LCI including the Trail hatchery were completed in 2012 and reports indicated minor administrative issues but operations generally complied with all of ADF&G regulations (Stopha 2012a). Review of the hatchery at Port Graham (Stopha 2012b) indicated poor hatchery practices and problems in compliance with genetic policies. Operations have been terminated with pink salmon releases ended and sockeye salmon program taken over by the Trail Lakes hatchery. The hatcheries at Tutka lagoon and at Eklutna (located in UCI), despite being inactive for the past several years, have received good marks for previous operations (Stopha 2013, Stopha & Musslewhite 2012).

Cook Inlet's long term regional plan indicates no likely major expansions of hatchery operations in the foreseeable future, although facilities where production has recently ceased could reopen. Indeed, in 2012, approximately 11 million pink fry were released from the Tutka Bay Hatchery. Much of the stocking of barren sockeye salmon systems has been affected by the inability to use Tustamena Lake sockeye salmon as an egg source for supporting these systems. Hidden Lake sockeye stocks in the Kenai River drainage has been used for brood source but may not be suitable for maintaining production on many of these systems. The hatchery programs at Port Graham and Tutka were not active for a variety of reasons, primarily financial. Major reductions recently occurred in stocking salmon for commercial harvests from much of CIAA's operations. Some of the stocking activities in LCI are directed at intensively used sport fisheries (CIRPT 2007) although multiple small sockeye salmon systems are the primary enhancement target in LCI. These have terminal fisheries and typically weir counts to enumerate escapements to facilitate terminal harvest management, which recently has been cost recovery and brood stock collection.

The estimated exvessel value of the 2010 commercial salmon harvest in LCI was approximately $1.78 million, about 12% less than the average of $2.03 million during the past decade. Hatchery cost recover was an estimated $599,000, or just over one-third of the entire exvessel value of the LCI salmon fishery. The hatchery proportion of this season's exvessel value was less than the previous year due to weak sockeye salmon runs to major enhancement sites. The price for Chinook salmon set a new record in the management area, while prices for all other species were the highest in over twenty years. In 2011, based on fish ticket reporting of prices, the preliminary estimated value of the commercial salmon harvest was $3.9 million, including hatchery sales, approximately double of the previous year. Set gillnet harvest value was an estimated $238,000, setting average permit earnings at $11,300; purse seine fishery exvessel harvest value was an estimated $2.1 million, setting average

permit earnings at $90,300. Revenue generated for hatchery operations was approximately $1.6 million.

Fish escapements are enumerated by a variety of methods, with multiple weirs (fish fences) providing real time counts of salmon for the major sockeye salmon systems. Aerial counts are also conducted in pink salmon and chum salmon management. Fisheries management use in season harvest rates reported in real time from the industry and the escapement data. Fisheries are relatively terminal and fishing on enhanced stocks is very terminal with hatchery cost recovery areas dominating the 2011 harvests.

There are 12 chum and 17 pink salmon systems with escapement goals in LCI. The LCI management area has six lake systems with significant naturally occurring sockeye salmon runs and 3 Chinook salmon systems. There are no escapement goals for coho and the 3 Chinook runs reflect sport fish management and are considered to be incidental harvests to the commercial fisheries in LCI. The escapement goals were recently reviewed (Otis *et al*. 2010) with adjustment to many of the systems that reflect improved data analysis.

Four of five sockeye salmon escapement goals achieved or exceeded their SEG's in 2010, while the sixth system has no formal escapement goal. Targeted fishing effort was allowed on sockeye salmon returning to Chenik Lake in the Kamishak Bay District for the seventh consecutive season in 2010, a system that has had poor production because of infectious hematopoietic necrosis virus outbreaks. The 12 chum systems have exceeded the lower end of the escapement goals 85% of the time over the past 9 years. The 17 pink salmon systems have exceeded the lower end of the escapement goals > 90% of the time over the past 9 years (Munro & Volk 2012). There are no stocks of concern in LCI (Hammarstrom & Ford 2011, Munro & Volk, 2012).

Future research plans and priorities have been developed for throughout the Central Region for all commercial fisheries, including salmon (Fair 2011). Much of the effort for research has recently been focused on Chinook salmon because of the past five years of declining run returns and of the economic importance to the tourist and guiding industry in Cook Inlet.

UoC 6 – Upper Cook Inlet

The Upper Cook Inlet (UCI) commercial fisheries management area is that portion of Cook Inlet north of the latitude of the Anchor Point Light and is divided into the Central and Northern districts. The Central District is 75 miles long and 32 miles in width. The Northern District is 50 miles long and 20 miles in width. All five species of Pacific salmon are commercially harvested. Set gillnets are the only gear permitted in the Northern District, while both set and drift gillnets are used in the Central District. The use of seine gear is restricted to the Chinitna Bay Sub-district, where they have been employed sporadically. Since 1966, drift gillnets have accounted for approximately 6% of the average annual harvest of Chinook salmon, 55% of sockeye, 47% of coho, 43% of pink, and 88% of chum salmon with set gillnets harvesting virtually all of the remainder (Shields & Dupuis, 2012).

A summary of the commercial fishery in 2010 has been extracted from Shields & Dupuis (2012). The 2011 UCI commercial harvest of 5.5 million salmon was approximately 34% greater than the 1966–2010 average annual harvest of 4.1 million fish, while the commercial sockeye salmon harvest estimate of 5.3 million fish was more than 82% above the 1966–2010 average annual harvest of 2.9 million fish. The 2011 estimated exvessel value of $53.1 million represented a 183% increase from the average annual exvessel value of $18.8 million from the previous 10 years, and approximately 112% more than the 1966–2010 average annual exvessel value of $25.0 million.

Salmon enhancement through hatchery stocking has been a part of UCI salmon production since the early 1970s. The Trail Lakes facility is operated by the Cook Inlet Aquaculture Association (CIAA).

This hatchery primarily produces sockeye salmon, with minor production of coho and Chinook salmon. Most of the production from this facility benefits Lower Cook Inlet fishermen. In 2011, CIAA released 1,044,000 sockeye into Hidden Lake (http://www.ciaanet.org) that were otolith-marked, which allowed for identification and enumeration of hatchery stocks when the smolt emigrated to sea. CIAA enumerated approximately 299,000 sockeye salmon smolt emigrating Hidden Lake, of which approximately 47% were estimated to be of hatchery origin. Adult salmon are also sampled and examined for hatchery otolith marks at the weir below Hidden Lake. Fish returning to this system are part of the Kenai River targeted sockeye harvests. After the 2008 season, CIAA discontinued sockeye stocking of Big Lake which drains into the Northern part of Cook Inlet. ADF&G is currently enumerating smolt emigrating Big Lake as CIAA discontinued operations. Other major hatchery operations targeting commercial harvests have been discontinued. In 2011, the estimated number of hatchery-produced adult sockeye salmon that returned to UCI was 112,000 which composed approximately 1.3% of the total UCI run (Shields & Dupuis 2012). Review of the hatchery operations of UCI including the Trail hatchery was completed in 2012 and reports indicated minor administrative issues but operations generally complied with all of ADF&G regulations (Stopha 2012a). Cook Inlet's long term regional plan indicates no likely major expansions of hatchery operations in the foreseeable future with major reductions recently occurring on stocking. Much of the stocking activity in UCI is directed at intensively used sport fisheries (CIRPT 2007).

UCI sockeye and Chinook salmon stocks have been well identified using GSI methods (Barclay *et al*. 2010, Barclay *et al*. 2012). There is a well-defined understanding of stock structure and the composition of the harvests from the commercial fisheries.

Fish escapements are enumerated by a variety of methods, with multiple weirs (fish fences) providing real time counts of salmon for the major sockeye salmon systems and some pink, coho, chum and Chinook escapements. Formal reviews of escapement goals in the UCI were conducted in 2007 (Hasbrouck & Edmundson 2007), in 2009 for the Susitna River (Fair *et al* 2009) and in 2011 (Fair *et al*. 2010). Minor adjustments to escapement goals were generally followed although the Kenai sockeye salmon escapements have been substantially increased. New sonar technology has at least contributed to changes in escapement goals and more accurate enumeration.

In the UCI, stocks of Chinook salmon with 21 formal escapement goals are closely monitored. Because of the broad based regional decline in marine survival, escapements have fallen short over the past five years. Most of the harvests from these systems are targeted for sport fisheries. Over the past 10 years, the lower end of the escapement goals has been met during the majority of the years (> 70% of the years) for most of the systems. However, several systems have been declared stocks of concern by the BOF and have action plans established to help them recover (Munro & Volk 2012).

There are 11 sockeye systems with formal escapement goals with the Kenai and Kasilof River dominating production. These systems in aggregate have met the lower end of the escapement goals approximately 85% of the time over the past nine years. The exception has been weak returns to the Susitna River, based on enumerations on the Yetna River. The use of the sonar counter has been discontinued for fisheries management although there are counting weirs on the major lake sockeye systems over the past three years. These systems indicate escapement have been met for each of the three systems being monitored for two of the last three years. The Susitna sockeye salmon run has been declared as a stock of yield concern by the BOF (Munro & Volk 2012).

Stocks of concern have been identified for several Chinook systems and one sockeye system has been identified as a stock of yield concern. The Department is actively addressing all issues with recovery action plans identified for the fisheries of concern (ADF&G 2011b; 2011c; 2011d).

There are a small number of coho and a single chum escapement goal with no formal pink escapement goals. The chum system has exceeded the lower end of the goal for six of the last nine years and all of

the past five years. The three coho systems being monitored have met escapement goals 75% of the years over the past nine years, although during the past five years, one of the three systems has fallen below the lower end of the escapement goals in three years and a second one failed to meet the escapement goal in two of the five years. The third system was not monitored for four of the past five years but met the goal in 2011 (Munro & Volk 2012).

There are many systems with harvested chum, coho and pink runs. The department has conservatively estimated harvest rates in the past and has indicated the rates are below 15% with the actual rates significantly less because of the lack of inclusion of many of the streams with escapement in the estimates (Willette *et al*. 2003), with likely harvest rates less than 10%.

Future research plans and priorities have been developed for throughout the Central Region for all commercial fisheries including salmon (Fair 2011). Much of the effort for research has recently been focused on Chinook salmon because of the past five years of declining run returns and of the economic importance to the tourism and guiding industry in Cook Inlet.

UoC 7 – Bristol Bay

The Bristol Bay salmon fishery takes large numbers of sockeye salmon in each of five fishing districts: Ugashik District, Egegik District, Naknek –Kvichak District (Naknek, Alagnak, and Kvichak rivers), Nushagak District (Nushagak, Wood and Igushik rivers), and Togiak District. All species of salmon may be harvested from June 1 through September 30. Fishing periods (windows) are established through emergency order designed to (1) ensure that adequate numbers of salmon escape to spawn and (2) harvest the surplus of fish in excess of escapement needs. Gear types include drift gillnet and set gillnet. There are no enhanced stocks in Bristol Bay.

In addition to sockeye salmon, other directed fisheries include Nushagak River Chinook, coho, and even-year pink salmon and Togiak River coho salmon. Large numbers of Nushagak River chum salmon are taken incidentally; incidental catch of other species is exceeding low.

Escapement goals are used to manage the fisheries; goals for directed fisheries are based on brood tables and stock-recruitment relationships. Brood tables originate from harvest, escapement, and age composition data; data series starting in the 1950s are available for most drainages. During the season fisheries are scheduled using: 1) preseason forecasts, 2) abundance and genetic stock composition data from the in season test fishery at Port Moller (sockeye), 3) in season (daily) monitoring of catch and escapement, 4) and regular monitoring of age, sex, and size. Daily escapements are monitored primarily by tower, but sonar and aerial surveys are also used.

Until early 2013, Kvichak River sockeye salmon was a SOC (yield concern) because of a series of poor-production years, especially 1996-2004. Recent years have shown increased production, seen as both catch and harvest. Returns per spawner increased from an average of 0.8, during the 1990s, to an average of 3.4 during the most recent 5 brood years. ADF&G recommended removing Kvichak River sockeye salmon from stock of concern status in 2012 and this recommendedation was approved by the BOF (L. Fair, personal communication). No stocks of concern are in the Bristol Bay Management Area.

The fishery has a long history of management and research, including long-term projects and data sets produced by University of Washington's Alaska Salmon Program and ADF&G. The primary documents used to assess fisheries management in Bristol Bay include reports of stock composition in the harvest (Dann *et al*. 2009; Smith 2010), the annual management report (Jones *et al.* 2012), and published accounts of management strategy (Fair 2003; Baker *et al.*, 2009).

2.3.5 UoCs in the Arctic-Yukon-Kuskokwim Region

Source: http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.interior

Figure 10: The Arctic-Yukon-Kuskokwim Region (NB. There is no commercial harvest of salmon in the Northern Management Area, and so this is not a Unit of Certification).

UoC 8 – Yukon River

The Yukon Management Area (YMA) is part of the Arctic-Yukon-Kuskokwim Region (AYK) and includes the Alaska portion of the Yukon River plus some nearby marine waters along the Bering Sea coast (Estensen *et al.* 2012). The Yukon is the largest river in Alaska, originating in British Columbia and the Yukon Territory and flowing over 2,300 miles to the Bering Sea.

Commercial salmon fishing occurs throughout the 1,200 miles of the Alaska mainstem portion of the river, as well as the lower 225 miles of the Tanana and lower 12 miles of the Anvik rivers (Estensen *et al.* 2012). Essentially all salmon harvested in the YMA are of Yukon River origin. The YMA is divided into 7 fishing Districts that progress from the coastal zone upstream to the US-Canada border. The vast majority of harvest occurs in Districts 1 and 2 of the lower river (average ~500 of the 520 deliveries during the summer season). Drift gillnets are the predominant gear type used in the lower Yukon River. Set gillnets are more common in the coastal district, and fish wheels account for most of the commercial harvest in the middle river districts. (N.B. “upper Yukon” is generally used to refer to the Canadian portion of the river). A salmon roe fishery is conducted in Districts 4-6 of the middle Yukon River, in which fishermen use beach seines and fish wheels to catch salmon which are then

stripped of roe. Only the roe is sold. Carcasses are retained for subsistence use (sometimes referred to as "commercial-related harvest"). The gear used in the roe fishery allows live release of male fish.

The Yukon River produces Chinook, chum, coho, pink, and sockeye salmon (Estensen *et al.* 2012). Chinook spawning populations occur throughout the drainage. A distinctive characteristic of the Yukon River Chinook salmon run is that it occurs in pulses, typically 3 or 4, with the earliest pulse containing a higher proportion of upper river (Canada bound) spawning stocks. Later pulses have progressively lower proportion of upper river stocks, and this information is used to manage the fisheries. Total Chinook run estimates were relatively stable at around 300,000 fish from 1982 to 1997, but have since declined sharply to an average of around 200,000 fish, with most recent years among the lowest (ADF&G 2012b).

Chum salmon occur as two genetically distinct runs, a summer run that spawn primarily in tributaries in the lower 700 miles of the drainage and in the Tanana River, and a fall run that spawns in the middle and upper portions of the drainage. The summer run is more abundant, averaging over 1.6 million fish annually compared to 800,000 fall chum. Annual abundance is variable for both chum runs, but in recent years has been above average.

Coho salmon have a discontinuous distribution throughout the Alaska portion of the drainage, spawning primarily in tributaries of the lower 700 miles and the Tanana River. Annual abundance ranges from about 62,000 to 270,000 (based on Pilot Station sonar that excludes lower river harvest). In recent years coho abundance has been near average (+/- about 30%) with no clear trend.

Pink salmon spawning is mostly in tributaries downstream of river mile 336 with abundance higher in even years. Total run abundance is unknown, but can be substantial in some lower Yukon River tributaries. Sockeye are uncommon in the Yukon River and have a scattering of recorded occurrences to river mile 763.

The commercial fisheries of the YMA target Chinook, summer chum, fall chum, and coho salmon (Estensen *et al.* 2012). The selectivity of fishing gear generally precludes harvest of pink salmon, which are small and typically pass through the gillnets. Commercial fishing unfolds as a series of waves that progress upstream through the various fishing districts as pulses of fish travel along their migration route. The first wave, the summer season, traditionally starts in June and targets Chinook salmon with unrestricted gillnet mesh size (mostly $\geq$8-inch) so fishermen can target large Chinook salmon and exclude smaller salmon. As the Chinook run wanes in late June or early July, management shifts to summer chum with gillnet mesh size restricted to 6-inch or smaller mesh. By mid-July, fall chum and then coho begin to enter the lower river and become the focus of management. In more recent years, low Chinook salmon abundance has prohibited any directed Chinook salmon fishery, but restricted mesh openings (6-inch or smaller) are allowed by late June or early July to target summer chum when abundance warrants. However, managers continue to close areas where late entering Chinook tend to be more abundant (e.g. Middle Mouth and North Mouth). The last commercial fishery targeting Chinook salmon occurred in 2007. Time, area, and gear restrictions have allowed commercial harvest opportunity for summer chum after the vast majority of Chinook have cleared the respective district. Commercial sale of incidentally-caught Chinook was prohibited in 2009, 2011, and 2012. Chinook captured in the commercial chum fishery were retained for subsistence use. Chinook salmon are currently the only stock of concern (yield) in the YMA, and have been since 2000.

Subsistence fishing is highly important to people throughout the YMA (avg. all salmon 200,441 fish, 2000-2009), especially for chum salmon (avg. 118,711 fish, 2000-2009) which accounts for about half the average annual statewide subsistence chum harvest (ADF&G 2010, Estensen *et al.* 2012). Chinook are an important species for subsistence harvest (avg. = 47,101 fish, 2000-2009), but repeated years of low Chinook abundance has led to progressively more stringent restrictions in the

form of multi-day closures and gillnets being limited to 6-inch or smaller mesh. In 2010, out of concern for the selective harvest on large Chinook salmon, the BOF restricted subsistence users to gillnets of 7.5 inch or smaller mesh size, which ADF&G studies found to result in age compositions more closely resembling that of entering fish (Howard and Evenson 2012). Still, mangers have continued to use time, area, and gear restrictions to minimize the subsistence harvest of Chinook salmon while targeting chum salmon. Annual subsistence Chinook harvests have been below the lower end of the "Amounts Necessary for Subsistence" (ANS; 45,500-66,704 fish) since 2008 (ADF&G 2012a), indicating that subsistence fishermen have not harvested enough Chinook salmon to meet their needs. The failure to meet ANS is in part because of the low Chinook abundance and the various management actions, but also because of informed choice among some members of the public to reduce their Chinook catch in order to bolster escapement.

Subsistence fishing was limited to rural Alaska residents in 1986, so the BOF established a "Personal Use" fishery for non-rural state residents (Estensen *et al.* 2012). Details of the fishery have changed repeatedly through various legal challenges. Currently there exists in the YMA a "non-subsistence area" in the vicinity of Fairbanks where limited Personal Use harvest is allowed though a permit system.

ADF&G is the lead fishery management agency. The Federal Subsistence Board (via United States Fish and Wildlife Service – USFWS) has authority to close fishing for non-subsistence uses on applicable waters if necessary to ensure a priority for federally qualified rural subsistence users, but most management decisions are done cooperatively. Although differences exist, state and federal regulations are generally the same. In some cases, State regulations can be superseded by a Federal Special Action.

The YMA salmon fisheries are managed to achieve spawning escapement goals in a number of tributaries and at the US/Canada border (Estensen *et al.* 2012). There are 16 goals in the YMA, 7 for Chinook, 2 for summer chum, 6 for fall chum, and 1 for coho. In addition, there are 3 goals for Canadian stocks, 1 for Chinook and 2 for fall chum. These goals are based on weirs, counting towers, peak aerial counts, and sonar projects. Eight of the YMA goals are BEGs and 8 are SEGs. Between 2007 and 2011, escapement goals were achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012). No changes are being recommended for escapement goals in 2013. Inseason, managers use a series of gillnet test fisheries and main stem sonar projects to monitor timing and abundance of each of the targeted species. Managers compare CPUE in the test fisheries and counts in the mainstem sonar with historical estimates as a means to determine whether there is sufficient abundance to open commercial fisheries while also meeting escapement goals. For example, coho and fall chum salmon enter the river together, and if coho abundance appears weak based on preseason forecast, test fisheries, Pilot Station sonar, and tributary index counts (several without formal goals), then frequency of commercial fishing periods is reduced as required in the management plan (F. Bue, former ADF&G Yukon manager, personal communication with D. Molyneaux; ADF&G 2010). Commercial fishing for coho typically stops well before the end of the migration period and the overall harvest rate on coho is relatively low.

The Yukon River Salmon Agreement between the United States and Canada factors in strongly with the management of Chinook and fall chum salmon (Estensen *et al.* 2012). Canadian waters are responsible for approximately 50% of the production of Yukon River Chinook salmon and a large fraction of the fall chum salmon. The agreement has undergone many adjustments in response to the changing dynamics of the fishery. In 2010 U.S./Canada panel agreed to one year Canadian interim management escapement goal (IMEG) ranges of 42,500 to 55,000 Chinook salmon and 70,000 to 104,000 fall chum salmon based on the Eagle sonar project near the Canadian border. In addition, Canada is receiving a share of any harvestable surpluses in the Canadian run component, referred to as the Total Allowable Catch (TAC), which is annually determined based on projected run abundance

with inseason adjustments. In January 2013, the BOF made it a priority to protect the first wave of Chinook (Canada-bound) passing through the Yukon from both commercial and subsistence fishing.

The Canadian portion of the Yukon River also supports aboriginal, commercial, sport, and domestic salmon fisheries that target Chinook and fall chum salmon. A hydroelectric dam equipped with fish ladder is located on the mainstem Yukon River at Whitehorse (river mile 1,980) and there is a small-scale on-site Chinook salmon hatchery for mitigation (Evenson 2009). The Canadian commercial fishery is not part of this MSC assessment.

UoC 9 – Kuskokwim

Kuskokwim Management Area (KMA) is part of the Arctic-Yukon-Kuskokwim Region (AYK) and includes the Kuskokwim River and Kuskokwim Bay drainages of the Bering Sea coast. The KMA includes three active commercial fishing districts, each managed as an independent terminal fishery. District 1 is in the lower Kuskokwim River and extends from the mouth upstream to river mile 126. Districts 4 and 5 occur in the marine waters south of the Kuskokwim River and the fisheries harvest salmon returning primarily to the Kanektok and Goodnews Rivers, respectively. Commercial fishing in all three districts occurs with gillnets, primarily drift gillnets, and fishermen can move between districts. Currently fishers are restricted to using gillnets with 6 inch or smaller mesh size, although in District 1 ADF&G has regulatory authority to allow the use of gillnets of up to 8 inch mesh to target Chinook salmon. The option to use 8 inch mesh has not yet been implemented since it went into regulation in 2007. Harvests of pink salmon are less than 2% of the total, as most are too small to be taken in the gillnets. Subsistence fishing is highly important to people throughout the KMA (avg. 197,000 salmon, 2003-2007), especially for Chinook salmon (avg. 74,000 per year, 2003-2007) and ranks as the largest Chinook subsistence fishery in the Alaska. Most subsistence harvest occurs with gillnets, and mesh size is unrestricted. ADF&G managers attempt to ensure that commercial fishing activities do not adversely impact subsistence fishing. Although ADF&G takes the lead in fishery management, the Federal Subsistence Board (via USFWS) has authority to close fishing for non-subsistence uses on applicable waters if necessary to ensure a priority for federally qualified rural subsistence users.

The District 1 commercial fishery (lower Kuskokwim River) focuses on chum and coho salmon (Brazil *et al.* 2011). Directed commercial fishing on Chinook salmon has not occurred since 1986, although Chinook are incidentally captured (and sold) in the commercial chum fishery (avg. 2,634 Chinook per year, 2001-2010). There is a trend of commercial fishing becoming more concentrated in the lower half of District 1, downstream of Bethel (W1-B) because of processor preference. In-season management is highly dependent on an ADF&G operated drift gillnet test fishery near Bethel to evaluate run strength and run timing, and serves as the primary basis for decisions when to allow commercial fishing. Escapement is currently monitored via 8 tributary weirs, plus aerial surveys are flown on up to a dozen other streams to index Chinook salmon escapement. Spawning escapement data are typically available late fishing season because it takes weeks for fish to reach the spawning areas where they are enumerated. A good statistical relationship has been developed between the test fishery and Chinook escapement at weirs (Schaberg 2012). The test fishery is also used to approximate relative abundance and timing of the other species. Low Chinook abundance in recent years has prompted time, area, and gear restrictions to the subsistence fishery, and delayed start of the commercial chum fishery.

The District 4 and 5 commercial fisheries target Chinook, sockeye, and coho salmon, with the directed fisheries roughly corresponding to the months of June, July, and August respectively. Chum are caught (and sold) incidentally. In-season management typically follows a fishing schedule that allows for 2 twelve hour periods per week in June and 3 per week in July and August, with one or more fishing periods removed if abundance is assessed as low. In District 4 in-season abundance is determined by fishery performance and through input from subsistence and sports fishermen, the

latter are used particularly for Chinook. More recently a weir has been operated intermittently from late June through August on the Kanektok River to monitor Chinook, sockeye and chum escapements and this information factors into District 4 in-season management when available. Coho salmon escapement is not monitored in District 4. In District 5, a weir is also operated in the lower Middle Fork Goodnews River that provides timely in-season abundance information for Chinook, sockeye, chum, and coho. Chinook and sockeye escapements are also monitored with peak abundance aerial surveys of the Kanektok and Goodnews rivers.

Overall, ADF&G manages KMA commercial fisheries to achieve spawning escapement goals in a number of tributaries. Overall, there are 14 goals for Chinook, four for chum and sockeye, and three for coho (Munro & Volk 2012). The goals are based on weirs, peak aerial counts (live and dead), and until recently one tributary sonar project. Most goals are classified as SEGs. Escapement goals (lower end) have been achieved during each of the five most recent years for chum, coho, and sockeye (except one sockeye stock in one year).

However, escapement goals for KMA Chinook salmon have not been achieved for 10 of the monitored stocks during most of the recent four year period. Only two Chinook stocks have consistently met their escapement goals. ADF&G recently reconstructed the drainage-wide abundance of Chinook salmon in the Kuskokwim River since 1976 and used these modelled data to develop a basin-wide escapement goal of 65,000 to 120,000 Chinook salmon using a Ricker approach coupled with a Bayesian state-spaced model (Bue *et al.* 2012, Schaberg *et al.* 2012). The new goal was reviewed and approved by external experts, including Dr. R Hilborn, University of Washington; eveidence indicated the previous goals were too high. Under the new drainage-wide goal, historical escapements would have achieved or exceeded in all but two years (1986 and 2010). The basin-wide goal was used to modify three tributary goals based on the average contribution of the tributaries to the total run, the result being a reduction and narrowing of escapement goal ranges. Chinook goals are to be eliminated in two other tributary because of their relatively low contribution to the run.

Concern was raised that escapements below the mid-point of the revised goal would significantly reduce catchability of Chinook by subsistence fishermen upstream of the W1-B commercial fishery because the basin-wide goal results in abundance levels below historical levels (e.g., average historical escapement was 150,000 Chinook). However, a management plan was developed and approved by the BOF in January 2013 for implementation of the new goal.

UoC 10 – Kotzebue

The Kotzebue District is part of the AYK management area and it includes all waters from Cape Prince of Wales to Point Hope, i.e., north of Norton Sound. The Kotzebue District is divided into three subdistricts and all are open to commercial fishing (Menard 2012b, Menard *et al.* 2012). This region supports the northern most commercial fishery in Alaska. Most fishing occurs in Subdistrict 1, which is subdivided into six statistical areas to help managers determine catch location. Chum salmon is the most abundant salmon, though other salmon species occur in small numbers. Commercial harvests are dependent on chum abundance and the presence of a buyer. Commercial harvests averaged 228,000 chum salmon during 2008-2012, supporting up to 89 fishermen (Menard & Kent 2012). Small numbers of other salmonid species, including Dolly Varden char and sheefish, are captured for personal use and documented on fish tickets. Primary fishery management objectives are to provide adequate chum salmon escapement through the commercial fishery to ensure a sustained run and to provide for the subsistence priority. A test fishery conducted on the Kobuk River provides the only in-season escapement index (600 fish is the index threshold). If commercial catches indicate a weak run, and are in agreement with test fish catches in the Kobuk River, the department reduces fishing time in late July to two short duration periods per week or less. If commercial catches indicate sufficient run strength the department allows commercial fishing to continue based on market conditions and escapement indicators. Age, sex and length composition (ASL) are taken from

commercial catch samples. Aerial survey data are utilized to: (1) evaluate initial run strength while salmon are traveling to the spawning grounds, and (2) document peak salmon abundance on the spawning grounds as an index to total escapement. One of the primary fishery management strategies is to provide for escapement within sustainable escapement goal ranges (SEG) for each river system (five goals). These ranges were developed in 2007 and are based on an analysis of historical harvest and escapement information of specific index areas within major drainages. In recent years, the goals have been met or surveys have not been conducted largely due to weather issues and water clarity (Menard 2012b, Munro & Volk 2012). Chum abundance in recent years has rebounded from low levels in the 1990s and 2000s.

There are no stocks of concern in Kotzebue and currently there is no hatchery production.

UoC 11 – Norton Sound

The Norton Sound unit of certification includes the Norton Sound District and the Port Clarence District, an expansive area (>500 miles of coastline) that is located in northwestern Alaska, including the City of Nome (Menard *et al.* 2012, Menard 2012a). Norton Sound is part of the AYK management area. The Norton Sound district is divided into 6 subdistricts. All commercial salmon fishing in the district is by set gillnets in marine waters; however, fishing effort is usually concentrated near river mouths. Commercial fishing typically begins in June and targets Chinook salmon if abundance is sufficient to meet escapement and subsistence needs. Emphasis switches to chum salmon in July and the coho salmon fishery begins the fourth week of July and closes in September. Pink salmon are much more abundant in even numbered years (late July and early August), and can support commercial fisheries when a buyer is present. Commercial fishing is not allowed when fish buyers are not present, as has frequently occurred since the mid-1990s, especially for pink salmon. Commercial fishery managers use estimates of run strength based on pre-season forecasts, in-season test fishing, escapement counting projects (e.g., three counting towers and six weirs), aerial surveys, and commercial fishing indices as a means to issue emergency orders to open the fishery. Gillnet mesh size varies with the targeted species, e.g., <4.5 inch for pink, <6 inches for coho. The use of smaller mesh sizes have been used to conserve larger, older Chinook salmon (2012a). Several of the subdistricts are managed intensively for subsistence use, and management uses a variety of tools to provide for escapement needs. Little or no commercial fishing has occurred in subdistricts 1 and 4 (Nome and Norton Bay) since the early 1980s. Relatively little commercial fishing occurs in Port Clarence District, which has been closed to commercial fishing in recent years (Menard 2012a).

Norton Sound/Port Clarence has escapement goals for all species of salmon (Brannian *et al*. 2006, Volk *et al.* 2009, Munro & Volk 2012): Chinook (5 goals), chum (12 goals), coho (3 goals), sockeye (2 goals), and pink salmon (5 goals). Fisheries are managed to achieve escapement goals (Menard 2012a). Low abundances of Chinook salmon have led to reduced commercial openings for chum salmon in the Unalakleet and Shaktoolik subdistricts. Methods to develop goals vary with the type and quality of data: percentile method, theoretical spawner-recruit analysis (SRA), SRA, proportion of aggregate goal, risk analysis, and empirical observation. In recent years, Chinook spawner escapements have fluctuated around the goals but often did not meet the lower goal in each of the five survey areas except Unalakleet River/Old Woman River where the goal was consistently met. In response to low Chinook run size (due primarily to environmental issues), directed commercial fisheries on Chinook salmon have been prohibited (Menard 2012a). Incidental commercial harvests of Chinook salmon have been greatly reduced, averaging only 70 Chinook per year, 2006-2010 (Menard 2012a).

Coho goals have been met or exceeded since 2006, and commercial harvests have averaged 105,000 fish. Chum escapements have fluctuated about the escapement goals, and commercial harvests averaged 42,000 fish during 2006-2010. Chum commercial harvests have increased since the very low catches in the early 2000s and exceeded 100,000 fish in 2010 and 2011. Sockeye escapements have

fluctuated about the goals in the past five years, with commercial harvests averaging 59 salmon. The commercial sockeye fishery in Port Clarence was closed in 2009 and 2010 because the in-river goal of 30,000 sockeye was not met. Pink salmon have been relatively abundant and have consistently met the goals each year while providing a commercial harvest of approximately 26,000 fish per year. Harvests of pink salmon are low due to the lack of buyers.

Presently, stocks of concern (yield) in the Norton Sound district have been identified for Chinook in subdistricts 5 & 6 (Shaktoolik, Unalakleet), and chum in subdistricts 1, 2, 3 (Nome, Golovin, Elim) because these stocks have been failing to produce expected levels of harvest. Action plans to improve harvests of these stocks have been developed (Kent *et al.* 2009, Menard and Bergstrom 2009a,b). The plans include a discussion on factors of decline (e.g., gold mining and road construction), management actions to improve the runs, and research activities. Although hatcheries are not part of the action plans, Norton Sound residents near Nome have expressed interest in developing hatcheries for chum salmon. However, the cost of heating water in order to rear eggs and fry in a hatchery may be cost prohibitive.

Presently, there are no commercial-scale hatchery programs in the Norton Sound area. However, pilot-scale projects exist for chum, coho, and Chinook salmon. On average, approximately 88,000 chum eggs and 49,000 coho eggs per year were stocked into Norton Sound streams during 2007-2011 by the Norton Sound Economic Development Corporation (NESDC-http://mtalab.ADF&G.alaska.gov/CWT/Reports/hatcheryrelease.asp). Approximately, 488 Chinook eggs were recently stocked into the Unalakleet watershed (L. Wilson, ADF&G, pers. comm.). All salmon are thermally marked (C. Lean, NSEDC, pers. comm..). These hatchery egg programs are not identified as part of the action plans developed by ADF&G to recover chum and Chinook populations, but the goal is to help rebuild wild salmon runs, especially in tributaries where few or no wild salmon currently exist (http://www.nsedc.com/reestablishment.html). Very few adult salmon have returned from this limited stocking (C. Lean, NSEDC, personal communication). Additionally, Salmon Lake, which discharges to Port Clarence, has been periodically fertilized in an attempt to enhance sockeye salmon growth and production (http://www.ADF&G.alaska.gov/FedAidPDFs/FDS12-28.pdf).

2.3.6 UoCs in the Westward Region

Source: http://www.adfg.alaska.gov/index.cfm?adfg=fishingcommercialbyarea.southwest

Figure 11: The Westward Management Region.

UoC 12 – Kodiak

The Kodiak salmon fishery is located on the Kodiak Island archipelago and the southeastern border of the Alaska Peninsula extending from Cape Douglas just south of Cook Inlet, and along the peninsula to the southwest where it adjoins the Chignik Management Area. All five species of Pacific salmon are targeted by a mixture of primarily purse seine and set gill net fisheries with a small number of beach seine permits.

Major hatcheries operate at Pillar Creek near Kodiak and at Kitoi Bay, with some production of all five species but major efforts are focused on pink, chum and sockeye salmon. Major enhancement activities in the past beyond the fish hatcheries have included lake fertilization of sockeye salmon lakes, and large run developments of sockeye salmon at Frazer Lake and Spiridon Lake. Frazer Lake is essentially a natural run with the fishway being the only factor. Spiridon Lake uses a smolt bypass but is annually stocked with fry originating from the Pillar Creek hatchery (PCH) with Saltery Lake as a brood stock. PCH sockeye salmon egg-take goals have ranged from 300,000 to 3.4 million early-run sockeye (Afognak Lake) eggs and from about 500,000 to 9.1 million late-run sockeye (Upper Station, Little Kitoi Lake, Saltery Lake) eggs. There are multiple other smaller sockeye salmon systems that are maintained by a combination of fishways and stocking (KRPT 2011).

Kodiak's long term regional plan indicates substantial expansion of fisheries enhancement from hatcheries (KRPT 2011). The regional planning team stated the following in the 2010-2030 salmon plan: "*Examination of supplemental harvest goals for the period 2010-2030 exposes a significant need to increase supplemental production. Significant expansion and new projects are required to meet these goals. While it may be possible that existing supplemental salmon production facilities in the KMA could make some increases to current production, any such expansion would likely still be insufficient to meet future harvest goals for supplemental chum salmon or even-year pink salmon. One or more new hatchery facilities is a logical alternative. Additional research programs to determine potential effects of new salmon hatchery projects will likely be required (e.g., coded wire tagging or thermal otolith marking of new salmon production). Hatchery investigation and site selection has been identified as a high priority project for all districts.*"

Because the long term plan is to increase supplemental production to equal or exceed natural production in the KMA (KRPT 2011), ADF&G has suggested that investigations of hatchery fish straying would be desirable for hatchery releases in the KMA. Musslewhite (2011a; 2011b) evaluated Kodiak's hatchery management plans and permits, an assessment of each hatchery program's consistency with statewide policies, and recommendations to address any deficiencies. These reports included a fisheries management component and the report recognized the need to mark hatchery releases as a means to evaluate fisheries management assumptions, although they acknowledged that the local staff had not requested a marking program.

Previous investigations have been conducted on the Spiridon Lake sockeye salmon stocking program using scale pattern analysis of age 1.2 Spiridon Lake adult returns that indicated a low risk to current management of wild salmon stocks (Nelson & Swanton 1996). A scale pattern analysis was conducted in recent years as well by visually examination of scales collected from the fishery, with similar components identifying Spiridon Lake sockeye in Kodiak fisheries. This study indicated similar proportions, but there was no indication of blind calibrations using samples from the escapement to determine classification accuracy (Foster 2010).

For Chinook salmon in the Kodiak Management Area (KMA) there are 6 stocks with escapement goals for the Karluk and Ayakulik River. For sockeye salmon there are 49 stocks with 14 escapement goals at Malina Creek, Afognak (Litnik) River, Little River, Uganik Lake, Karluk River Early Run, Karluk River Late Run, Ayakulik River Early Run, Ayakulik River Late Run, Upper Station River Early Run. Upper Station River Late Run, Frazer Lake, Saltery Lake, Pasagshak River, and Buskin

Lake. For coho there are 204 stocks with 4 goals at Pasagshak River, Buskin River, Olds River, and American River. For chum salmon there are 174 Stocks with 2 Goals, the Mainland District and the Kodiak Archipelago Aggregate. For pink salmon there are 404 Stocks with 3 Goals, the Mainland District, Kodiak Archipelago (odd year) and Kodiak Archipelago (even year).

Fish escapements are enumerated by a variety of methods, with multiple weirs (fish fences) providing real time counts of salmon for the major sockeye salmon systems and some pink, coho and Chinook escapements. Multiple overflight of pink, chum and some coho systems are used to obtain real time escapement data used for inseason management of the commercial fishery.

A summary of the commercial fishery in 2010 has been extracted from Jackson *et al.* (2010): The 2010 KMA commercial salmon fishery began on June 9 with the last reported landing on September 20. A total of 315 permits were fished, consisting of 155 purse seine permits, 2 beach seine permits, and 158 set gillnet permits. The total commercial salmon harvest in the KMA, including cost recovery harvest, but excluding test fishery harvest and commercially-caught salmon retained, but not sold, was 14,550 Chinook: 1,436,606 sockeye: 266,431 coho, 8,864,796 pink: and 734,806 chum salmon. Commercial harvests were less than projected based on the forecast for all species of salmon. The ex-vessel value for salmon harvested by all gear types totalled approximately $24.3 million. Commercially-harvested salmon that were reported as retained for personal use, but not sold, totalled 11,748 salmon in the KMA, consisting of 160 Chinook: 2,330 sockeye: 2,976 coho: 6,267 pink: and 15 chum salmon.

In 2010, sockeye salmon escapements met or exceeded the established goals of Malina, Afognak, Uganik, Frazer, Saltery, late-run Karluk, Ayakulik, Buskin, Little River, Pasagshak and South Olga kakes runs, but were not met for the Karluk early-run. The Kodiak Archipelago and Mainland District pink salmon escapement goals were met. The Kodiak Archipelago and Mainland District chum salmon lower bound escapement goals were exceeded. The Chinook salmon escapement goal was not achieved in the Karluk River, but was achieved in the Ayakulik River. The coho salmon escapement goals were achieved in the Buskin and Pasagshak rivers, but not in the American and Olds rivers. Harvest data for subsistence permits issued in 2010 were not summarized when Jackson *et al.* (2010) was prepared.

A formal review of escapement goals in the Kodiak region was presented to the BOF during January 2011 (Nemeth *et al.* 2010) and historical attainment of escapement goals has been summarized by Munro & Volk (2012).

In the KMA, stocks of Chinook have failed to meet the lower bound of the sustainable escapement goal (SEG) in 5 out of 8 years in the Ayakulik River and 6 out of 9 years in Karluk River. This reflects a broad regional decline in Chinook productivity in the marine environment across south-central Alaska and is being addressed in the Kodiak area with non-retention of Chinook in the commercial fishery and closures for retention in the sportfish fishery. Karluk River Chinook is the only designated “stock of management concern” in the KMA. There are no other stocks of concern in KMA at any level.

The chum salmon escapement goals for the mainland were met in 7 out of 9 years and the Kodiak archipelago escapement goal was met 8 out of 9 years (Munro & Volk 2012). For coho salmon escapement goals at the Bushkin River were met 9 of 9 years, Pasagshak River 6 of 9, Olds River 5 of 9 and American River, 7 of 9. Of the 14 KMA sockeye salmon goals, all had escapements above the lower bound of the escapement goal in the majority of years, with most of the systems consistently meeting the escapement targets. Early run Karluk has failed to meet escapement goals over the past four years (2008-2011).

UoC 13 – Chignik

The Chignik Management Area (CMA) is in the Westward Management Region and located on the south side of the Alaska Peninsula, approximately 250 miles southwest of Kodiak. The Chignik salmon fishery focuses on catches of sockeye salmon, largely while fishing in Chignik Lagoon and Chignik Bay. Fishing can also occur in districts along the south side of the Alaska Peninsula when areas are opened by the manager. Harvests of other salmon species are largely incidental to sockeye salmon, but they do contribute significantly to the overall value of the fishery. Directed fishing for pink and chum salmon may occur in the Eastern, Western, and Perryville districts. Catch of Chinook and coho is largely incidental to the sockeye fishery. Coho returning to the Chignik lake system can support modest harvests when fishermen fish into late September, although effort is often low. Purse seine is the only commercial gear. Escapements are monitored hourly by a large weir in Chignik River and by aerial surveys (~weekly) along the peninsula (up to 49 streams for pink and chum salmon). The weir has been used to monitor escapements of sockeye, Chinook, and to a lesser extent coho salmon since 1922. Aerial surveys are also used to monitor abundance and distribution of sockeye spawning in tributaries upstream of the counting weir. Escapement goals are used to manage the fisheries. Escapement goals are largely based on stock-recruitment relationships with consideration of sockeye habitat conditions, including lake euphotic volume and zooplankton biomass (Nemeth *et al.* 2010). Yield analysis and risk analysis are used for pink and chum salmon goal determinations. Due to late season run timing and limited directed effort, escapement goals for coho salmon have not been established in the CMA (Anderson & Nichols 2012). Escapement goals are reviewed every three years; detailed area management reports are produced annually. The fisheries are managed using: 1) preseason forecasts and preseason management plans, 2) in-season test fisheries, 3) in-season catch per effort by district, 4) daily monitoring of catch and escapement (sockeye), 5) weekly aerial surveys of streams along the coast (pink and chum), and 6) and monitoring of age, sex, and size (primarily sockeye). Chignik sockeye are intercepted in both Kodiak and South Peninsula management areas, which are managed based on written management plans (Anderson & Nichols 2012). Until 2004, the early and late Chignik sockeye runs were quantified in-season using scale pattern analysis, which has given way to an assumed fixed 50% date of stock composition (July 4). For example, the 2011 fishery was managed based on this date, so that through July 4, fishing periods were based on achieving interim early-run escapement objectives, and beginning July 5, fishing periods were based on achieving interim late-run escapement objectives. The fishery has a long history of management and research, including efforts by the University of Washington. Although fishermen support the Chignik Regional Aquaculture Association (CRAA), this organization supports research to improve management of wild salmon, including natural changes to Black Lake; there are no enhanced salmon in Chignik.

Commercial harvests during 2006-2010 averaged 2.69 million salmon, including 1.0 million sockeye, 1.3 million pink, 237,000 chum, 109,000 coho, and 3,740 Chinook salmon. The commercial ex-vessel value during 2006-2010 was $8.1 million, of which 77% was from sockeye salmon and 4.5% from coho salmon. Although significant natural changes to the habitat of Black Lake have occurred in recent decades, the salmon stocks remain relatively robust. Escapement goals of sockeye (early, late stocks), Chinook, pink (odd, even year), and chum salmon have been met each year, 2003-2011 (Munro & Volk 2012).

UoC 14 – Peninsula/Aleutian Islands

The Peninsula/Aleutian Islands UoC is in the Westward Management Region and has three components. The first is located on the southern portion of the south side of the Alaska Peninsula adjacent to the southern boundary of the Chignik management area and is called the South Unimak and Shumagin Islands June commercial salmon fishery which targets sockeye salmon. The Aleutian Islands and Atka-Amlia Islands management area component extends southwest from Unimak Island and encompasses all of the Aleutian Islands to the Russian border and the Pribilof Islands. The

Northern portion of the Peninsula/Aleutian Islands UoC extends along the northern side of the Alaska Peninsula from Cape Sarichef on Unimak Island to Cape Menshikof near Port Heiden where it joins the Bristol Bay District of the Central Management Area. The Peninsula fishery focuses on catches of sockeye salmon, composed of interceptions of sockeye salmon bound primarily for Bristol Bay and local stocks primarily along the north side of the Alaska Peninsula. Significant catches of coho, pink and chum are also caught but are largely incidental to sockeye salmon although there are some targeted fisheries, although they do contribute significantly to the overall value of the fishery. Purse seines, drift gill nets, and beach seines are the only commercial gear allowed with significant restrictions on gear types are employed to accomplish various conservation and allocation objectives established by the BOF.

The during the most recent 10 years (2002-2011), the South Unimak and the Shumagin Islands fishery harvest averaged 3,375 Chinook, 1,097,865 sockeye, 749 coho, 918,427 pink, and 397,150 chum salmon (Poetter 2012).

There has been no commercial harvest in the Atka-Amlia Islands component of the Peninsula/Aleutian Islands UoC since 1996. In 2011 there were 632,889 pink salmon landed in this area with averages from 1991-2009 pink salmon landings of 264,307 during odd years and 322,909 during even years (1992-2010). Landings recently have been dominated by odd years but previously have been dominated by even years. Small numbers of each of the other salmon species are landed annually in this area (Poetter & Keyse 2012).

The North Alaska Peninsula landing annual averages (2001-2010) have been 5,542 Chinook, 2,203,432 sockeye, 62,460 coho, 89,578 pink, and 117,696 chum salmon for a total average of 2,409,237 fish for all species. Pink averages only include odd years from 2001 to 2009 (Murphy & Wilburn 2012; Wilburn & Murphy 2012). Because the Chinook comprise < 1 % of total harvest, they are considered against the IPI species criteria in this UoC under MSC criteria for harvests. They are not considered to be a target species although there is an escapement goal developed for Nelson Lagoon on the North Peninsula for Chinook.

Interception fisheries are based on quotas established preseason, dependent upon run forecasts for the primary stocks being intercepted. Chum salmon from various stocks are also intercepted with some captured from Japanese aquaculture releases (Murphy 1993). Escapements are monitored hourly by weirs and by aerial surveys (~weekly) along the Peninsula (streams for pink and chum salmon. Aerial surveys are also used to monitor abundance and distribution of sockeye and coho spawning in tributaries upstream of the counting weir. Escapement goals are used to manage the fisheries where the primary stocks are local. Escapement goals are largely based on stock-recruitment relationships with consideration of sockeye habitat conditions, including lake euphotic volume and zooplankton biomass (Wittiveen *et al*. 2009). Escapement goals are reviewed every three years; detailed area management reports are produced annually. The fisheries are managed using 1) preseason forecasts and preseason management plans, 2) inseason test fisheries, 3) inseason catch per effort by district, 4) daily monitoring of catch and escapement (sockeye), 5) weekly aerial surveys of streams along the coast (pink and chum), and 6) and monitoring of age, sex, and size (primarily sockeye and chum).

There were no stocks of concern in the Peninsula/Aleutian Islands UoC, but recommendations were made in September 2012 to consider the Swanson Lagoon sockeye salmon to be a stock of management concern (Regnart & Swanson, 2012). This receommendation was accepted at a February 2013 meeting of the Alaska Peninsula/Aluetian Islands BoF (Munro & Volk 2013). ADF&G has difficulty assessing escapements because of algal blooms; fisheries that may impact the stock have been closed. The stock's decline is related to natural causes where a berm was formed at the mouth preventing escapements from entering the system.

Escapement goals of the local stocks targeted in the Alaska Peninsula by commercial fisheries have generally been met each year. Escapements to the Peninsula fisheries have improved monitoring and have shown increases in abundance in recent years (2003-2011) (Munro & Volk 2012). There is one escapement goal for Chinook, 13 for sockeye, three for coho, two for pink (different for odd and even

years) and six for chum salmon. Escapement goals were reviewed in 2012 (Sagalkin & Erickson 2012) with minor recommendations for changes, specifically to drop goals where survey information is unreliable and little fishing effort is occurring. In the three coho systems monitored for escapements, the lower thresholds were exceeded 85% of the time over the past nine years of monitoring. For chum salmon they exceeded the lower bound 85% of the time over the nine years of monitoring the district escapements. Pink salmon exceeded the lower bound 13 out of 17 years of monitoring (alternative years only had targeted escapements). Sockeye salmon exceeded lower escapement goals 90% of the time over the past nine years for the 14 established escapement goals. Escapement trends and monitoring appears to be improving and failure to achieve the lower bounds of the escapement goals are less likely to occur than exceeding the upper bounds, with an overall success rate of exceeding the lower bounds of approximately 90% (Munro & Volk 2012).

There are no significant hatchery contributions or enhanced fisheries to the Alaska Peninsula Salmon Fishery. Previous MSC conditions have focused on determining composition of harvests in the districts where potential significant interceptions have occurred of unidentified stocks in targeted fisheries. The Western Alaska Salmon Stock Identification Program (WASSIP) reports have been very extensive and have used genetic information to address harvest composition. A series of report have been made available in 2012 that provided the information on target stock composition (e.g. Eggers *et al* 2012). (See http://www.adfg.alaska.gov/index.cfm?adfg=wassip.reports) for an extensive list of reports on chum and sockeye salmon catch and escapement composition throughout western Alaska.

2.4 Principle Two: Ecosystem Background

2.4.1 Overview of the Alaska Ecosystem

The following overview of the Alaska ecosystem is extracted and adapted from the document 'Our wealth maintained: a strategy for conserving Alaska's diverse wildlife and fish resources' (ADF&G 2006).

Alaska has more than 40% of the surface water resources of the entire USA. Approximately three quarters of all freshwater resources in Alaska are stored as glacial ice covering about 5% of the state. Alaska has more than 3 million lakes greater than 5 acres, over 12,000 rivers, thousands of streams and creeks, and an estimated 100,000 glaciers. Alpine glaciers, lakes, groundwater, glacial and clear water rivers, streams, springs and ice fields connect the uplands to Alaska's estuarine ecosystem.

Alaska's largest rivers include the Yukon, Kuskokwim, Susitna, and the Copper. The state's longest river is the Yukon. At over 2,000 miles long it is the third longest river in North America. It flows for 1,280 miles through Alaska and drains a 204,000 square mile area. Alaska's rivers support many aquatic species including the five species of Pacific salmon, and other anadromous and resident fish, and serve as migratory corridors to the many smaller tributaries and waterways that support spawning, rearing, and overwintering habitats. These same tributaries provide protective vegetative cover, a significant source of detritus, and terrestrial wildlife riparian migration corridors.

Alaska's freshwater ecosystems are found across the state from the temperate coastal rain forest of the Southeast region with maritime climate and dense riparian vegetation, to the boreal forest of Interior Alaska, with continental climate and modest riparian vegetation, to the Arctic tundra of the North Slope, with sparse riparian vegetation. In terms of elevation, freshwater habitats are found from the highest alpine glacier and cirque lakes down to sea level, and flowing waters effectively connect the mountains to the sea. Aquatic habitats are complex and range from small, ephemeral streams to large, braided glacial systems that flow across entire regions of the state.

Moving into the marine environment, Alaska's shoreline is more than double the shoreline for the entire Lower 48 states at 44,000 miles. This extensive shoreline creates an impressive abundance and diversity of intertidal and nearshore habitats, comprising rocky reefs, mud and sand beaches and eelgrass beds. Alaska also has over 5 million acres of islands and sea cliffs, spreading along its coastline, from the Alaskan Panhandle in the southeast, around the Gulf of Alaska, across the Aleutian Islands, and north through the Bering Sea to above the Arctic Circle. Alaska's marine waters and associated habitats are considered to be generally healthy.

2.4.2 Retained and bycatch species

The highly directed nature of salmon fishing (i.e., harvesting often occurs in terminal areas, fishing is focused around peak run times, nets are closely monitored) means that capture of non-salmonids in the fishery is minimised. Nevertheless, with the exception of the troll fishery in the Southeast region of Alaska, non-salmonids may not be retained in the Alaska salmon fishery except for personal use. Personal use fish may not be sold but must be reported on fish tickets, and this helps to minimise any incentives to catch non-salmonids and steelhead.

At the request of the 2001 MSC review of Alaska salmon fisheries, ADF&G collected bycatch data in test fisheries in the majority of the management areas during 2002-2004 (Table 3). Test fisheries are regularly used as a tool by ADF&G to identify numbers of salmon that might be available for harvest early in the season before many fish have reached escapement counting areas. No birds or marine mammals were taken by the test fishery program, but harbour seals were encountered when they

attempted to steal fish from the nets (Chaffee 2005, Chaffeee *et al*. 2007). Salmon dominate the catches in each area, almost always making up more than 99% of the catch. Where captured, the bycatch was reported to be made up of sheefish (*Stenodus leucichthys*), starry flounder (*Platichthys stellatus*), Dolly Varden (*Salvelinus malma malma*), sculpin spp. or cisco (*Coregonus* spp.). The assessment team is not aware of any stock or management concerns associated with the bycatch of these species in the commercial salmon fishery, and Alaska provides abundant, pristine habitat that functions to support healthy populations. There are no 'main' bycatch species taken in the Alaska salmon fisheries, i.e., bycatch species that exceed 5% of the salmon harvest by weight and, overall, it is considered that the quantity of non-salmonids taken is negligible.

Table 3: Salmon test fisheries monitored for bycatch, 2002-2004 (Source: Chaffee 2005).

			Years Sampled			
Region	Location	Gear Type	2002	2003	2004	Bycatch
Southeast	Hawk Inlet - N.Chatham Strait	Purse Seine	X	X	X	0.06% - 0.3% (mainly Dolly Varden)
UCI		Drift Gillnet			X	0%
Bristol Bay	Kvichak River	Drift Gillnet			X	0%
	Egegik River	Drift Gillnet			X	Minimal
	Ugashik River	Drift Gillnet			X	Minimal
Kuskokwim	Bethel	Drift Gillnet		X	X	<1%
	Aniak River	Beach Seine		X	X	No %, but live releases
	Kalskag & Aniak	Fish wheel & Gillnet		X	X	No %, but live releases
	Holitna River	Drift Gillnet		X	X	No %, but live releases
	Birch Tree	Fish wheel & Gillnet		X	X	No %, but live releases
Yukon	Lower Yukon	Set + drift gillnet		X	X	Minimal (mainly sheefish, whitefish, cisco)
	Pilot Station	Drift gillnet		X	X	Minimal (mainly sheefish, whitefish, cisco)
	Mountain Village	Drift gillnet		X	X	Minimal (only ciscos)
	Kaltag	Drift gillnet		X	X	Very low
	Russian Mission	Fish wheel		X	X	No %, but live releases
	Tanana tagging	Fish wheel		X	X	No %, but live releases
	Kantishna tagging	Fish wheel		X	X	No %, but live releases
	Nenana recovery	Fish wheel		X	X	No %, but live releases
	Kantishna recovery	Fish wheel		X	X	No %, but live releases
	Tolklat recovery	Fish wheel		X	X	No %, but live releases
Norton Sound	Unalakleet River	Set Gillnet		X	X	<1% (Dolly Varden, starry flounder)
Kotzebue	Kobuk River	Drift Gillnet		X	X	No % (Sheefish and Dolly Varden)
Kodiak	Alitak Bay	Set gillnet	X	X	X	<1% (cod, pollock, sculpin spp. starry flounder)
Peninsula / Aleutians	Shumagin Is. Immature Salmon	Purse Seine	X	X	X	<0.08% (pollock, flatfish spp.)
	Bear River	Drift gillnet	X	X	X	<7% (starry flounder, yellowfin sole, sculpin spp.)

Additional data are available on levels of non-salmonid catches from subsistence or personal use fisheries that occur at the same or similar times to the commercial harvest in the Copper/Bering, LCI and UCI UoCs. These data also show very low levels of bycatch (Table 4), confirming the findings of fishery data from other sites.

Table 4: Retention of species other than Pacific salmon in three UoCs of the Alaska salmon fishery.

UoC	4: Copper/Bering		5: LCI		6: UCI	
Fishery	Upper Copper River subsistence and personal use		Southern District personal use / subsistence set gillnet		Upper Cook Inlet personal use fishery	
Source	Botz *et al*. (2012), Appendix F4		Hollowell *et al*. (2012), Appendix E4.		Dunker (2010), Tables 3 and 4.	
Catch	Salmon	Other bycatch	Salmon	Other bycatch	Salmon	Flounder
2001	225496	548	1858	0	-	-
2002	144958	342	1878	0	-	-
2003	135244	307	1324	0	-	-
2004	172100	563	1805	0	-	-
2005	190521	487	1207	0	-	-
2006	189330	547	1577	0	-	-
2007	198790	716	2229	0	363852	2799
2008	132100	482	2639	0	335924	3310
2009	141531	340	1034	1	470657	5080
2010	211837	534	1306	0	-	-
2011	-	-	1197	3	-	-
Mean	174191	487	1641	0	390144	3730
Mean % Bycatch	0.3		0.0		1.0	

Groundfish are harvested in the Southeast Region troll fishery comprising SEAK and Yakutat (NPFMC 2011), and these fish can be sold commercially. In the period 2005 – 2010, lingcod (*Ophiodon elongatus*) made up 57.4% of the reported groundfish harvest in the fishery, while black rockfish (*Sebastes melanops*) made up 25.5% of the groundfish catch. All other species made up less than 5% of the groundfish catch (Table 5). However, the groundfish catch overall is negligible in comparison to the catch of salmon, making up an average of only 0.02% of the total weight of fish caught.

Table 5: All groundfish species (round pounds) reported on salmon troll fish tickets for all Southeast Alaska, 2005-2010. (source: NPFMC *et al.* 2011, with additional analysis by assessment team).

Species	2005	2006	2007	2008	2009	2010	2005-2010 Average
Arrowtooth flounder	0	0	0	49	0	0	8
Black rockfish	15,598	14,832	15,998	18,510	8,362	7,774	13512
Blue rockfish	961	0	0	7	150		224
Bocaccio rockfish	85	104	85	8	45	116	74
Bullhead sculpin	20	0	0	0	0	0	3
Canary rockfish	496	548	287	525	255	699	468
China rockfish	1	0	0	2	3	4	2
Copper rockfish	13	0	13	5	15	11	10
Dusky rockfish	1,669	1,230	745	3		15	732
General flounder	0	0	0	18	0	0	3
General shark	29	0	0	0	0	0	5
Greenstripe rockfish	0	923	23	0	210	0	193
Lingcod greenling	25,400	34,937	41,231	31,862	29,709	19,246	30398
Pacific cod	32	0	0	9	0	54	16
Pacific ocean perch	0	1,397	11	3	0	18	238
Quillback rockfish	260	156	324	247	401	440	305
Redbanded rockfish	3	99	10	0	0	22	22
Redstripe rockfish	14	31	33	30	23	57	31
rockfish, dark	0	0	0	16	0	5	4
rockfish, dusky	0	0	0	1,292	2,215	2,743	1042
Rosethorn rockfish	52	16	0	15	0	15	16
Rougheye rockfish	17	4	25	0	0	27	12
Sablefish	0	0	0	20	0	0	3
Salmon shark	0	0	0	111	0	0	19
Shortraker rockfish	5	14	48	0	0	10	13
Silvergray rockfish	1,761	1,420	1,553	1,974	1,529	3,027	1877
Thornyhead rockfish	3	39	0	0	0	0	7
Tiger rockfish	0	0	0	17	0	3	3
Widow rockfish	8	0	0	48	0	0	9
Yelloweye rockfish	1,837	1,314	1,587	888	1,075	1,887	1431
Yellowmouth rockfish	0	0	0	0	0	15	3
Yellowtail rockfish	2,679	2,029	1,930	2,641	2,077	3,073	2405
Total	50,943	59,093	63,904	58,299	46,069	39,260	52,928
%Lingcod	49.9	59.1	64.5	54.7	64.5	49.0	57.4
%Black rockfish	30.6	25.1	25.0	31.8	18.2	19.8	25.5
%Yellowtail rockfish	5.3	3.4	3.0	4.5	4.5	7.8	4.5
%Silvergray rockfish	3.5	2.4	2.4	3.4	3.3	7.7	3.5
%Yelloweye rockfish	3.6	2.2	2.5	1.5	2.3	4.8	2.7
%Dusky rockfish	3.3	2.1	1.2	0.0	0.0	0.0	1.4
Total % Lingcod + top 5 rockfish	96.1	94.4	98.7	95.8	92.8	89.2	95.1
Total % all fish other than lingcod + top 5 rockfish	3.9	5.6	1.3	4.2	7.2	10.8	4.9
Total Southeast Region commercial salmon catch (x 1000 lb)	298,154	199,364	268,804	162,518	217,663	206,723	225,537
Groundfish (lb) as % total salmon + groundfish catch	0.02	0.03	0.02	0.04	0.02	0.02	0.02

Source: Groundfish data: NPFMC *et al.* (2011).
Source: Salmon data: http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery

2.4.3 Inseparable or Practically Inseparable (IPI) species

An important consideration for scoring through the Alaska salmon fishery is that each UoC included as many as all five of the Pacific salmon as target species (e.g. SEAK, UCI) or as few as one species (e.g., Kotzebue). If a UoC has less than all five Pacific salmon included as target species, then the other salmon species were considered to be IPI catches on the basis of the MSC guidance as provided in the draft SamFAM guidance (MSC 2012a, MSC 2012b). This guidance states that stocks shall only be considered IPI if they are:

a) Non-target species (scored in Principle 2, not Principle 1); or

b) Non-local stocks of species targeted in the fishery (i.e. stocks that are caught in the fishery but do not breed within the stock management unit area and are not therefore normally scored as part of the stock management unit diversity) (MSC 2012b).

It is important to note that the MSC acknowledged a request from IMM to use of the draft requirements for salmon to differentiate between non-target species of salmon within the UoC and non-local stocks of the same species targeted by the fishery. The MSC also noted that the request is consistent with the default IPI requirements in which the total combined proportion of any catches from IPI stocks do not exceed 15% of the total combined catches in the Unit of Certification (UoC). The IPI requirements of Annex CH apply in this case, such that the IPI stocks may be assessed under the retained species component of Principle 2. Under CR 27.4.10.2 (MSC 2013a), those UoCs where total combined IPI catches are less than or equal to 2% of the total catch are also eligible for an exemption to the requirements.

The Pacific salmon species that were considered against IPI criteria are shown in Table 6, below, together with a confirmation of the findings.

Table 6: Inseparable or Practically Inseparable (IPI) Pacific salmon species taken in each UoC (Dark shading indicates that the species is targeted in the UoC).

	Target Species				
Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
1: Southeast	**Non-local IPI**	**Non-local IPI**	**Non-local IPI**	**Non-local IPI**	**Non-local IPI**
There are no non-target salmon species to be considered against IPI category 'a' criteria in the SEAK UoC. However, sockeye, Chinook, coho, chum and pink salmon harvested in the SEAK UoCs may originate from transboundary and non-Alaskan rivers. (PSC 2012c). These fish are considered against IPI category 'b' criteria because they are from non-local stocks of a species targeted in the fishery. In the years 2008 – 2011, 271,000, 267,000, 260,000 and 344,000 Chinook were taken in the Southeast Region fishery, from a total salmon harvest of 28.1 million, 51.6 million, 36.7 million and 73.7 million respectively (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). The Chinook harvest therefore comprised an average of just under 0.7% of the total salmon harvest from these UoCs. It is estimated that over the period 1985 – 2010, an average of 96.2% of the Chinook taken in the Southeast Region fishery originated outside of Alaska. As such, non-local Chinook made up an average of just over 0.6% the total all species catch within the Southeast Region. Major components of the harvest were derived from the North/Central British Columbia (16.5%), Columbia Upriver Bright (15.7%), West Coast Vancouver Island Hatchery (15.5%), Oregon Coastal North Migrating (14.7%), Fraser Early (6%) and Mid-Columbia Brights (5.6%) runs (PSC 2012c). Fish from a number of other non-local runs may also be taken in the fishery, but no other run made up an average of more than 5% of the catch annually.					

It is considered that the majority of the Chinook taken in the SEAK fishery are derived from healthy runs. Although comprising a small percentage of the SEAK Chinook harvest (1985 - 2010 average = 3.2%; 2010: 1.2%), the status of wild West Coast Vancouver Island stock is considered to be poor (DFO 2012). From 1995 to 2009, the average estimated annual fishing mortality in the Southeast Region fishery for this run was 18% (DFO 2012). In order to address conservation concerns in this and other runs, the renewal of the Pacific Salmon Treaty in 2009 resulted in agreement to reduce the total mortality of Chinook by 15% in the Southeast Region fishery and by 30% in the Canadian West Coast of Vancouver Island fishery relative to Table 1 of the 1999 agreement (http://www.psc.org/about_treaty.htm).

ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). PSC (2012c, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. The highest harvest rate is for local Alaska Chinook salmon (avg. 35%, 1985-2010), followed by Upper Georgia Strait (19.7%), WCVI (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks are less than 10% and typically less than 5%. As noted above, harvest rates in recent years are less than these averages.

Fish from four ESA-listed Chinook runs are also harvested through Federally-issued incidental take permits in the Southeast Region fishery. The four runs are the Puget Sound, Upper Willamette, Lower Columbia River Bright and Snake River Fall Runs. In all cases, factors other than fishing are considered to be the major limiting factors for Chinook populations in these four ESA-listed ESUs, and average catches of Chinook in the Southeast Region fishery comprise a maximum of 18% of the total catches from any of these runs, and in most cases comprise much less (see table below). We note that in almost all cases, catches of ESA-listed runs in 2011 as a percentage of the total Southeast Alaska Chinook catch were lower than the average for the period 1985-2010. The exception was the Willamette River Hatchery run, where the catch was essentially the same as the average. As shown in the table below, the highest average Alaskan exploitation rate on any of the ESA-listed stocks was 7.7% (Lewis R component of Lower Columbia Bright). Spawning escapement goals have been achieved for most of the 25 Chinook Technical Committee-approved Chinook stocks in all years (PSC 2013c).

ESU	Runs found in Southeast Alaska catches	% of Southeast Alaska all-gears Chinook catch, 2011	Mean % of Southeast Alaska all-gears Chinook catch, 1985 - 2010	Southeast Alaska catch of run as % of stock total catch	Southeast Alaska catch of run as % of stock total return
Puget Sound	Skagit Summer / Fall	0.02	0.09	3.71	1.04
	Stillaguamish Summer / Fall	0.04	0.06	16.99	6.44
	Puget Sound Natural	0.02	0.05	0.54	0.25
	Snohomish Summer / Fall	0.02	0.04	2.65	1.08
	Nooksack Fall	0.02	0.04	0.15	0.11
	Nooksack Spring	0.00	0.00	0.00	0.00
Upper Willamette	Willamette River Hatchery	2.22	2.21	11.63	5.14
Lower Columbia Bright	Fall Cowlitz	0.49	0.99	5.44	2.08
	Lewis River	0.62	0.81	17.99	7.69
	Spring Cowloitz	0.03	0.08	1.62	0.83
Snake River Fall	Snake River Fall	0.38	0.1	8.65	5.23

In the years 2008 - 2011, 400,700, 820,100, 594,000 and 1,067,300 sockeye were taken in the SEAK fishery, from a total salmon harvest of 28.1 million, 51.6 million, 36.7 million and 73.7 million in the respective years (calculation based on harvest figures from ADF&G [http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery] minus figures from the Yakutat annual management report [http://www.adfg.alaska.gov/FedAidpdfs/FMR12-01.pdf]). The sockeye harvest therefore comprised an average of just over 1.5% of the total salmon harvest from the SEAK UoC.

Four transboundary sockeye runs are identified as potential IPI runs in SEAK. These are fish from the Nass and Skeena rivers that are taken in SEAK District 104 and District 101 fisheries (PSC 2012d), the Stikine run that is taken in Districts 106 and 108, and the Taku run that is taken in District 111 (PSC 2013b). Over the period 2007-2009 (the latest data published by the PSC are for 2009), these runs have comprised an average of 22.7% of the total annual SEAK sockeye harvest, but 0.3% of the total salmon harvest in SEAK. The last ten years of data (2002 – 2011) show that catches of Nass and Skeena fish in these fisheries have consistently been below the annual allowable harvest (PSC 2012d), while U.S. catches of Stikine and Taku fish have been around or sometimes over the TAC for the years 2007-2009 (PSC 2010, PSC 2013a, PSC 2013b). Escapement for the Stikine and Taku sockeye have been met in 8 of the last 9 years (Munro & Volk 2013). English *et al.* (2012) estimated exploitation rates (ER) in Alaska for sockeye salmon originating from key North Coast/Central Coast statistical areas for 1980-2008. Average ERs in Alaska fisheries were 24%, 9%, and 1% for sockeye originating from BC areas 3, 4, and 5, respectively, during 2006-2008.

Relatively small quantities of coho are also taken from transboundary Taku, Stikine, Nass and Skeena runs. The Pacific Salmon Treaty includes requirements for US managers to provide for upriver escapement of transboundary stocks, and escapement to the Taku is actively monitored by ADF&G; this has been met in each of the past 9 years (Munro & Volk 2013). ERs in Alaska fisheries were estimated to be 4%, 4%, 37%, 14%, 5%, 14%, 8%, 8%, 3%, and 3% for coho originating from BC areas 2E, 2W, 3, 4, 5, 6, 7, 8, 9, and 10, respectively, during 2006-2010 (English *et al.* 2012).

ADF&G also manages its pink salmon fisheries to achieve spawning escapement of wild pink salmon. ERs in Alaska fisheries were estimated to be 9%, 9% and 8% for pinks originating from BC areas 3, 4, and 5, respectively during 2006-2010 (English *et al.* 2012).

Chum salmon return to rivers in British Columbia including the Nass, Skeena and Taku rivers. Few BC chum are taken in Alaska fisheries relative to Alaska chum, and the average exploitation rate by Alaska fishers for chum salmon from British Columbia north coast statistical areas 3 (including Portland Canal), 4 and 5 for the period 2006 - 2010 was 24%, 10% and 10% respectively. Annex IV of the Pacific Salmon Treaty states, "*With respect to the Portland Canal chum salmon fishery, neither Party shall conduct net fisheries in Alaskan Section 1A and Canadian sub-areas 3-15 and 3-16 norconduct directed chum fisheries in Alaskan Section 1B north and east of Akeku Point or in Canadian sub-areas 3-11 and 3-13 unless agreed otherwise by the Parties.*" For this evaluation, Alaska catch of other British Columbia chum stocks is considered to be negligible relative to the overall catch (English *et al.* 2012).

Overall, the total combined catch of non-local salmon in the SEAK UoC is approximately 1.2%, and therefore non-local sockeye, Chinook, coho, pink and chum salmon qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
2: Yakutat	**Non-local IPI**	**Non-local IPI**	**Non-local IPI**		**Non-target IPI**

Chum salmon comprised a very minor component of the Yakutat harvest in the years 2008 – 2011. Of total salmon harvests of approximately 256,000, 319,000, 446,000 and 501,000 respectively, only 546, 871, 1,239 and 900 chum were taken in the same years (Woods & Zeiser 2012a). On average, chum therefore makes up approximately 0.2% of the total salmon harvest in the Yakutat UoC.

As noted against the SEAK UoC, Chinook salmon harvested in the Southeast Region fishery (i.e., SEAK + Yakutat UoCs) may originate from rivers in British Columbia, Washington, Oregon and California (PSC 2012c). These fish are considered to be potential IPI because they are from non-local stocks of a species targeted in the fishery (i.e., IPI category 'b'). More details on the range of runs encountered are provided in the SEAK section above, but it is noted that the non-local Chinook harvest comprises an average of just

0.6% of the total salmon harvest from these UoCs.

The Alsek River terminates in Yakutat but is transboundary with Canada. Sockeye, Chinook and coho from the Alsek are taken in the Yakutat fishery. The average Chinook and coho harvest over the years 2008-2011 have represented less than 2% of the total salmon harvest from the Yakutat UoC (Woods & Zeiser 2012), and these species are therefore exempt from the IPI requirements CR 27.4.10.2 (MSC 2013a)..

The Alsek sockeye harvest has averaged 3.6% of the salmon harvest in the Yakutat UoC over the period 2008 - 2011 (Woods & Zeiser 2012), and therefore the Alsek sockeye run is not exempt from the IPI requirements. Sockeye did not meet the upriver Klukshu River Weir escapement goal from 2008 - 2009, but comfortably exceeded the goal range from 2010 - 2012 (Woods & Zeiser 2013).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
3: Prince William Sound		**Non-target IPI**	**Non-target IPI**		

There has been no release of Chinook salmon for several years in PWS, and Chinook harvest has been limited to 309, 564, 525 and 614 individual fish in the years 2008 – 2011 respectively. Chinook account for <0.1% of the total harvest of salmon in the Sound.

Coho is largely a hatchery-based fishery, although relatively small numbers of wild stocks are included in catches. The primary purpose of the fishery appears to be to develop a stable sport fishery as well as cost recovery to the hatchery operators. Commercial catches of hatchery coho are uneven and sometimes large. The total commercial harvest and cost recovery of coho in the PWS area for the years 2008 – 2010 was 176,000, 18,000, and 47,000 fish out of total harvests of 49.3 million, 24.4 million, and 78.0 million salmon respectively (Botz 2012). Coho therefore made up an average <1% of the PWS salmon catches annually.

The total combined catch of non-target Chinook and coho salmon in the PWS UoC is approximately 1%, and these species therefore qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
4: Copper/Bering Districts				**Non-target IPI**	**Non-target IPI**

Pink and chum salmon are considered to be IPI species in the Copper/Bering Districts Unit of Certification. The pink salmon harvest amounted to 1,446, 16,760, 21,167 and 24,058 animals in the years 2008-2011, accounting for an average of 1.2% of the harvest annually during that time period. Chum salmon harvests amounted to 1,331, 8,634, 15,776 and 13,231 fish annually in the same four-year period, accounting for an average of 0.8% of the harvest annually.

The total combined catch of non-target pink and chum salmon in the Copper/Bering Districts UoC is approximately 2.1%. It is considered that the relatively low overall catches, minimal targeting and relatively pristine habitat in the area mean that pink and chum salmon meet the 2% - 15 % IPI requirements in this area.

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
5: Lower Cook Inlet		**Non-target IPI**	**Non-target IPI**		

Chinook and coho are incidental catches in the LCI UoC. Catches of Chinook in the years 2008 – 2011 were 190, 84, 39 and 136 fish respectively, while catches of coho were 1689, 977, 760 and 152 fish in the same years (Hollowell *et al*. 2012). The total annual harvest of all salmon during this same four-year period was approximately 1.09 million, 1.34 million, 467,000 and 788,000 fish respectively. Both species constitute ≤ 0.1 % of the salmon catch with tine UoC. As such, Chinook and coho qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
6: Upper Cook Inlet					

There are considered to be no IPI salmon species in the Upper Cook Inlet UoC.

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
7: Bristol Bay			**Non-target IPI**		

Coho is considered to be a potential IPI species in the Bristol Bay UoC. 117,000, 59,000, 109,000 and 13,000 coho were taken annually in the years 2008 – 2011, out of totals of 29.4 million, 32.3 million, 31.5 million and 22.8 million salmon in the same years (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). These coho catches amount to an average of 0.2% of the total salmon catch in the Bristol Bay UoC. As such, coho qualifies for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
8: Yukon River	**Non-target IPI**			**Non-target IPI**	

Sockeye and pink salmon harvest in the Yukon UoC is incidental to harvest of Chinook, coho and chum salmon. From the years 2008 – 2011, zero annual take of sockeye was reported by ADF&G, while the only take of pink salmon reported was of 14,000 animals in 2008 (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery).

The total combined catch of non-target sockeye and pink salmon in the Yukon UoC is ≤ 0.1 %, and these species therefore qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
9: Kuskokwim				**Non-target IPI**	

Pink salmon is harvested incidentally to the other four Pacific salmon species in the Kuskokwim UoC. No pink salmon were recorded in 2008 and 2009, but a figure of <1000 was reported in both 2010 and 2011 (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). The total number of salmon taken in each year in the same period was 502,000, 545,000, 529,000 and 455,000. Pink salmon therefore accounted for an average of 0.1 % of the harvest, and this species therefore qualifies for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
10: Kotzebue	**Non-target IPI**	**Non-target IPI**	**Non-target IPI**	**Non-target IPI**	

The only target species in the Kotzebue UoC is chum salmon, such that sockeye, Chinook, coho and pink salmon are all considered to be potential IPI species. The only record of any of these four species being taken in the ADF&G harvest data for the years 2008- 2011 is for 1,000 pink salmon taken in 2008 (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). These constituted 0.5% of the combined pink + chum salmon harvest, and so sockeye, Chinook, coho and pink salmon qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
11: Norton Sound					

There are considered to be no IPI salmon species in the Norton Sound UoC.

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
12: Kodiak					

There are considered to be no IPI salmon species in the Kodiak UoC.

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
13: Chignik					

There are considered to be no IPI salmon species in the Chignik UoC.

Unit of Certification	Sockeye	Chinook	Coho	Pink	Chum
14: Peninsula / Aleutian Islands		**Non-target IPI**			

Chinook is harvested incidentally to other salmon species in the Alaska Peninsula and Aleutian Islands UoC, with a total of 6,000, 9,000, 11,000 and 10,000 fish reported for the years 2008 – 2011

(http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). The total salmon harvest for the same years was reported to be 19.1 million, 16.1 million, 5.7 million and 10.0 million fish, such that Chinook accounted for an average of 0.1% of the annual salmon harvest. This species therefore qualifies for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

2.4.4 ETP Species

All marine mammals and birds are evaluated in section 2.3 (ETP species) because all marine mammals are protected by the Marine Mammal Protection Act (MMPA) and many birds are protected by the Migratory Bird Act (MBA), in addition to other federal and international wildlife protection laws. This assessment therefore assumes that all marine mammals and birds are ETP species, in addition to salmonids and other species protected by the Endangered Species Act and CITES (Convention on International Trade in Endangered Species). Thus, although some birds may not be protected by the Migratory Bird Act, this assessment is evaluating bycatch of all birds and marine mammals in the ETP evaluation (PIs 2.3.1 – 2.3.3).

Bycatch of birds and marine mammals was the subject of a Condition of Certification during the first MSC certification in 2000. The condition required collection of bycatch data in test fisheries as a means to identify whether bycatch was a significant conservation issue. As reported by ADF&G and presented in the 2007 recertification report (Chaffee *et al.* 2007), no bycatch of birds or marine mammals was observed in ADF&G test fisheries in Southeast Alaska, Upper Cook Inlet, Bristol Bay, Kuskokwim, Yukon, Norton Sound, North Alaskan Peninsula, Shumagin Islands, and Kodiak during 2002, 2003, and/or 2004. Since that time, additional monitoring of bird bycatch has occurred in specific areas of Alaska.

In Kodiak, in 2002, estimates of total “take” expanded to account for the entire set net salmon fishery (standard errors in parentheses) were: pelagic cormorants, 14.1 (13.4); red-faced cormorants, 28.2 (18.9); harlequin ducks, 15.5 (14.9); pigeon guillemots, 75.9 (32.5); marbled murrelets, 56.4 (26.9); common murres, 185.4 (53.3); thick-billed murres, 14.1 (13.5); horned puffins, 14.1 (13.3); tufted puffins, 110.0 (78.0); sooty shearwaters, 14.1 (13.5); and all species of birds, 527.7 (109.6). In 2005, estimates of total “take” in Kodiak were: pelagic cormorants, 178.0 (62.5); harlequin ducks, 19.7 (19.0); pigeon guillemots, 117.6 (46.4); marbled murrelets, 142.6 (67.4); Kittlitz's murrelets, 18.1 (16.8), common murres, 483.5 (156.2); thick-billed murres, 19.7 (19.3); tufted puffins, 95.9 (41.4); white-winged scoters, 21.5 (21.1); and all species of birds, 1096.6 (195.4) (Manly 2007). Most but not all birds observed to be taken were released dead. Note that the “expanded” take of Kittlitz's murrelets, an ESA candidate species, was 0 in 2002 and 18.1 in 2005.

In the Yakutat set net fishery in 2007, an expanded total take of all species of birds was 305 (SE: 90) (Manly 2009). Total take of birds in 2008 was 137 (49). Species observed in the nets were Kittlitz's murrelet, marbled murrelet, Arctic loon, red-throated loon, common murre, and long-tailed duck. The total expanded take of Kittlitz's murrelet in the Yakutat fishery was 0 in 2007 and 14 in 2008. Fishing effort and location were key factors affecting bycatch.

In the combined Upper and Lower Cook Inlet fisheries (set net and drift gillnet), during 1999, the estimated total incidental take of birds was 183 (SE: 258) common murres, 628 (664) white-winged scoters, 628 (665) common loons, and 122 gulls (211), while the 2000 total incidental take was 31 (55) common murre (Manly 2006). No Kittlitz's murrelets were observed to be taken. Observer coverage was limited in the lower Cook Inlet fishery, leading to high SE values of some species. All observed birds were reportedly released alive without serious injury.

In Prince William Sound, incidental bird mortality was observed in less than 2% of sets in 1990 (Wynne et al. 1991) and less than 1% of the sets in 1991 (Wynne et al. 1992). In the Alaska Peninsula/Aleutian Island fishery (e.g., South Unimak Island) birds were observed in fewer than 2% of the sets (Wynne et al. 1991). More recently, Blejwas & Wright (2012) examined spatial and temporal overlap of Kittlitz's murrelets with gillnets in Prince William Sound, Cook Inlet, Kodiak, and Yakutat and concluded that most Kittlitz's murrelets were found in areas where there was no fishing. In areas of overlap, they concluded "the total number of birds exposed to gillnets in any of the overlap areas is small.

Most marine bird habitat and most marine bird populations in Alaska are relatively robust, indicating that the level of bycatch in Alaska salmon fisheries is not a significant factor in the overall fluctuations of bird population abundances. However, Kittlitz's murrelet is a candidate for protection under the Endangered Species Act and more information has recently become available on this species. The USFWS estimated that the world-wide (Alaska & Russia) abundance of Kittlitz's murrelet is approximately 30,900-56,800 birds, including approximately 20,000-46,000 birds in Alaska. The State of Alaska's response (dated Dec 22nd, 2010) to the November 2010 Federal Register proposed rule, stated that that the population is considered to be stable or increasing in significant portions of its range (http://www.adfg.alaska.gov/static/species/specialstatus/pdfs/kittlitzmurrelet_2010_adfg_cnor.pdf). Day (2011) concluded that while Kittlitz's murrelet populations may be declining in some areas, information is too uncertain to determine if there is an overall population decline. Of 10 experts that were interviewed by Day (2011), only one indicated bycatch in salmon fisheries as a potential factor of decline: "One respondent suggested that fishing bycatch might have an effect, albeit a small one." Most interviewed experts indicated that food limitations were the key factor. Blejwas & Wright (2012) examined spatial and temporal overlap of Kittlitz's murrelets with gillnets in Prince William Sound, Cook Inlet, Kodiak, and Yakutat and concluded that most Kittlitz's murrelets were found in areas where there was no fishing. In areas of overlap, they concluded "the total number of birds exposed to gillnets in any of the overlap areas is small."

The NMFS is required under the Marine Mammal Protection Act to monitor and report on the effects of commercial fisheries on marine mammal stocks. The List of Fisheries, published annually by NMFS, is a list of all commercial fisheries that legally operate in U.S. waters. The list contains information on each fishery including number of participants, marine mammal stocks affected by the fishery, and the classification of the fishery relative to its impact on those marine mammal stocks. For each fishery, the annual mortality and serious injury for each marine mammal stock is evaluated relative to the potential biological removal (PBR) level of that stock. Fisheries are then classified as Category I, II or III fisheries, where:

- Category I: Mortality ≥ 50% PBR (**frequent** incidental mortality or serious injury of marine mammals),
- Category II: 50% PBR > Mortality > 1% PBR (**occasional** incidental mortality or serious injury of marine mammals),
- Category III: Mortality ≤ 1% PBR (**remote likelihood of/no known** incidental mortality or serious injury of marine mammals)

One of the ways NMFS assesses the correctness of the fishery classification is through the Alaska Marine Mammal Observer Program (AMMOP). The primary goal of the program is to provide reliable observation data on the number and condition of incidental injury and mortality to marine mammals occurring in commercial fisheries, but seabird bycatch information is also collected and is considered an important secondary benefit of the program (NOAA 2012a).

There are no Category I salmon fisheries in Alaska. Category II commercial salmon fisheries in Alaska include the SEAK drift gillnet, Yakutat set gillnet, PWS drift gillnet and other fisheries as

listed below in Table 7 (see reports at http://www.nmfs.noaa.gov/pr/interactions/lof/final2012.htm). Observers may be placed in Category I and II fisheries on a mandatory basis. They also can be placed in Category III fisheries on a voluntary basis. The AMMOP has implemented several observer programs on Alaskan fisheries that were given Category II status by NMFS, and plans to conduct additional studies in the future.

AMMOP observer programs on Alaskan salmon fisheries have been applied to drift and set gillnet fisheries in PWS in 1990 and 1991, the drift gillnet fishery in South Unimak (Area M) in 1990, drift and set gillnet fisheries in Cook Inlet in 1999 and 2000, the Kodiak set gillnet fishery in 2002 and 2005, and the Yakutat set gillnet fishery in 2007 and 2008. An outreach program was conducted by NMFS in SEAK in 2011 to discuss program goals and industry concerns and to determine the best approach for placing observers throughout the fishery for data collection during the 2012 and 2013 seasons (http://www.fakr.noaa.gov/protectedresources/observers/mmop.htm). Monitoring will continue, as described in the NOAA website.

Table 7: Gear types and areas within the Alaska salmon fishery listed as Category II fisheries for interaction with marine mammals (source: NMFS 2012)

UoC	Category II - Occasional Interaction Basis for current classification in the List of Fisheries.
1: SEAK	Drift gillnet: The total annual mortality and serious injury of humpback whale (Central North Pacific stock) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level.
2: Yakutat	Set gillnet: Due to insufficient information on this particular fishery, it was classified as a Category II fishery based on analogy to other Category II AK set gillnet fisheries that use similar gear and operate in the same manner as this fishery.
3: PWS	Drift gillnet: The total annual mortality and serious injury of harbor porpoise (Gulf of Alaska [GOA] stock) and Steller sea lion (Western U.S. stock) in this fishery is greater than 1% and less than 50% of the stocks' Potential Biological Removal (PBR) level.
4: Copper / Bering	No category II fishery listed.
5 and 6 combined: Cook Inlet	Drift gillnet: The total annual mortality and serious injury of harbor porpoise (Gulf of Alaska [GOA] stock) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level. Set gillnet: The total annual mortality and serious injury of humpback whales (Central North Pacific stock) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level.
7: Bristol Bay	Drift gillnet: Based on analogy with other Category II AK gillnet fisheries that operate in the same manner as this fishery. Set gillnet: Based on analogy to other Category II AK set gillnet fisheries. The level of marine mammal mortality and serious injury in this fishery is assumed to be similar to those in other Category II set gillnet fisheries.
8: Yukon	No category II fishery listed.
9: Kuskokwim	No category II fishery listed.
10: Kotzebue	No category II fishery listed.
11: Norton Sound	No category II fishery listed.
12: Kodiak	Set gillnet: The total annual mortality and serious injury of harbor porpoise (Gulf of Alaska [GOA] stock) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level.
13: Chignik	No category I or II fishery listed.
14: Peninsula / Aleutians	Drift gillnet: Based on analogy to other Category II AK drift gillnet fisheries that use similar gear and operate in the same manner as this fishery. Set gillnet: Based on analogy to other Category II AK set gillnet fisheries.

Encounters of marine mammals with commercial fishing gear occurred in some study areas, and some mortalities were documented (NMFS 2012). Encounters with birds are also documented. Ratio estimation is used to estimate total take in the fishery. For example, in Kodiak in 2005, estimates of total "take" expanded to account for the entire set net salmon fishery were (standard errors in parentheses): unknown otters, 27.8 (27.1); harbor porpoises, 39.4 (27.1); pelagic cormorants, 178.0 (62.5); harlequin ducks, 19.7 (19.0); pigeon guillemots, 117.6 (46.4); marbled murrelets, 142.6 (67.4); Kittlitz's murrelets, 18.1 (16.8), common murres, 483.5 (156.2); thick-billed murres, 19.7 (19.3); tufted puffins, 95.9 (41.4); white-winged scoters, 21.5 (21.1); and all species of birds, 1096.6 (195.4) (Manly 2007). The single unknown otter observed to be taken was released alive, apparently uninjured, while all four of the harbor porpoises observed to be taken were released dead. All of the birds observed to be taken were released dead (Manly 2007).

In the Yakutat set net fishery in 2008, the AMMOP observers recorded three harbor porpoises and one harbor seal take while on set and haul watches, while one northern Steller sea lion was seen to interact with nets between two soak watches. Of these, one harbor porpoise, the harbor seal and the sea lion were released alive while the other two harbor porpoises were released dead. All of the marine mammal takes were in sampling region Y3 (Manly 2009). A total of 12 birds were also observed to interact with nets (a Kittlitz's murrelet, four marbled murrelets, a murrelet of unknown species, an Arctic loon, two red-throated loons, a common murre, and two Long-tailed duck ducks). Only two of the birds were released alive. The two long-tailed ducks were taken in sampling region Y1 (the Alsek River area), one marbled murrelet was taken in sampling region Y2, and the remainder of the birds were taken in sampling region Y3 (Manly 2009).

In Cook Inlet, an estimated 13.5 harbor porpoise per year were taken in 1999 and 2000, based on expansion of the one mortality in 2000. The estimated incidental take of birds in 1999 was limited to common murre (dead), 182.6 (257.8) and gulls (alive), 121.7 (211.4), while the 2000 incidental take was limited to common murre 31.2 (55.0) (Manly 2006). In 2005, a humpback whale was taken in by Cook Inlet set gillnet (percentage of PBR = 1.55%). In Bristol Bay, an estimated 0.5 beluga whales per year were taken by set gillnets, or 2% of the PBR. In PWS, incidental bird mortality was observed in less than 1% of the sets (Wynne *et al*. 1992).

Marine mammal and bird encounter data are being collected by ADF&G in connection with studies to estimate encounter rates of Chinook salmon in Southeast Alaska commercial salmon fisheries. Although the primary focus of these studies is on Chinook salmon, bycatch and encounter information of other species is being documented. Logbook data were collected from commercial gillnetters, seiners and trollers in 2004. Department observers were deployed on commercial troll vessels in 2004 and on vessels in the commercial drift gillnet fishery in District 111 and purse seine fishery in Districts 101-104 during the 2005 fishing season.

2.4.5 Habitat

The ecosystem in Alaska that supports the five species of commercially exploited salmon encompasses both marine and freshwater habitats. Most of the variation in salmon returns can be attributed to conditions in the marine ecosystem, after salmon have migrated from freshwater. In general, these conditions are beyond the control of harvest managers or other actions associated with enhancement activities. However, there are some elements of the marine ecosystem that may be influenced or affected by the fishery.

The marine ecosystem off Alaska waters is relatively pristine, although major incidents, such as the Exxon Valdez oil spill of 1989, provided a warning of how even low populated areas can have major catastrophes that could potentially impact the sustainability of fisheries. The nearshore waters provide immediate rearing areas for smolt upon entering the marine environment in the spring. Much of the

understanding of salmon rearing in these waters, as well as off shore areas, has been derived from recent research as a follow-up to the oil spill in PWS, with much of the focus on pink salmon. In addition, long term studies of the ecology of offshore areas, such as the recent investigations of the Bering Sea, provide some ecological context to salmon rearing in offshore areas (Aydin *et al*. 2005, BSIERP 2007, Helle *et al*. 2008). Welch *et al*. (2000) have also provided investigations into climate change and its potential impacts on salmon production in the marine environment. Other studies have focused on the relationship of the Pacific Decadal Oscillation weather phenomenon and its relationship to salmon runs as well as the production of other marine species (Hare 1996). These factors are likely the largest variable influencing salmon run return cycles and may ultimately lead to the demise of wild salmon and enhanced salmon runs in Alaska, depending upon the rate and severity of global climate change. Despite the importance of these weather or climatic variables on salmon runs, they are not the focus of fisheries management, other than providing some early warning as to the need to compensate for harvest management.

Factors in the marine ecosystem that are within the control of management agencies include impacts of enhanced fish stocking on the marine carrying capacity for producing salmon, bycatch of non target salmon stocks (both retained and discards) in both salmon fisheries and other marine fisheries (NPFMC 2009), impacts for food competition on piscivorous species of marine mammals and birds, and gear affected mortality of icon or endangered or species of special status. In general, where data exist, impacts of the salmon fishery on non-salmonid species is quite limited, as the gear used is usually quite specific for the targeted salmon species, although low abundances of non-target salmon may constrain the fishery, despite restrictions to the fishery to avoid bycatch, such as time and area closures and gear restrictions. Species of particular importance and concern includes Cook Inlet beluga whales (NOAA 2012b), Steller sea lions (NOAA 2010), and marbled murrlets. Recent declines in Chinook salmon runs through southwest and southcentral Alaska have prompted close examination of bycatch of these species in offshore fisheries targeting groundfish and abundant stocks of pelagic species (NPFMC 2009). Although not strictly a marine issue, increasing incidences of Atlantic salmon being observed in Alaska's waters, which have apparently escaped from Canadian pen rearing fish farms, are thought to pose some risk to Alaska's wild salmon (Gaudet 2002).

However, the largest single concern is the accelerating release of enhanced pink and chum salmon from hatcheries in Kodiak, PWS, and Southeast Alaska (Brenner *et al*. 2012, Piston & Heinl 2012). These concerns include overharvest of wild stocks in pursuit of the more productive enhanced populations, genetic impacts on long term productivity of wild stocks by hatchery strays, and rearing competition with wild salmon for both near shore and offshore rearing. Many of the conditions associated with the previous MSC assessment of the Alaskan fisheries were associated with this or related issues.

Within the freshwater ecosystems, salmon have long acknowledged to have a major role in the productivity of aquatic and associated terrestrial life. In addition to both historic and current importance in the subsistence requirements for rural residents, the seasonal concentration of protein is the essential ingredient in the nutrition of many terrestrial species, including icon species such as the Alaska brown/grizzly bears and bald eagles. Salmon eggs, carcasses, and juveniles also contribute to the production of non-anadromous aquatic species, such as rainbow/cutthroat trout and Dolly Varden. These species provide for economic activity associated with bear/bird watching, State and National Park visitations, sport fishing and hunting. Salmon also serve as nutrient pumps by transferring marine nutrients to freshwater for fertilizing and enhancing productivity of freshwaters by delivering marine derived nutrients from the carcasses, such as phospohorus (P) and nitrogen (N), which limit productivity of most of Alaska's freshwater. Energy from the carbon content of carcasses also directly enters the food chain of freshwater ecosystems by directly feeding on the carcasses by fish and invertebrates. Stable isotope analysis of marine derived nutrients indicates that all trophic levels of the aquatic and adjacent terrestrial ecosystems are benefiting from the salmon runs, including terrestrial vegetation. The importance of salmon runs on human values derived from aquatic ecosystems is very

visible with the amount of commerce generated from economic activities in salmon rich systems may be of an order of magnitude when compared with salmon poor systems, or those areas where runs are failing (Stockner 2003). The economic and social stability of many of the rural outposts are often centered around salmon abundance and even the historical location and existence of many communities can be related to salmon runs and their ecological services and cultural development of remote areas of Alaska (Schmidt *et al*. 1997).

Freshwater fish habitat protection has both been the cornerstone of fisheries management in Alaska through maintenance, restoration or enhancement of habitat, but also the source of much conflict within the state, both historically and currently. Referred often as "Title 16", the Anadromous Fish Act (AS 16.05.871- .901) provides for the protection of all anadromous fish habitat in the state by requiring permitting for any activity that may impact salmon habitat and other anadromous fish species. Authority for habitat protection was transferred to Alaska Department of Natural Resouces from the ADF&G Habitat Division and, in 2008, back to ADF&G, which currently has authority over permitting activities that impact anadromous fish habitat and other 'special areas' that have been designated by the legislature. Alaska also has provisions under the 'Water Act' (Sec. 46.15.030. and Sec. 46.15.145) for the reservation of water for environmental and other purposes, which includes instream flow and stream and lake water levels (Kline 2011).

Because of the northerly location of the state and low population densities, urban development and agriculture have had very minor impacts on the State's salmon fisheries. Local mine developments and historical large scale gold dredging operations, where regulation of the activities were minimal, undoubtedly created impacts on some salmon systems in the Yukon and other areas. The most recent proposed Pebble Mine, that is located within the Naknek and Kvichak watershed of Bristol Bay, has created much concern by the sport fishing, subsistence and commercial salmon industry in that region, in addition to broader ecological concerns expressed by NGO's. Extensive state and federal regulatory permitting processes are currently underway that will ultimately decide if the project is to be built and the degree of protection for fisheries and wildlife, including commercial salmon production in Bristol Bay. Other major developments include the decision by the State to pursue the Susitna Hydroelectric project that may influence productivity of salmon fisheries in Upper Cook Inlet. This project is undergoing major environmental reviews by both State and Federal agencies. Alaska has several other relatively hydroelectric projects, but these are located on relatively small systems and have been the subject to many constraints to protect salmon resources.

The State of Alaska, Federal Agencies, and the Private Non-Profit (PNP) aquaculture associations have provided habitat restoration activities in addition to fish hatcheries and limited spawning channels. In addition, enhancement activities that have established fisheries or increased their productivity through the use of fishways for passage of fish over natural barriers, including downstream passage of smolt, have been developed. Nutrient supplementation programs have been implemented, generally as a restorative measure to replace nutrients lost through decades of commercial harvest. The state originally developed the Fisheries Rehabilitation and Enhancement Division (FRED), which was dissolved in the early 1990's and merged with the Commercial Fisheries Division. This corresponded with transferring of hatchery operations to private non-profit divisions. The Statewide Limnology Laboratory originally oversaw the nutrient supplementation programs and provided guidance for both state and PNP hatcheries for stocking rates for sockeye salmon fry plants into barren systems or into systems that were thought to be limited by spawning habitat or required short term supplementation because of low returns of adults. This laboratory has been reduced to limited activity in southcentral Alaska while a new laboratory was established by ADF&G on Kodiak Island in support of the Kodiak Regional Aquaculture Association enhancement and restoration programs. Other habitat restoration programs include stream bank and riparian habitat restoration, as required under permits for short term development that may impact fish habitat under Title 16 provisions.

The term 'enhancement' under the MSC's 'hatch and catch' criteria implies hatchery production and release of juveniles into wild habitats, where they can potentially compete with wild stocks or confound their management. When runs are initially established in barren systems with fish passes, by either hatchery stocking or transfers of adults from adjacent systems, but are subsequently terminated after the run is established, are generally not considered to be enhanced stock, but are treated similarly to new habitats created by receding glaciers or removal of beaver dams. In these cases, the systems and fisheries management are indistinguishable from management of wild systems. The Frazer Lake sockeye salmon run on Kodiak Island is an example of this type of salmon run. Similarly, lake fertilization programs, which are designed to restore or enhance systems to make them comparable to historic or similar systems, are not considered to be "enhanced" under the definitions used in assessing these fisheries. This is because the intent is to make the salmon population's productivity comparable to similar populations in the area or return to historical production and as a consequence, will alleviate, rather than compound fisheries management issues related to multiple stock harvests. In some cases, barren systems have been accessed with fishways and lake fertilization has been applied to these systems to provide for sockeye run returns similar to natural systems. These habitats undergo significant changes in the lake ecosystem but do not compound management of wild stock fisheries and the management goal of the enhancement activity is to parallel the productivity of a self sustaining wild system. Consequently, these activities are treated similarly to natural occurring activities where fisheries are established by receding glaciers or beaver dam removal (natural or man caused) and are not considered to have major impact on the fisheries, while having minimal adverse impacts on lake habitats and ecosystems.

Salmon fishing gear typically has little contact with the bottom substrate or causes relatively little damage when gear hits soft bottom habitats. Troll salmon gear is usually fished off the ocean bottom so there is little contact with the sea floor or to rocky habitats. Contact with the bottom would lead to gear loss or entanglement, which could be costly to fishermen. Purse seines and drift gill nets are often fished in waters deep enough to avoid contact with the substrate in order to protect nets. In some areas, purse seines, drift gill nets, and set gillnets are fished in relatively shallow waters and contact the bottom. In these areas, substrates are typically soft rather than hard rocky bottoms that would ensnare the nets. Salmon gear contact with the bottom may temporarily disrupt benthic communities in localized areas.

In fisheries using gillnets, lost gillnets may continue to take marine mammals and birds. Alaska has a program to remove derelict nets located on beaches but not those remaining in the water column. Although the impact of lost gear on marine mammals and birds is probably not high, the extent of this take in Alaska salmon gillnet fisheries is unknown.

The extent of gear loss or gear discard in the Alaska salmon fisheries is unknown. There can be major expense involved in the loss of salmon trolling gear, gillnets, and purse seines, including the cost of the gear itself and lost fishing time associated with making repairs. Gear loss is more likely to occur in rocky habitats with strong currents. Derelict fishing gear, especially gill nets, may continue to kill marine fishes, birds, and potentially marine mammals (http://www.derelictgear.org/; http://www.nwstraits.org/Archives/Library.aspx). Derelict fishing gear also impacts habitat. Greater effort should be made to encourage fishermen to retrieve drift gillnets and set gillnets that might be lost. To facilitate retrieval of lost gear, identification tags could be attached the nets, providing information on the owner. Alaska has a program (Marine Conservation Alliance) to remove derelict gillnets that are found on beaches, but there is no program to remove lost nets in the water, as is done in Puget Sound Washington where more than 4,100 derelict gillnets have been removed in the past 10 years (J. June, NRC, pers. comm.).

2.5 Principle Three: Management System Background

2.5.1 State of Alaska Salmon Management Authority

There are many places where the management of Alaska's salmon fisheries have been documented. The Commercial Salmon Fishery in Alaska (Clark, J.H. *et al.* 2006) provides a recent review of Alaska's management of salmon. Excerpts from the paper are quoted below to give the reader of this report a general idea of Alaska salmon management. For a greater appreciation, the reader can find the full paper at http://www.ADF&G.state.ak.us/pubs/afrb/afrbabst.php#vol12_1.

"*Authority for the management of the subsistence and commercial salmon fisheries of Alaska was primarily vested with the ADF&G, Division of Commercial Fisheries at statehood. The Alaska constitution provided policy guidance. The Alaska legislature created the Department of Fish and Game as well as the Division of Commercial Fisheries at statehood with a mandated fishery management mission. The Alaska legislature has passed laws since statehood providing further authority and guidance. The Alaska Board of Fish and Game and later the Alaska BOF has promulgated a diverse set of regulations and plans for management of Alaska's subsistence and commercial salmon fisheries that provide guidance for day to day management by area biologists of the Division of Commercial Fisheries. Since statehood, some major changes in authority for management of the Alaska salmon fishery have occurred.*

Article VIII of the Alaska Constitution is dedicated to natural resources. Sections pertinent to the management of salmon include: "Section 1. It is the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum benefit of its people. Section 2. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people. Section 3. Wherever occurring in the natural state, fish, wildlife, and waters are reserved to the people for common use. Section 4. 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. Section 15. No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State." Section 15 of the Alaska constitution was included due to the special privileges granted to the salmon canning industry by the federal fishery management program prior to statehood, particularly the ownership and use of fish traps. Fish traps were quickly prohibited by regulation, but language in section 15 prevented the BOF and Game from implementing regulations to limit total fishing effort. In 1972, the Constitution was amended to facilitate a limited entry program for the Alaska commercial salmon fishery. Section 15 now reads: "No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the State.

In 1973, the Alaska legislature passed a bill creating the first comprehensive limited entry program 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. It improved management effectiveness and the ability of the fishery managers to regulate the fishery such that harvestable surpluses could be taken while still meeting escapement objectives in an orderly and predictable fishery. Limited entry also succeeded in maintaining a high proportion of Alaska resident participation in the state's salmon fisheries. The Alaska legislature created the ADF&G with the commissioner as the principle executive and charged the commissioner to: "manage, protect, maintain, improve, and extend the fish, game, and aquatic plant resources of

the State in the interest of the economy and general well-being of the State." At statehood, Alaska made two very significant departures from the prior federal fishery management regime.

At statehood, Alaskans keenly understood the value of a decentralized salmon management program after dealing for decades with the centralized federal salmon management regime. First, in an important organizational change, ADF&G offices were opened in numerous towns and villages across Alaska and staffed with area management biologists. Second, these area management biologists were provided with fishery management authority so they could ably address the rapidly changing in-season fishery management needs of the salmon fisheries in Alaska. Area biologists in the Division of Commercial Fisheries were charged with managing subsistence and commercial salmon fisheries while area biologists in Sport Fish Division were charged with managing sport fisheries for salmon. Since statehood, emergency order authority has been vested in area management biologists giving the department's field staff authority to make regulatory announcements that carry the force of law and can be implemented immediately.

AS 16.05.060, Emergency Orders, states: "(a) This chapter does not limit the power of the commissioner or an authorized designee, when circumstances require, to summarily open or close seasons or areas or to change weekly closed periods on fish or game by means of emergency orders" and "(c) An emergency order has the force and effect of law after announcement by the commissioner or an authorized designee…". Sustained yield management of commercial salmon fisheries requires precise timing of fishery openings and closures and adjustments in gear, often with short notice to allow the harvest of surplus fish and simultaneously assuring adequate escapement of spawning fish. Prior to statehood, federal managers had been given limited authority to make field announcements, however, less than 25 such announcements were made per year across the State of Alaska by federal managers in the 1950's. In contrast, under State of Alaska management, in 2004, 745 emergency orders were issued by Division of Commercial Fisheries staff to manage salmon fisheries.

Regulations for prosecution of the commercial salmon fisheries in Alaska were promulgated by the Alaska Board of Fish and Game from statehood until 1975 when that Board was split and the Alaska BOF was formed. The BOF is defined as: "*for purposes of the conservation and development of the fishery resources of the State, there is created the* BOF *composed of seven members appointed by the governor, subject to confirmation by a majority of the members of the legislature in joint session. The governor shall appoint each member on the basis of interest in public affairs, good judgment, knowledge, and ability in the field of action of the board, and with a view to providing diversity of interest and points of view in the membership. The appointed members shall be residents of the State and shall be appointed without regard to political affiliation or geographic location of residence*." The authority of the BOF is defined in AS 16.05.251. In part those authorities include: establishing fishing seasons, setting fishing quotas, setting bag limits, establishing harvest levels along with sex and size limitations on these harvests, establishing means and methods employed in the pursuit, capture and transport of fish, and regulating commercial, sport, subsistence, and personal use fisheries.

The BOF has sole authority to allocate fishery resources among commercial, sport, personal use, and subsistence users. Regulations enacted by the BOF for management of the Alaska salmon commercial fishery are extensive, taking up a substantial portion of the 1,147 page booklet entitled "*Alaska Fish and Game Laws and Regulations Annotated, 2004-2005 Edition, Including updates to the Alaska Administrative Code through Register 171*". These diverse and detailed fishery regulations provide much of the basis for management of the Alaska commercial salmon fishery. These regulations provide guidance but these regulations are supplemented by hundreds of emergency orders developed and announced by ADF&G area management biologists that are directly responsible for management of specific salmon fisheries across the State of Alaska.

In 2000, the Policy for the Management of Sustainable Salmon Fisheries was adopted into state regulation (5 AAC 39.222). Referred to as Alaska's Sustainable Salmon Fisheries Policy, the regulation states that: "*while, in the aggregate, Alaska's salmon fisheries are healthy and sustainable largely because of abundant pristine habitat and the application of sound, precautionary, conservative management practices, there is a need for a comprehensive policy for the regulation and management of sustainable salmon fisheries.*" The goal of the policy is to "*ensure conservation of salmon and salmon's required marine and aquatic habitats, protection of customary and traditional uses and other uses, and the sustained economic health of Alaska's fishing communities.*" The landmark policy updates and strengthens long-standing principles of Alaska's salmon management program. Most importantly, it direct ADF&G and the Alaska BOF to follow a systematic process for evaluating the health of salmon stocks throughout the state by requiring ADF&G to provide the Board, in concert with its regulatory cycle, with reports on the status of salmon stocks and fisheries under consideration for regulatory changes. The policy also defines a new process for identifying stocks of concern (stocks which have not met escapement goals or yield expectations), and requires ADF&G and the Alaska 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 is the least severe and results from an inability to maintain expected harvest levels over a 4- to 5-year period, (2) a management concern relates to the inability to maintain escapements within escapement goal ranges over a 4- to 5-year period despite the use of management measures, and (3) a conservation concern is the most severe and relates to the inability over a 4- to 5-year period to maintain escapements above a minimum threshold below which the stock's ability to sustain itself is jeopardized.

To comply with the new policy, ADF&G has expended considerable effort since 2000 to update salmon stock status information and review and update the scientific basis of salmon escapement goals – producing an extensive series of published reports in the process. There are currently over 270 escapement goals established for salmon stocks or stock aggregates throughout the state of Alaska. The goals are classified either as BEGs, which are scientifically-based and represent the escapement estimated to provide the greatest potential for maximum sustainable yield, or as SEGs, which represent an escapement level that is known to provide for sustained yield over a 5- to 10-year period. Relative to the criteria of Alaska's Sustainable Salmon Fisheries Policy, as of early 2013 only 5 salmon stocks in Alaska are classified as stocks of management concern and 6 are identified as stocks of yield concern which are meeting escapement objectives but producing low levels of harvest (Table 2). The BOF and ADF&G have developed action plans to address rebuilding of each these stocks.

2.5.2 Pacific Salmon Treaty

Coastal and freshwater salmon fisheries such as occur in Alaska sometimes harvest salmon that spawn in other jurisdictions. Significant interceptions of Alaskan, southern U.S. and Canadian spawned salmon occur in coastal fisheries of Southeast Alaska, Canada, and Washington. Alaskan fisheries also intercept significant numbers of salmon that originate in Canadian waters of the Yukon River. A long series of negotiations between the U.S. and Canada concluded in the signing of the Pacific Salmon Treaty (PST) in 1985. The PST was renegotiated in 1999 and again in 2008 with an increased effort to implement abundance based management regimes.

The resultant U.S. Canada agreement(s) through the Treaty process reflects a political balance of the fishing and conservation interests of Alaska, Washington, Oregon, Idaho, 24 southern U.S. treaty Indian tribes, and Canada. Various annexes in the PST provide policy guidance to the salmon management regimes in place in Southeast Alaska, specific limits are applied to Chinook salmon harvests in Southeast Alaska, limits are applied to sockeye salmon harvests in specific Alaskan fisheries near the U.S. Canada border in the southern portion of the region, and limits are applied to harvests of salmon originating from Canadian waters of the three transboundary rivers (Taku, Stikine, and Alsek). The PST, through annexes provides fishery management authority, direction, and policy

guidance to ADF&G staff responsible for management of the salmon fisheries in Southeast Alaska. The PST also put into place a cooperative management program in the Yukon River that is intended to ensure adequate passage of Canadian origin Yukon River salmon through Alaskan fisheries for both conservation and continuation of Canadian fisheries that utilize these stocks. The PST through the Yukon Article thus provides fishery management authority, direction, and policy guidance to ADF&G staff responsible for fishery management of Yukon salmon fisheries.

2.5.3 Alaska Salmon Hatcheries

Various salmon hatchery operations were initiated in Alaska prior to statehood. At statehood, Deer Mountain Hatchery near Ketchikan was operating, a hatchery located in Kitoi Bay on Afognak Island was operating, and Fort Richardson Hatchery near Anchorage was operating. The ADF&G built Crystal Lake Hatchery near Petersburg in 1964 and Fire Lake Hatchery near Anchorage in 1965. In 1971, the Alaska legislature created the Fisheries Rehabilitation, Enhancement and Development Division (FRED) of ADF&G, an action that resulting in a major expansion in salmon aquaculture research and production in the 1970's.

By the early 1980's, ADF&G was involved with construction and or operation of about 20 additional salmon aquaculture facilities located from southern Southeast Alaska to as far north as the Noatak River near Kotzebue. As State support for salmon enhancement developed, the Alaska legislature created a framework for private salmon enhancement through creation of private nonprofit corporations. North Slope oil revenues to Alaska declined in the 1980's and natural salmon production increased. As a result, Alaska explored the option of private sector operation of State salmon enhancement programs. In 1993, the Governor issued an executive order merging the FRED Division with the Commercial Fisheries Division. By the mid-1990's, most State run salmon aquaculture facilities were taken over by the private sector. State aquaculture facilities that primarily produced fish caught in sport fisheries were transferred to the Division of Sport Fish and by the later 1990's, the Commercial Fisheries Division neither funded nor operated salmon hatcheries. The Division of Commercial Fisheries, however, has continued to provide technical support to all of the salmon aquaculture facilities operated in Alaska (Figure 2) such as was provided by FRED Division while in existence; technical support such as disease screening and production evaluation.

In commercial salmon fisheries in Alaska, such as in Southeast and PWS, a major responsibility of the area biologists is the management of enhanced salmon returns. These area biologists attempt to provide for the full harvest of surplus hatchery fish while providing adequate protection to wild stocks of salmon. In 2004, over 1.7 billion salmon eggs were collected by Alaskan salmon operators, over 1.6 billion fish were released, and over 20 million salmon originating from Alaskan hatcheries were harvested in common property commercial salmon fisheries as a result of the Alaska salmon hatchery program. The 2004 Alaska salmon enhancement program consisted of twenty-nine private non-profit salmon hatcheries, two federal operated salmon hatcheries, two State operated hatcheries, and several streamside incubation and restoration projects (White 2005).

2.5.4 Alaska Commercial Salmon Fishery Users

Fishermen can only participate in the commercial salmon fisheries in Alaska by holding a limited entry permit or by working as a crew member for a limited entry permit holder. As of August 31, 2005, there were a total of 11,301 valid commercial salmon limited entry permits. Each limited entry permit is valid for a specific gear type and area in Alaska. Gill net permits issued for western Alaska (Kuskokwim, Yukon, Norton Sound, and Kotzebue) are not differentiated for set versus drift netting, but regulations by the BOF restrict fishing in Kotzebue to set net fishing only. Drift gill net permits are the most common gear, representing about 32% of all valid permits to fish for salmon in Alaska. There are more valid permits issued for the Southeast-Yakutat area salmon fishery (3,133 permits, 28% of total) than for any of the other salmon fisheries in Alaska; the Bristol Bay salmon fishery

includes 2,866 valid permits (25% of total), the second highest number of permits issued for salmon fisheries in Alaska. Limited entry permits are bought and sold on the open market and their value is based upon gear type and area.

Based on average market value in 2004, the most valuable limited entry permit type in Alaska were purse seine permits in the Chignik area with an estimated value of about $182,000. The least valuable permits, based upon permit transactions in 2004 were gill net permits to fish in the Kotzebue salmon fishery, their value was $2,000. Across Alaska, the most valuable permit type was drift gill net permits with a weighted average value of about $32,700 and the least valued type of permit was hand troll permits with an average value of about $4,100. Based upon the number of valid permits issued and average value per permit, the estimated value of the 11,301 commercial salmon limited entry permits in 2004 was about $228 million. Not all permits are fished each year. As prices paid to commercial fishermen declined in the 1990's due to the availability of farmed salmon, the number of permits fished in Alaska commercial salmon fisheries declined and then as the prices started to increase in the last couple of years, the number of permits fished has increased. In 2004, 7,179 of the valid limited entry permits in Alaska were fished (64%). Each of the limited permits for commercial salmon fishing in Alaska represent the equivalent of a small independent business. When the permit is fished it represents a business with employees as in most cases, a crew is used for commercial salmon fishing and thus jobs are created, wages are paid, and the fishing activity adds to the economic foundation within Alaska.

2.5.5 Alaska Commercial Salmon Fishery Harvests

The last year of federal management of the commercial salmon fishery in Alaska was 1959 and in that year the harvest totalled only 25.1 million salmon; the decade average harvest in the 1950's was 41.4 million salmon commercially harvested, the lowest decadal average since the first decade of the 1900's. State managers in the 1960's made judgment calls concerning appropriate escapement levels needed and took management actions to achieve the spawning goals. The salmon stock assessment program improved in the 1970's, goal setting improved, and salmon managers used emergency order authority to achieve the spawning goals.

Commercial harvests of salmon averaged about 50 million salmon during the 20-year period of 1960-1979. By the 1970's, budget support for salmon management had increased substantially, an Alaska salmon plan was developed, and payoff from investments in salmon escapements, in salmon stock assessment programs, and in in-season salmon management started to accrue to the Alaska commercial salmon fisheries. The decade average harvest level in the 1980's increased to 122 million salmon commercially harvested, a two-fold increase over the prior period. Budget support for the commercial salmon management program peaked in the 1980's and payoff from better management, improved stock assessment tools and prior investments in the Alaska salmon hatchery program combined to result in another significant increase in sustained harvest levels. Average commercial harvests in the 1990's were about 175 million salmon.

Average harvest so far in the 2000's has been similar to the last decade average; about 167 million salmon have been commercially harvested per year since 2000. Trends by species in the commercial salmon harvests have been variable. Chinook harvests by the commercial fishery in Alaska have not varied much over the past 90 years, with the last ten decadal averages ranging from about 600,000 to 800,000 Chinook salmon. On the other hand, significant use of Chinook salmon in Alaska occurs in sport and subsistence fisheries and those harvests have increased substantially. In several areas of Alaska, Chinook harvests in the commercial fishery are restricted to provide for other users. Recent sockeye salmon harvests by the Alaska commercial fishery have been higher than occurred historically; harvests since 1980 have averaged about 41 million sockeye, the highest decadal average prior to that was in the 1910's. Most major stocks of sockeye salmon in Alaska are managed for scientifically based escapement goals, sustained harvests are high and productive annual escapement

strength is maintained on an annual basis. The historic coho commercial harvests peaked in the 1940's with a decadal average of about 3.1 million fish; average commercial harvest since 1980 for coho salmon has been about 5.1 million, about 65% higher than in the 1940's. Coho salmon in many parts of Alaska are important to sport fisheries which have grown substantially in the last few decades. In several areas of Alaska, coho salmon are underutilized. Commercial fishery harvest trends for pink salmon are similar to coho salmon, a historic peak in the 1940's (about 49 million) with harvests since 1980 being about 92.6 million fish or about 53% higher. While hatchery programs have been responsible for some of the increase in pink salmon production, a major factor has been regulation of harvest and achievement of escapements that are highly productive. In some parts of Alaska, pink salmon are underutilized due to low market value. Chum salmon commercial harvests in Alaska were relatively stable from 1910 to 1980, averaging about 6.9 million fish; harvests in the 1980's, 1990's and 2000's increased to about 11.3 million, 15.3 million, and 16.5 million, respectively, mostly as a result of the Alaska hatchery program. Like pink salmon, chum salmon are under utilized in some parts of Alaska due to low prices. Further improvements in the salmon stock assessment program could lead to increased production and harvests of all five species of salmon if such improvements could be maintained over a long period of time.

The Southeast-Yakutat area harvests of salmon from 1980-2004 represented about 35% of the total Alaska harvest, the largest percentage of the eleven areas. The PWS area represented about 20% of the Alaska harvest of salmon and Bristol Bay about 17%. The four areas within the Arctic-Yukon-Kuskokwim Region (Kuskokwim, Yukon, Norton Sound, and Kotzebue) in total represented about 1.5% of the statewide commercial harvest. In the early 1970's, Governor Hammond instructed the ADF&G to develop an Alaskan salmon plan; the plan was completed in 1976 and was used to assist the State of Alaska to develop and implement the Alaska hatchery program as well as used as a focus for improved stock assessment and management of salmon. With the Governors' office and legislative support, the operational budget for the Division of Commercial Fisheries increased substantially from the early 1970's through the mid 1980's.

The Alaska salmon plan suggested the salmon resources of Alaska could support a commercial fishery with average annual harvests in excess of 100 million salmon given reasonable survival conditions, improved management technology, and improved budget support. At the time the plan was written, the highest decadal commercial harvest level that had occurred was in the 1930's when the average harvest was about 90 million salmon and many salmon stocks had been over fished, the runs depleted, and in need of rehabilitation. Plan developers in the early 1970's were optimistic that with improved management tools and better in-season management, these historic harvest levels could be surpassed. While most people familiar today with the Alaska salmon fishery would consider annual commercial salmon harvests of less than 100 million as a disaster; from the inception of the salmon fishery in the late 1800's through the 1970's, such harvest levels were considered a godsend. Prior to the plan being written, annual commercial harvest levels in excess of 100 million salmon had only happened in six of the years from the start of the Alaska commercial salmon fishery in 1878 through the time when the plan was completed (1918, 1934, 1936-1938, and 1941; only 6% of the years prior to 1980). Since 1980, the Alaska commercial salmon fishery has only once (4% of the years) harvested less than 100 million salmon (1987, harvest was 96.6 million).

The Alaska commercial salmon harvest history ably demonstrates that the plan developers were right, given long term average survival conditions coupled with better support to the salmon managers of Alaska through improved technological abilities and funding, the overall Alaska salmon resource could support sustained production in excess of 100 million salmon per year. In fact, the Alaska salmon management program is one of the most successful natural resource management programs in the world. While overall, commercial salmon harvests have exceeded expectations listed in the Alaska salmon plan, salmon harvests for some species in some areas have not met the plan objectives. Notable exceptions include Chinook harvests in some areas of Alaska, and pink and chum harvests in much of western Alaska. BOF decisions concerning allocation of Chinook among commercial, sport,

and subsistence fisheries and U.S. Canada Treaty limits on harvest of Chinook impacted commercial harvests of Chinook in Alaska. Lack of market interest in pink and chum salmon coupled with remoteness played a part in the failure to achieve plan objectives in western Alaska.

There are no other salmon management programs in North America where field level managers have both the responsibility and the full authority to act quickly to provide additional fishing opportunity or to take such opportunity away depending upon in-season stock strength. From 2000-2004, an average of 713 emergency orders were issued in-season by Division of Commercial Fishery managers just to manage Alaskan commercial salmon fisheries; additional emergency orders were issued in-season that regulated sport, personal use, and subsistence fisheries. A thorough understanding of the Alaska salmon management program needs to take this important aspect and fact of the Alaska management program into account.

3 Evaluation Procedure

3.1.1 Previous assessments

The Alaska salmon fishery was first certified against the MSC Principles and Criteria as sustainable in December 2000, and was then recertified in November 2007. This latest assessment therefore constitutes the second reassessment of the fishery.

In the December 2000 assessment, the Alaska salmon fishery was scored as follows across the 26 Performance Indicators (PIs) used at that time:

Principle 1 (Resource management):	84.0 (8 Performance Indicators)
Principle 2 (Ecosystem management):	84.0 (4 PIs)
Principle 3A (Effective Management System):	91.0 (8 PIs)
Principle 3B (Fishing Operations):	84.0 (6 PIs)

Ten conditions of certification were also set against the fishery in 2000, covering a range of areas where the fishery was deemed to be failing to meet the SG 80 level of performance as defined at that time. The 2007 recertification report noted that "*In general, the conditions assigned to the fishery during the initial assessment were addressed.*" (Chaffee *et al.* 2007). It should also be noted that the assessment tree used in 2000 was not the same as the assessment tree used in either the 2007 assessment or this latest assessment.

In the November 2007 reassessment, the Alaska salmon fishery was divided into 16 Units of Certification (UoCs), and was scored as follows:

Unit of Certification	Principle 1	Principle 2	Principle 3
SE Drift Net	80.89	80.87	92.73
SE Purse Seine	80.89	80.87	92.73
SE Troll	85.23	80.87	92.73
Yakutat	85.44	82.12	92.73
Prince William Sound	80.21	80.25	92.73
Copper River / Bering	80.03	82.12	92.73
Lower Cook Inlet	86.63	82.12	92.73
Upper Cook Inlet	83.34	82.12	92.73
Bristol Bay	90.44	82.12	92.73
Yukon	91.75	82.12	92.73
Kuskokwim	82.1	82.12	92.73
Kotzebue	83.73	82.12	92.73
Norton Sound	80.56	82.12	92.73
Kodiak	82.48	82.12	92.73
Chignik	87.55	82.12	92.73
Peninsula	80.13	82.12	92.73

In 2007, the fishery was assessed against the MSC Fishery Certification Methodology Version 6, and a non-standard assessment tree was used that defined 51 separate Performance Indicators (PIs) across the three MSC Principles. A total of 69 Cconditions of Certification were also introduced across the 16 UoCs, with some of the conditions being mirrored across a number of the UoCs. Details of all the conditions can be found in the annual surveillance reports (i.e., Knapman *et al.* 2009, MML 2010, MML 2011a, MML 2011b), including the work carried out to satisfy those conditions which were closed out. A total of 19 of the conditions were not closed out by the fourth annual surveillance audit; details of those conditions, as reported in the fourth annual audit report, are provided in Table 8, below.

With respect to carrying conditions over from one certificate to the next, the MSC provides guidance for fisheries with conditions written prior to the requirement for outcome-based conditions (2006), or against performance indicators in assessment trees which differ from those in the tree being used in the reassessment – a clause that applies to the Alaska salmon fishery. Such conditions, depending on their wording, may be evaluated or updated with the latest guidance regarding setting conditions that are time-bound and outcome-focused; this is outlined in the CR V1.2 at Section 27.24.2.4 b:

(For fisheries with conditions written prior to the requirement for outcome-based conditions (2006), or against performance indicators in assessment trees which differ from those in the tree being used in the reassessment):

> *ii) If the conditions are not appropriate to deliver SG80 outcomes in the reassessment tree, CABs shall consider what action is needed to deliver the outcome required at SG80 level, and evaluate whether this outcome has been achieved.*
>
> *1) If the SG80 level has not been achieved, such conditions shall be rewritten against the reassessment tree following the requirements specified in 27.11, with a timeline for completion of less than one certification period.*

The final column in Table 8, below, is therefore added for this reassessment report, which details how the existing conditions have been evaluated or rewritten. It is noted that only Condition 29 has needed to be rewritten to take account of the assessment tree used during this reassessment, related to Copper/Bering Districts (Condition 4).

Table 8: Conditions from the 2007 Alaska salmon fishery certification that remained open following the fourth annual surveillance audit in September 2011.

N.B. The table includes information on the Unit of Certification (UoC) to which the condition applies, the "Issue" associated with the condition, the "Action" that the ADF&G and subsequently the Alaska Fisheries Development Foundation (AFDF - the client for the fishery between February 2010 and October 2012) committed to undertake to meet the condition and the timescale within which the condition was/is expected to be closed.

Condition(s)	UoC affected	Issue	AFDF Action	Timescale	Closed or Carried-over in 2012 reassessment
3, 11, 15 Estimate contribution of hatchery chum to wild escapement in representative areas through appropriate means, such as implementing thermal otolith mass marking of all hatchery chum salmon. [Southeast]	3 - Southeast Drift gill net 11 & 15 - Southeast Purse seine	PI 1.1.1.5 Conditions 3 &11 Natural spawning streams have not been systematically sampled to determine hatchery contribution. Fisheries are actively managed for wild escapement goals (there are 5 escapement goals according to Heinl *et al.* 2004), however "there is no scientific justification for the goals, because neither escapement nor harvest are reliably measured on a system-specific basis" (Heinl *et al.* 2004). There are no formal Biological Escapement Goals, nor are there Sustainable Escapement Goals, as recommended by the Sustainable Salmon Policy. PI 1.1.2 Condition 15 Not having formal escapement goals and avoiding the Stocks of Concern process.	To satisfy this condition, AFDF will interface with ADF&G to develop multi-year otolith sampling program to estimate contributions of hatchery chum salmon to a subset of wild escapements, including streams near significant chum salmon hatchery release sites and streams in areas more distant from those releases. This will require additional staff time for collecting otoliths as well as for analysis. ADF&G has implemented a 3 year sampling program that will estimate contributions of hatchery chum to wild escapements for a set index of streams surrounding significant hatchery release sites throughout southeast Alaska. Field crews will sample 100 fish each from early, middle, and late run. Otoliths will be returned to the tag lab to quantify hatchery fish. The need for further work will be assessed according to the results of this sampling. A report summarising the work will be completed in July, 2011. The major southeast Alaska hatcheries are already otolith marking virtually all of their chum salmon production, which represents most (e.g. 83% in 2004) of the region's enhanced chum salmon releases. It would be a substantial burden on smaller facility operators to purchase and operate otolith marking technology; therefore, we will consider the need to otolith marking additional facilities' production after obtaining results from the initial studies. By July, 2011, AFDF will provide an ADF&G review of additional research needs, if any, based upon these initial studies.	These conditions were to be completed in 2011 and evaluated during 4th surveillance audit. Due to the need for additional work to be undertaken, these conditions will not be closed out during the course of this certificate. A new condition will likely be raised during recertification.	ADF&G has achieved this through accounting for hatchery chum salmon in the escapement (Piston & Heinl 2012b). These conditions have therefore been closed during reassessment.

4, 12 Develop escapement goals for chum salmon.	4- Southeast Drift Gill net 12 Southeast Purse seine	PI 1.1.2.2 Condition 4 & 12 There is limited information on straying of hatchery chum salmon in Southeast Alaska and its possible impacts on wild stock production. Hatchery contributions to net natural production have not been determined. Significant straying could mask true estimates of wild chum abundance and productivity or reduce natural stock productivity throughout breeding depression of hatchery domestication.	Work is underway on this task. Existing ADF&G staff have developed sustainable escapement goals for southeast Alaska chum salmon stocks as part of the triennial escapement goal review prior to the next Alaska BOF meeting for southeast Alaska. A published report will be available in early 2009.	This condition was to be completed in 2009 and evaluated during the 4th surveillance audit. A report on the three year straying study is being prepared and drafts are in review. Preliminary results have been presented at conferences. The continuing delay reflects the need for additional data collection and analysis to be undertaken. The condition may now be closed during the re-certification process, or early in next certification period.	ADF&G has produced the reports required in order to close this condition (Piston & Heinl 2012a, 2012b). These conditions have therefore been closed during reassessment.

23, 25 Provide adequate data and analyses to demonstrate that hatchery and fishery management actions are sufficient to ensure that harvest of enhanced fish is not adversely affecting the wild pink, chum, sockeye, and coho stocks. Revise wild stock assessments and management as appropriate.	23-Prince William Sound seine and gill net	PI 1.1.1.5 Condition 23 The impacts and interactions of hatchery salmon that stray into wild salmon spawning streams is still required. An analysis of the results of straying studies in the context of the State's genetics policy and wild stock escapement goals is required. This is anticipated in the latter part of 2008 and will be reviewed as part of next year's surveillance audit.	Current management practices identify wild stocks in catch and fishery openings are modified as needed on a weekly basis. Escapement goals have been established for wild stocks of pink, chum, and sockeye salmon in PWS. Escapement goals have been consistently met in face of large hatchery runs of pink and chum salmon. No significant wild coho stock exists in PWS so the condition is not relevant for PWS coho salmon. AFDF will provide a report produced by ADF&G, including data and analyses, by December 31, 2008	This was to be completed in 2009, and evaluated during 3rd surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition may now be closed during the re-certification process or early in the next certification period.	The PWS UoC remains in assessment at this time.

	25- Prince William Sound seine and gill net	PI 1.1.2.4 Condition 25 This condition will not be achieved until the Department completes an analysis of the results of the straying studies in the context of the State's genetics policy and wild stock escapement goals.	Current management practices identify wild stocks in catch and fishery openings are modified as needed on a weekly basis. Escapement goals have been established for wild stocks of pink, chum, and sockeye salmon in PWS. Escapement goals have been consistently met in face of large hatchery runs of pink and chum salmon. No significant wild coho stock exists in PWS so the condition is not relevant for PWS coho salmon. AFDF will provide a report produced by ADF&,G including data and analyses, by December 31, 2008.	This was to be completed in 2011, having been evaluated during the 4th surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition may now be closed during the re-certification process or early in the next certification period.	The PWS UoC remains in assessment at this time.

24 Estimate the contributions of stray hatchery chum and sockeye to spawning escapements and report results.	Prince William Sound seine and gillnet	PI 1.1.2.2 The fishery does not meet the 80 scoring guidepost regarding the availability of estimates of escapement and spawning of enhanced fish stocks.	AFDF has advised Moody marine Ltd that ADF&G is entering year 3 of a multi-year study of chum salmon straying. The sockeye salmon from the Main Bay hatchery are thermally marked. Study of straying Eshamy and Coghill river systems is feasible. ADF&G will conduct a three year study of sockeye salmon straying and will provide a report to AFDF when completed. The report for chum salmon is scheduled to be completed by May 30, 2008, and the report for sockeye salmon will likely be completed by May 30, 2011.	This was expected to be completed in 2011 after being reviewed by the surveillance team in the 4th annual surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition should now be closed early in the next certification period.	The PWS UoC remains in assessment at this time.
26 Review pink salmon escapement goals and management practices taking into account recent research results on genetic stock structure of wild pink stocks. The review should include a discussion of how the escapement goals take into account variability in the productivity of each component of the target stocks.	Prince William Sound seine and gillnet	PI 1.1.3.2 The fishery does not meet the 80 scoring guideposts with respect to the escapement goals taking into account variability in the productivity of each component of the target stocks.	Pink salmon escapement goals and management practices are reviewed every three years. The next review will occur during the 2008/2009 BOF cycle. This review will take all available research information into consideration. While current management practices, including escapement windows and district management targets, have consistently maintained spatial and temporal distribution of escapement, refinements in management may come out of this review. AFDF will provide a report of these evaluations, produced by ADF&G, taking into account genetics data, prior to the 2008/2009 BOF meeting.	This was to be completed in 2009, and evaluated during 3rd surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition should now be closed early in the next re-certification period.	The PWS UoC remains in assessment at this time.

27 Provide a written evaluation of the effects of potentially selective hatchery practices on characteristics of un-enhanced wild stocks.	Prince William Sound seine and gillnet	PI 1.3.1 The knowledge of the effect of fishing on biological characteristics such as the age, size, sex and component stocks may be adequate to detect threats to the reproductive capacity of the majority of the target stocks but it is unclear if hatchery management actions are consistent with maintaining the native biological characteristics such as age, size, sex and genetic structure of all target stocks.	One of the primary concerns for hatchery practices is changing run timing. AFDF will request ADF&G to compile the long-term data on run timing for both wild and hatchery stocks and provide a report and analysis to AFDF by the end of 2008.	This was to be completed in 2009 and evaluated during 2nd surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition should now be closed early in the next certification period.	The PWS UoC remains in assessment at this time.
28, 30, 31 Continue to improve information on contributions of component stocks of sockeye and Chinook salmon to the commercial fishery by time and area and demonstrate that current harvest strategies are adequate to maintain the high productivity of all target stock components.	28-Copper/Bering seine and gill net	PI 1.1.1.3 Condition 28 To evaluate if current harvest policies sufficiently protect sub-stock components.	Detailed work on timing and distribution using on-going telemetry studies in combination with the completion of genetic baselines studies and publication in 2011 escapement goal report.	This condition was to be completed in 2010, and evaluated during 4th surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition may now be closed during the re-certification process or early in the next certificate period.	ADF&G conducted extensive genetic studies, created a baseline data set, and uses these data to identify component stocks in the commercial fishery (Ackerman *et al*. 2010, Ackerman *et al*. 2011, Templin *et al*. 2011a). These studies complement earlier studies using genetics and radio telemetry (Savereide 2005, Templin *et al*. 2008) such that these conditions are considered closed.

	30-Copper/Bering seine and gill net	PI 1.1.2.2 Condition 30 The fishery did not meet 80 scoring guideposts for reliable estimates of escapement for any target stock, fishery-independent indicators of in-season escapement, or estimates of annual escapement and natural spawning of hatchery fish.	Detailed work on timing and distribution using on-going telemetry studies in combination with the completion of genetic baselines studies and publication in 2011 escapement goal report.	This condition was to be completed in 2011 and evaluated during 4th surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition may now be closed during the re-certification process, or early in the next certificate period.	ADF&G conducted extensive genetic studies, created a baseline data set, and uses these data to identify component stocks in the commercial fishery (Ackerman *et al*. 2010, Ackerman *et al*. 2011, Templin *et al*. 2011a). These studies complement earlier studies using genetics and radio telemetry (Savereide 2005, Templin *et al*. 2008) such that this condition is considered closed.

	31-Copper/Bering seine and gill net	PI 1.1.2.4 Condition 31 It is unclear whether harvest limitations for target stocks take into adequate consideration the uncertainty in productivity estimates or the variability in productivity of different components within the aggregate sockeye, Chinook, and coho stocks for which this fishery is managed. The fishery does not meet the 80 scoring guideposts for productivity information required to maintain the high productivity of the target stocks.	Detailed work on timing and distribution using on-going telemetry studies in combination with the completion of genetic baselines studies and publication in 2011 escapement goal report.	This condition was to be completed in 2011 and evaluated during 4th surveillance audit. The complexity of the condition and the need for additional data collection and analysis means that this condition will not now be closed out during this certificate period. Instead, the condition may now be closed during the re-certification process, or early in the next certificate period.	ADF&G conducted extensive genetic studies, created a baseline data set, and uses these data to identify component stocks in the commercial fishery (Ackerman *et al*. 2010, Ackerman *et al*. 2011, Templin *et al*. 2011a). These studies complement earlier studies using genetics and radio telemetry (Savereide 2005, Templin *et al*. 2008) such that this condition is considered closed.
29 TO BE COMPLETED AS PART OF (66, 67) Conduct a review of the Gulkana sockeye hatchery program with emphasis on potential impacts to wild stocks.	Copper/Bering seine and gill net	PI 1.1.1.5 Condition 29 More years of stock allocation data from the strontium marking program in conjunction with the retrospective analysis from the genetic baseline are needed to evaluate if the presence of enhanced fish is impacting wild stocks	AFDF believes that ADF&G will provide the information to close out this condition as part of Condition 66 & 67:	This was scheduled to be completed in 2010 and evaluated during 3rd surveillance audit. However, the need for extra data collection means that this condition will not now be closed out during the course of this certificate due to its complexity. Instead, the condition may now be closed during the re-certification process or early in the next certificate period.	This condition has not been closed during the reassessment. As such, it has been rewritten and addressed as a new certification. See new Condition 4.

31a Refine knowledge of sub-stock structure of Copper salmon. Incorporate information as appropriate into stock productivity estimates and refinement of escapement goals.	Copper/ Bering Drift Gillnet	PI 1.1.3.2 The fishery does not meet the 80 scoring guideposts with respect to the escapement goals taking into account variability in the productivity of each component of the target stocks.	Chinook salmon genetic stock identification studies are underway and will be continued. Gulkana hatchery sockeye are marked with strontium and recovered through sampling of the commercial fishery to ensure that hatchery contributions through time are factored into management and do not impact wild stocks. AFDF has been advised that this program will be continued. DNA baselines for sockeye salmon will need to be developed before any mixed stock fishery analysis can occur using this approach. ADF&G has advised AFDF that they will begin to develop the sockeye salmon baseline. AFDF will provide a report by July 2009, produced by ADF&G, on Chinook salmon stock identification using DNA, sockeye salmon hatchery stock identification using strontium, and progress on sockeye salmon DNA development.	This condition was to be completed in 2011 and evaluated during 4th surveillance audit. However, the need for extra data collection means that this condition will not now be closed out during the course of this certificate due to its complexity. Instead, the condition may now be closed during the re-certification process or early in the next certificate period.	ADF&G conducted extensive genetic studies, created a baseline data set, and uses these data to identify component stocks in the commercial fishery (Ackerman *et al*. 2010, Ackerman *et al*. 2011, Templin *et al*. 2011a). These studies complement earlier studies using genetics and radio telemetry (Savereide 2005, Templin *et al*. 2008) such that this condition is considered closed.

58 Provide a report that defines the geographic range of all target stocks and provide an explanation of how escapements for all target stocks are adequately monitored through direct or indirect means.	Peninsula / Aleutian	PI 1.1.1.3 Harvests are monitored during the fishing season, but the geographic range for harvests of all target stocks is not completely defined, and therefore not all 80 scoring guideposts are met for this indicator	Information on stocks harvested in the South Alaska Peninsula June fishery, SEML sockeye, post June chum, pink and coho fisheries is based on tagging, genetics, run timing, proximity of stocks and location of fisheries. Similar information exists for the North Peninsula fisheries; however for northern areas of North Peninsula and South Peninsula post June sockeye, additional stock identification studies may be required. AFDF has been advised that sample collection for both sockeye and chum salmon in these areas is ongoing as a part of ADF&Gs overall research program. Detailed genetic stock identification studies are underway but results will not be reported until fall 2012 in part because ADF&G (with University of Washington) is developing a new genetic baseline using single nucleotide polymorphisms (SNPs). The WASSIP genetic program is a large, comprehensive program that involves both chum and sockeye salmon throughout western Alaska. The delay in meeting this condition is well worth the wait because ADF&G has devoted substantial resources to this project and because the information is important for harvest management in the coming years.	This was scheduled to be closed out in the 3rd audit. However, the Condition is complex and new, important work has been proposed that will not be completed until fall 2012. A As such, this condition will not be closed out during the course of this certificate. Instead, the condition should now be closed early in the next certification period.	This condition has been met with the submission of the findings of the WASSIP program (http://www.adfg.alaska.gov/index.cfm?adfg=wassip.reports). The WASSIP data have provided extensive documentation of the escapement and stock composition of catch throughout this region Stocks are now well defined in terms of timing and geographic range, and they can be effectively managed and conserved.

62 Support additional investigations of hatchery chum straying into natural production areas, including streams that are close to release sites and some streams distant from release sites.	All	PI 2.2.2 Straying of hatchery salmon	AFDF believes that this condition is being met by ADF&G activities directed at meeting Conditions 3, 11, 15 and 24. AFDF has been informed that initial investigations into straying of hatchery fish into wild stock spawning areas have occurred in Prince William Sound for pink and chum salmon and in Kodiak for sockeye salmon as part of ADF&Gs normal research program. ADF&G has reported that additional work will be carried out as part of meeting Conditions 3, 11, 15 and 24. Based on the results of these studies, ADF&G will assess the need to continue, expand or reduce the scope of these studies, and provide AFDF with this assessment. A summary of ADF&Gs findings and its estimate of further work will be provided to AFDF as the other conditions are met. AFDF will provide this needs assessment to the surveillance team as received.	This was scheduled to be closed out by the 4th audit. ADF&G is now undertaking additional work that should support the closure of this condition. However, this condition will not be closed out during the course of this certificate. Instead, the condition may now be closed during re-certification or early in the next certificate period.	The report by Piston & Heinl (2011a, 2012a,b) provided documentation of hatchery straying rates into natural production areas. Therefore this condition is considered closed. Additional issues remain because of the high straying rate, however, and these issues are identified in new conditions (4 and 5- SEAK, and 8 and 9- Kodiak) included in this reassessment.

63 Implement effective hatchery management practices needed to minimize hatchery impacts on the genetic diversity and productivity of wild pink and chum stocks in Prince William Sound. Effective measures will include: 1) evaluate various on site and remote release strategies to identify those that cause significant straying of hatchery-produced fish into natural production areas, 2) substantially reduce undesirable straying by improving or eliminating appropriate strategies, and 3) avoidance of hatchery selection practices that alter genetic and life history characteristics of the hatchery stocks relative to the local wild stocks.	Prince William Sound	PI 2.2.2 The fishery does not fully meet the 80 benchmark for performance due to concerns as to how uncertainty is taken into account.	AFDF has been told that ADF&G recently conducted an Internal Review of Prince William Sound Aquaculture Corporation (PWSAC) hatchery operations and developed an action plan to help improve those operations. The Action Plan has been provided by AFDF after the first annual surveillance. AFDF believes that Condition 63 will also be met through meeting Conditions 66 and 67, which call for formal hatchery reviews and a comprehensive, formal, written and externally reviewed evaluation of how the enhancement programs in Prince William Sound protect and sustain the genetic structure and productivity of natural stocks in the area as well as updating the PWS regional management and enhancement plan.	This condition was expected to be closed in the 3rd surveillance audit. However, additional data collection and analysis is now required, such that this condition will not now be closed out during the course of this certificate. A new condition will likely be raised.	The PWS UoC remains in assessment at this time.

67 (related to 66) Complete a comprehensive, formal, written, and externally-reviewed evaluation of how the enhancement programs in Prince William Sound protect and sustain the genetic structure and productivity of natural stocks in the area. The review should include an explanation of how the current programs are consistent with current scientific information on hatchery risks to wild stocks, statewide policies, and hatchery practices in other regions of Alaska. Based on this review, update the comprehensive regional management and enhancement plan to include appropriate policies, objectives, and practices comparable to those identified in the comprehensive enhancement plan for southeast Alaska.	Prince William Sound	PI 3.1.10 Uncertainty as to whether existing hatchery protocols and agreements have provided adequate protection for wild stocks in Prince William Sound. The Prince William Sound hatchery program has not been subjected to a formal and comprehensive review or analysis of consistency with current policies.	AFDF will interface with ADF&G while, in cooperation with the PWS/CBR Regional Planning Team and PWSAC, they conduct a review of the PWS enhancement programs. Revisions of the PWS comprehensive plan may or may not result from this review. AFDF will provide the surveillance team with periodic updates in developments stemming from this review as advised by ADF&G.	This was scheduled to be closed at the 3nr annual surveillance audit. However, the schedule for PWS hatchery review means that this condition will not now be closed out during the course of this certificate. Instead, the condition may now be closed during the re-certification process or early in the next certificate period.	The PWS UoC remains in assessment at this time.

3.1.2 Harmonised Fishery Assessment

The MSC requires that assessments are harmonised for fisheries that overlap. An overlap occurs when some or all of the same stock, environmental and/or management concerns covered by MSC Principles 1, 2 and/or 3 are the same as that/those of another MSC certified fishery or fishery in assessment. In essence, harmonisation requires that the assessment trees used are the same or complementary, and that outcomes with respect to evaluation, scoring and conditions are consistent between the fisheries. Full details are available in the Section 27.4.13 and Annex CI of the CR (MSC 2012).

3.1.3 Fisheries of potential harmonisation relevance

There are a number of MSC fisheries that may be considered to be of potential harmonisation relevance with respect to Alaska salmon fisheries. These are shown in Table 9, below. It is noted that the previous assessment of the Alaska salmon fisheries cannot be compared directly, PI by PI, against this new assessment because the previous assessment was undertaken against a non-standard, pre-FAM assessment tree.

Table 9: MSC fisheries of potential harmonisation relevance to the Alaska salmon fisheries.

N.B. Information on certification status was accurate (as published on the MSC website) up to October 15th, 2012.

Fishery	Species	Stock/Region	Certified	Relevant to harmonisation?
Annette Island	Chum salmon (*O. keta*) Coho salmon (*O. kisutch*) King salmon (*O. tchawytscha*) Pink salmon (*O. gorbuscha*)	Waters of the Annette Islands Reserve, Southeast Alaska.	Yes (June 2011)	Yes (Same geographic region and management)
British Columbia	Pink salmon (*O. gorbuscha*)	Canadian Pacific EEZ and British Columbia Coastal Waters	Yes (July 2011)	Yes (Different stock but same region)
British Columbia	Sockeye salmon (*O. nerka*)	Canadian Pacific EEZ and British Columbia Coastal Waters	Yes (July 2010)	Yes (Different stock but same region)
British Columbia	Chum salmon (*O.keta*)	Canadian Pacific EEZ and British Columbia Coastal Waters	Yes (Dec 2012)	Yes (Different stock but same region)
Iturup Island	Pink salmon (*O. gorbuscha*) Chum salmon (*O. keta*)	Iturup Island, Russia	Yes (September 2009)	No (Different stock and region)
Ozernaya River	Sockeye salmon (*O. nerka*)	Ust-Bolsheretsk district, Ozernaya River, Russia	Yes (September 2012)	No (Different stock and region)

Sakhalin Island	Pink salmon (*O. gorbuscha*)	East Sakhalin Island, Russia	Yes (June 2012)	No (Different stock and region)
Hokkaido Fall set net	Chum salmon (*O. keta*)	Coastal waters off the county of Kitami, Hokkaido Island, Japan	No (Site visit undertaken, April 2012)	No (Different stock and region)
Sakhalin Island Aniva Bay trap net	Pink salmon (*O. gorbuscha*)	East Sakhalin Island, Russia	No (Peer reviewers proposed July 2012)	No (Different stock and region)

The Annette Island Reserve fishery and the three British Columbia salmon fisheries were the only MSC fisheries that were considered to be of harmonisation relevance to the Alaska salmon fishery, with the Annette Island Reserve fishery being the only one that used a FAM-based assessment tree similar to the one used in reassessing the Alaska salmon fishery. Comparison with the three British Columbia fisheries is therefore hampered by the use of a non-standard tree. However, the Principle 1, 2 and 3 outcomes for these four fisheries may be compared with the new and previous assessment of the Alaska salmon fishery, and results are presented in Appendix 6.

3.1.4 Assessment Methodologies

This reassessment of the Alaska salmon fishery used the MSC Certification Requirements Version 1.3 (MSC 2013a), while the report was based on the MSC Full Assessment Reporting Template V. 1.0. A large number of changes were made to the default assessment tree in assessing the fishery against the MSC Principles and Criteria. Details on all the changes were published on the MSC website, here: http://www.msc.org/track-a-fishery/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120730_DAT_MOD.pdf (web address checked January 28th, 2012). A summary of the changes is provided below:

Principle 1 (modified)

PI 1.1.1- Stock status
PI 1.1.2- Reference points
PI 1.1.3- Stock rebuilding
PI 1.2.1- Harvest strategy
PI 1.2.3- Information and Monitoring
PI 1.2.4- Assessment of stock status

Principle 1 (added)

PI 1.3.1- Enhancement outcomes
PI 1.3.2- Enhancement management
PI 1.3.3- Enhancement information

Principle 2 (modified)

PI 2.2.1- Bycatch species- outcome
PI 2.3.1- ETP species- outcome
PI 2.3.2- ETP species- management
PI 2.3.3- ETP species- information
PI 2.4.1- Habitats- outcome
PI 2.4.2- Habitats- management
PI 2.4.3- Habitats- information
PI 2.5.1- Ecosystem- outcome
PI 2.5.2- Ecosystem- management

PI 2.5.3- Ecosystem- information

Principle 3 (modified)

PI 3.1.3- Long term objectives
PI 3.2.1- Fishery specific objectives
PI 3.2.2- Decision-making processes
PI 3.2.3- Compliance and enforcement
PI 3.2.4- Research plan
PI 3.2.5- Management and performance evaluation

The rationale behind the large number of changes made to the default assessment tree is provided in the formal announcement of the proposed changes. The changes made were a mix of those made for the Northeast Sakhalin Island and Aniva Bay salmon assessments with changes proposed for the new default MSC Salmon Fishery Assessment Methodology (SamFAM).

Stakeholder responses to the proposed modifications can be found on the MSC website, here: http://www.msc.org/track-a-fishery/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120925_Comments-State_of_the_salmon.pdf (web address checked January 28, 2013) and here: http://www.msc.org/track-a-fishery/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120925_STholder_Comments.pdf (web address checked January 28, 2013).

A response to the comments and final confirmation of the assessment tree is then included in this report as Appendix 2. Please note, however, that a change was made in the assessment to the weighting for Principle 1 in comparison to that proposed in the assessment tree. The three Principle 1 PI groups (1.1.1 − 1.1.3, 1.2.1 − 1.2.4 and 1.3.1 − 1.3.3) were each weighted ⅓, rather than 0.375, 0.375, 0.25, so that all three PI groups were weighted equally. This better reflects the importance of the enhancement component of this fishery.

3.1.5 Consultation

A number of stakeholders who previously expressed an interest in the Alaska salmon fisheries certification were contacted prior to the commencement of this latest reassessment. Other potential new stakeholders were also contacted. The full list of those individuals and organisations contacted is contained below in Table 10.

Table 10: Stakeholders and potential stakeholders contacted by e-mail prior to reassessment.

Date	Individual	Organisation
6/7/2012	Aaron Hill	Watershed Watch Salmon Society
16/7/2012	Alison Cross	WWF
6/7/2012	Allison Bidlack	Ecotrust
6/7/2012	Becca Robbins Gisclair	Yukon River
6/7/2012	Brian Caouette	Wild Salmon Center
6/7/2012	Chris Stark	University of Alaska Fairbanks
6/7/2012	David Martin	Sustainable Fisheries Partnerships
6/7/2012	Ed Backus	Ecotrust
6/7/2012	Erica McCall Valentine	Ecotrust
6/7/2012	Greg Knox	SkeenaWild Conservation Trust
6/7/2012	Greg Taylor	Pacific Salmon Foundation
6/7/2012	Heather Brandon	WWF
6/7/2012	James Brady	HDR Inc.
6/7/2012	Janis Ivanoff	Norton Sound Economic Development Corporation
6/7/2012	Jeffrey Young	David Suzuki Foundation

Date	Individual	Organisation
6/7/2012	Jerry Isaac	Tanana Chiefs Conference
6/7/2012	Karen Gillis	Bering Sea Fishermen's Association
6/7/2012	Kurt Beardslee	Wild Fish Conservancy
6/7/2012	Loretta Bullard	Kawerak Incorporated
6/7/2012	Mark Hersh	Wild Fish Conservancy
6/7/2012	Mark Vinsel	UFA-fish
6/7/2012	Misty MacDuffee	Raincoast Conservation Foundation
6/7/2012	Morgen Crow	Coastal Villages Region Fund
6/7/2012	Myron Naneng	Association of Village Council Presidents
6/7/2012	Nick Gayeski	Wild Fish Conservancy
6/7/2012	PWSAC	Prince William Sound Aquaculture Corporation
6/7/2012	Ragnar Alstrom	Yukon Delta Fisheries Development Association
6/7/2012	Ralph Andersen	Bristol Bay Native Association
6/7/2012	Randy Ericksen	State of the Salmon
6/7/2012	Robin Samuelson	Bristol Bay Economic Development Corporation
6/7/2012	Southeast Alaska Fishermen's Alliance	-
6/7/2012	Stephanie Bradley	WWF
6/7/2012	Tom Pickerell	Monterey Bay Aquarium
6/7/2012	Virgil Umphenour	-

3.1.6 Site visit

Dates for the site visit were advertised on the MSC website (Appendix 3), with the reassessment team being available to meet with stakeholders in Seattle, Washington on the 18th and 19th of October 2012, and Anchorage, Alaska on the 22nd and 23rd of October 2012. A number of stakeholders asked to meet with the team, and the details of those meetings are listed in Table 11, below. Meetings were also held with ADF&G staff on the 24th and 26th of October 2012; key topics of interest are included in Table 11, below. Two written submissions were received prior to the site visit, as shwown in Appendices 7 and 8, while Appendix 9 includes summary details of meetings held with NGO stakeholders (Skeena Wild Conservation Trust, Watershed Watch Salmon Society, Wild Fish Conservancy and Raincoast Conservation Foundation in one meeting, and State of the Salmon and Sustainable Fisheries Partnerships as separate meetings.)

Table 11: Topics of interest at meetings held with stakeholders during the site visit.

Date	Individual	Organisation	Topics of Interest
18th Oct 2012	Rob Blyth-Skyrme	Intertek Moody Marine	▪ Non-local Chinook catches in the Southeast ▪ Impact of troll fisheries on size and age of returning fish ▪ Ocean ranching in SEAK and PWS ▪ Condition setting and existing conditions ▪ Target salmon species and take of non-target and bycatch salmonid species ▪ ETP species ▪ Application of the precautionary principle
	Greg Ruggerone	Intertek Moody Marine	
	Dana Schmidt	Intertek Moody Marine	
	Jim Seeb	Intertek Moody Marine	
	Greg Knox	SkeenaWild Conservation Trust	
	Aaron Hill	Watershed Watch Salmon Society	
	Nick Gayeski	Wild Fish Conservancy	
	Kurt Beardslee	Wild Fish Conservancy	
	Misty MacDuffee	Raincoast Conservation Foundation	
	Dan Averill	MSC	
	Jim Humphreys	MSC	
	Wes Toller	ASI	
22nd Oct	Rob Blyth-Skyrme	Intertek Moody Marine	▪ Non-local Chinook catches in the Southeast ▪ Ocean ranching, straying and marking fish ▪ Hatchery planning and program review
	Greg Ruggerone	Intertek Moody Marine	
	Dana Schmidt	Intertek Moody Marine	

Date	Individual	Organisation	Topics of Interest
2012	Jim Seeb	Intertek Moody Marine	▪ Condition setting ▪ Stocks of concern in Southeast Alaska ▪ Ocean productivity and cumulative impact of Pacific hatcheries
	Randy Ericksen	State of the Salmon	
	Rich Lincoln	State of the Salmon	
	Dan Averill	MSC	
	Megan Atcheson	MSC	
23rd Oct 2012	Rob Blyth-Skyrme	Intertek Moody Marine	▪ Further increases in ocean ranching ▪ Apparent removal of a 2009 PWSAC review document ▪ Capture of non-local salmon, including from ESA-listed runs ▪ Ocean productivity and need for precautionary management across N.Pacific
	Greg Ruggerone	Intertek Moody Marine	
	Dana Schmidt	Intertek Moody Marine	
	Jim Seeb	Intertek Moody Marine	
	David Martin	Sustainable Fisheries Partnerships	
	Dan Averill	MSC	
	Megan Atcheson	MSC	
24th Oct 2012	Rob Blyth-Skyrme	Intertek Moody Marine	▪ Progress on existing conditions ▪ Escapement goal review process ▪ Hatchery management review process ▪ Changes to fishery management and monitoring processes ▪ Progress on straying studies ▪ WASSIP ▪ Test fishery data availability ▪ Lost gear regulations
	Greg Ruggerone	Intertek Moody Marine	
	Dana Schmidt	Intertek Moody Marine	
	Jim Seeb	Intertek Moody Marine	
	Jeff Regnart	ADF&G	
	Eric Volk	ADF&G	
	Bob Kehoe	PSVOA	
	Doug Molyneaux	PSVOA	
	Megan Atcheson	MSC	
26th Oct 2012	Rob Blyth-Skyrme	Intertek Moody Marine	▪ Development of escapement goals for increasingly targeted runs ▪ Hacthery marking programs ▪ Non-Alaskan salmon stocks taken in Alaska ▪ ESA-listed runs ▪ Steelhead and other bycatch species
	Greg Ruggerone	Intertek Moody Marine	
	Dana Schmidt	Intertek Moody Marine	
	Jim Seeb	Intertek Moody Marine	
	Jeff Wadley (phone)	ADF&G	
	Scott Kelley (phone)	ADF&G	
	Bill Templin	ADF&G	
	Eric Volk	ADF&G	
	Bob Kehoe	PSVOA	
	Doug Molyneaux	PSVOA	
	Dan Averill	MSC	
	Megan Atcheson	MSC	

3.1.7 Evaluation Techniques

The team reassessing the Alaska salmon fisheries is comprised of individuals with a demonstrably long history of involvement in Pacific salmon fishery science and management at a senior level. The scoring process for the assessment involved undertaking a preliminary scoring review immediately following the site visit, where initial findings were discussed. A follow-up scoring meeting was then held in Seattle from the 15th to the 18th of January, 2013, where team members were able to review text for the different UoCs and confirm scoring.

The assessment team members were responsible for scoring the Principle 1 UoCs as leads for specific areas, with a combined drafting process undertaken for Principle 2 and 3 PIs. Each team member reviewed and confirmed their agreement with the findings and the scores awarded for the other sections. Hence, it is important to note that while each assessment team member led the assessment of the fishery for specific UoCs, the team as a whole has taken responsibility for the final score awarded to each PI. With respect to setting the conditions of certification, the assessment team was guided by the CR V.1.2 (MSC 2012) while also closely considering the findings of the previous reassessment of the Alaska salmon fisheries. It may also be noted that the MSC's risk-based framework (RBF) was not used in scoring any PI of Alaska salmon fishery.

4 Traceability

4.1 Eligibility Date

The target eligibility date (TED) shall be the 1st February 2013. This date is selected because it is prior to the commencement of the 2013 fishery, making it logical with respect to products from the certified fishery entering the supply chain.

4.2 Traceability within the Fishery

All landings from the Alaska salmon fishery are recorded and reported through fish tickets. Processing occurs at shore-side plants and on at-sea processing vessels, where landings are monitored by fishery enforcement officers and recorded by the licensed processing facility. Most landings are made to tenders (i.e., are trans-shipped) and transported to processing facilities. Processors control the transport of their products from landing locations to processing facilities.

There is no potential for vessels to fish outside any particular UoC or for non-certified fish to be substituted for certified fish because of the management and enforcement processes employed in the fishery that minimises opportunities for fishing contrary to permit specifications. Alaska law allows for a salmon vessel to fish in only one salmon region per year. On some occasions, tender vessels may transport fish harvested in one UoC to a distant processing facility receiving fish from a different UoC. However, state and local taxing requirements necessitate that the fish are recorded and reported to the area of actual harvest (i.. the ADF&G management area). In the event that a tender vessel collected fish from different UoCs, such fish would have to be stored and transported separately.

4.3 Eligibility to Enter Further Chains of Custody

It is concluded that any certified products from the fishery would be clearly identifiable and would be eligible to enter further certified chains of custody. The fishery certification will end, and chain of custody begin, at the point at which landings are made from fishing vessels to a named processing facility or to a tender or other collecting vehicle of a named processing facility (i.e., at the point of change of ownership).

To continue a chain of custody, all named processing companies will require separate Chain of Custody (CoC) certification.

A list of parties and eligible points of landing will be provided in due course.

4.4 Eligibility of IPI stocks to enter further Chains of Custody

The Pacific salmon species that were considered to meet IPI requirements and are therefore eligible to enter further chains of custody are shown in Table 12, below.

Only catches from SEAK and Yakutat were considered to include fish that were IPI as non-local stocks. In addition to Canadian sockeye taken in SEAK, Chinook taken in these two UoCs may be derived from Canadian or other US (i.e., Washington, Oregon and California) runs, including from four Endangered Species Act (ESA)-listed runs. These ESA-listed Chinook runs are the Puget Sound, Upper Willamette River, Snake River fall and Lower Columbia River bright runs. These are included in this IPI group because of their ESA-listed status and because it is impossible to quickly or simply separate these species out from the catch of other fish of the same species, even if they are taken.

It is noted that, to comply with provisions of the 1999 Pacific Salmon Treaty (PST) Agreement, to improve Chinook stock assessment and modeling, and to help facilitate MSC examination of Alaska's salmon fisheries, ADF&G conducted two related Chinook research studies in the Southeast Alaska Region during the 2004 and 2005 fishing seasons:

A) Estimate the stock composition of the Chinook salmon harvest by genetic analysis of tissue samples.
B) Estimate the incidental mortality of Chinook salmon intercepted in the fishery from the numbers of Chinook salmon caught and released by purse seine.

These tissue samples provide ADF&G with first-time estimates of the stock composition of the entire catch of Chinook salmon in the drift gillnet fishery, both region wide and by district, and will provide benchmark estimates to compare with the PSC Chinook Model. In the past ADF&G produced partial estimates of the stock composition from coded-wire tags. CWT data provided estimates of ESA salmon captured in SEAK salmon fisheries. More details on the approach to IPI species is found in Section 2.4.3.

Table 12: Pacific salmon species considered against non-local and non-target IPI criteria. Dark-shaded cells signify targeted species.

Unit of Certification		Sockeye	Chinook	Coho	Pink	Chum
1	SEAK	Non-local IPI	Non-local IPI	Non-local IPI	Non-local IPI	Non-local IPI
2	Yakutat	Non-local IPI	Non-local IPI	Non-local IPI		**Non-target IPI**
3	Prince William Sound		**Non-target IPI**	**Non-target IPI**		
4	Copper/Bering Districts				**Non-target IPI**	**Non-target IPI**
5	Lower Cook Inlet		**Non-target IPI**	**Non-target IPI**		
6	Upper Cook Inlet					
7	Bristol Bay			**Non-target IPI**		
8	Yukon River	**Non-target IPI**			**Non-target IPI**	
9	Kuskokwim				**Non-target IPI**	
10	Kotzebue	**Non-target IPI**	**Non-target IPI**	**Non-target IPI**	**Non-target IPI**	
11	Norton Sound					
12	Kodiak					
13	Chignik					
14	Peninsula and Aleutians		**Non-target IPI**			

5 Evaluation Results

5.1 Principle Level Scores

Table 13: Final Principle level scores

Unit of Certification		Principle	Score	Pass?
1	Southeast Alaska	P1 - Target Species	80.7	Yes
		P2 - Ecosystem	81.0	
		P3 - Management System	93.5	
2	Yakutat	P1 - Target Species	97.1	Yes
		P2 - Ecosystem	83.7	
		P3 - Management System	96.5	
3	Prince William Sound	P1 - Target Species	-	Still in assessment
		P2 - Ecosystem	-	
		P3 - Management System	-	
4	Copper/Bering Districts	P1 - Target Species	82.4	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	93.5	
5	Lower Cook Inlet	P1 - Target Species	91.0	Yes
		P2 - Ecosystem	86.0	
		P3 - Management System	91.5	
6	Upper Cook Inlet	P1 - Target Species	94.3	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	94.5	
7	Bristol Bay	P1 - Target Species	98.9	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
8	Yukon River	P1 - Target Species	91.7	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
9	Kuskokwim	P1 - Target Species	91.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
10	Kotzebue	P1 - Target Species	88.3	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
11	Norton Sound	P1 - Target Species	84.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
12	Kodiak	P1 - Target Species	82.5	Yes
		P2 - Ecosystem	85.3	
		P3 - Management System	93.5	
13	Chignik	P1 - Target Species	87.1	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
14	Peninsula/Aleutian Islands	P1 - Target Species	97.4	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	

5.2 Summary of Scores

Table 14: Summary of Performance Indicator scores for Units of Certification 1 – 7.

Principle	Component	PI No.	1: SEAK	2: Yakutat	3: PWS (still being assessed)	4: Copper / Bering	5: LCI	6: UCI	7: Bristol Bay
1	Outcome	1.1.1	90	90	-	80	90	90	100
		1.1.2	90	95	-	95	85	90	90
		1.1.3	N/A	N/A	-	N/A	N/A	90	100
	Management	1.2.1	95	100	-	100	100	95	100
		1.2.2	80	100	-	90	100	100	100
		1.2.3	90	100	-	100	100	100	100
		1.2.4	90	95	-	95	95	90	100
	Enhancement	1.3.1	60	100	-	60	80	100	100
		1.3.2	70	100	-	70	90	100	100
		1.3.3	60	100	-	60	90	90	100
2	Retained species	2.1.1	80	80	-	100	100	100	100
		2.1.2	80	80	-	100	100	100	100
		2.1.3	80	80	-	100	100	100	100
	Bycatch species	2.2.1	80	80	-	80	80	80	80
		2.2.2	80	80	-	80	80	80	80
		2.2.3	80	80	-	80	80	80	80
	ETP species	2.3.1	80	80	-	80	80	80	80
		2.3.2	80	80	-	80	80	80	80
		2.3.3	80	80	-	80	80	80	80
	Habitats	2.4.1	90	90	-	90	90	90	90
		2.4.2	80	85	-	80	85	80	80
		2.4.3	80	80	-	80	80	80	80
	Ecosystem	2.5.1	90	100	-	90	90	90	100
		2.5.2	75	90	-	85	85	85	90
		2.5.3	80	90	-	80	80	80	90
3	Governance and policy	3.1.1	100	100	-	100	100	100	100
		3.1.2	100	100	-	100	100	100	100
		3.1.3	100	100	-	100	100	100	100
		3.1.4	80	80	-	80	80	80	80
	Fishery specific management system	3.2.1	80	100	-	80	80	80	100
		3.2.2	90	90	-	90	90	90	90
		3.2.3	100	100	-	100	80	100	100
		3.2.4	100	100	-	100	100	100	100
		3.2.5	90	100	-	90	90	100	100

Overall weighted scores	Total	Total	Total	Total	Total	Total	Total
Principle 1 - Target species	80.7	97.1	-	82.4	91.0	94.3	98.9
Principle 2 - Ecosystem	81.0	83.7	-	85.7	86.0	85.7	87.3
Principle 3 - Management	93.5	96.5	-	93.5	91.5	94.5	96.5

Table 15: Summary of Performance Indicator scores for Units of Certification 8 – 14.

Principle	Component	PI No.	8: Yukon	9: Kuskokwim	10: Kotzebue	11: Norton Sound	12: Kodiak	13: Chignik	14: Peninsula / Aleutians
1	Outcome	1.1.1	90	80	80	80	90	80	90
		1.1.2	90	90	80	90	80	60	95
		1.1.3	N/A	N/A	N/A	N/A	80	N/A	95
	Management	1.2.1	95	95	95	90	95	90	100
		1.2.2	80	80	80	90	100	100	100
		1.2.3	80	90	80	80	100	100	100
		1.2.4	85	90	85	90	95	95	95
	Enhancement	1.3.1	100	100	100	80	60	100	100
		1.3.2	100	100	100	80	80	100	100
		1.3.3	100	100	100	80	60	100	100
2	Retained species	2.1.1	100	100	100	100	100	100	100
		2.1.2	100	100	100	100	100	100	100
		2.1.3	100	100	100	100	100	100	100
	Bycatch species	2.2.1	80	80	80	80	80	80	80
		2.2.2	80	80	80	80	80	80	80
		2.2.3	80	80	80	80	80	80	80
	ETP species	2.3.1	80	80	80	80	80	80	80
		2.3.2	80	80	80	80	80	80	80
		2.3.3	80	80	80	80	80	80	80
	Habitats	2.4.1	90	90	90	90	90	90	90
		2.4.2	80	80	85	80	85	85	80
		2.4.3	80	80	80	80	80	80	80
	Ecosystem	2.5.1	100	100	100	100	90	100	100
		2.5.2	90	90	90	90	75	90	90
		2.5.3	90	90	90	90	80	90	90
3	Governance and policy	3.1.1	100	100	100	100	100	100	100
		3.1.2	100	100	100	100	100	100	100
		3.1.3	100	100	100	100	100	100	100
		3.1.4	80	80	80	80	80	80	80
	Fishery specific management system	3.2.1	100	100	100	100	80	100	100
		3.2.2	90	90	90	90	90	90	90
		3.2.3	100	100	100	100	100	100	100
		3.2.4	100	100	100	100	100	100	100
		3.2.5	100	100	100	100	90	100	100

Overall weighted scores	Total	Total	Total	Total	Total	Total	Total
Principle 1 - Target species	91.7	91.2	88.3	84.2	82.5	88.7	97.4
Principle 2 - Ecosystem	87.3	87.3	87.7	87.3	85.3	87.7	87.3
Principle 3 - Management	96.5	96.5	96.5	96.5	93.5	96.5	96.5

5.3 Summary of Conditions

The summaries below indicate the specific text of the conditions only and indicate the key areas of performance to be addressed. Further information relevant to each condition is provided in the text of the associated PIs, and in the more detailed explanatory text as provided in Appendix 4.

In recognition of their interlinked nature and in order to minimise repetition, the text of a number of conditions was drafted to address deficiencies identified across two or more PIs. A variation request was accepted by MSC on this variation from the normal MSC requirement on wording conditions.

In addition, the timeline for Condition 1 extends the period of time available for meeting this condition to beyond the period of the certification, due to 'exceptional circumstances' (CR 27.11.8, MSC 2013a). In this cases, the exceptional circumstances relate to the life cycle of chum salmon, and therefore to the time taken for data to be collected and made available for the study, as detailed in the Condition.

Table 16: Summary of conditions

Condition number	UoC	Condition	Performance Indicator	Related to previously raised condition? (Y/N/N/A)
1	1: SEAK	By the end of **2023**, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG 80a) It is highly likely that the chum salmon enhancement activities in SEAK do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.	1.3.1	No
2	1: SEAK	By the end of the **fourth** year of certification, the SG 80b scoring requirements must be met for chum salmon. This will be achieved when it has been demonstrated that: a) (PI 1.3.2, SG 80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).	1.3.2	No
3	1: SEAK	By the end of the **fourth** year of certification, the SG 80 scoring requirements for PI 1.3.3, and the SG80e scoring requirements for PI 2.5.2 must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. b) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild stock status,	1.3.3 2.5.2	No

		productivity and diversity. c) (PI 2.5.2, SG80e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.		
4	5: Copper/ Bering Districts	By the end of the **fourth** year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG80a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon, b) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement), c) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock, and d) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild sockeye stock status, productivity and diversity.	1.3.1 1.3.2 1.3.3	Yes (existing Condition 29)
5	12: Kodiak	By the end of the **fifth** year of certification, the SG 80 scoring requirements for PI 1.3.1 and PI 1.3.3, and the SI 80e requirements for PI 2.5.2, must be met in full. With respect to the current hatchery programs at Pillar Creek and Kitoi Bay for Chinook, coho, pink and chum salmon, this will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG80a) it is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. b) (PI 1.3.3, SG80a) sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. c) (PI 1.3.3, SG80b) the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. d) (PI 2.5.2, SG80e) there is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.	1.3.1 1.3.3 2.5.2	No
6	13: Chignik	By the end of the **fourth** year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.1.2, SG80a) Reference points are appropriate for the	1.1.2	No

		wild stock and can be estimated, b) (PI 1.1.2, SG80b) The limit reference point (e.g., lower end of the Sustainable Escapement Goal or equivalent) is set above the level at which there is an appreciable risk of impairing reproductive capacity, c) (PI 1.1.2, SG80c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome. d) (PI 1.1.2, SG80e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.		

5.4 Recommendations

The assessment team had no recommendations.

5.5 Determination, Formal Conclusion and Agreement

At the Final Determination Report stage, the assessment team considers that the Alaska salmon fishery (13 UoCs, not including the Prince William Sound (PWS) UoC) should be recertified. This is confirmed and agreed by Intertek Moody Marine's Independent Board. It is therefore determined that the Alaska salmon fishery (13 UoCs, not including the Prince William Sound (PWS) UoC) be recertified according to the Marine Stewardship Council's Principles and Criteria for Sustainable Fisheries.

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Appendix 1: Performance Indicator scores and rationale.

Principle 1

P1: UoC 1 – SEAK

Evaluation Table PI 1.1.1 – UoC 1: SEAK

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			In the Southeast Alaska fishery, non-Southeast Alaska sockeye, Chinook, coho, pink and chum will be considered as Inseparable/Practically Inseparable (IPI) species, and will therefore be addressed under the Performance Indicators under Principle 2. The fishery exceeds this level of performance. See discussion of chum salmon under SG 80.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, Chinook, coho, pink and chum salmon have generally exceeded the lower end of the TRP (escapement goal (SEG)) in each of the past 10 years (Munro & Volk 2012). The stocks are consistently well above a level that might cause recruitment to be impaired. One exception where harvest management may be an issue is Hugh Smith Lake, where sockeye escapements fell below the lower goal range in 2002, 2008 and 2009 (Hugh Smith sockeye was a stock of management concern from 2003 to 2006, despite the OEG set by the BOF, allowing hatchery fish to be included in the escapement goal). Hatchery stocking has since been discontinued and escapements of sockeye have been above the lower goal since 2010 with no returns of hatchery fish. If, in the future, directed or non-directed fisheries continued to have significant harvest rates on wild fish when the escapement goal was being maintained by hatchery returns, this fishery would likely fail at the SG 60 level of performance. Because, currently, the wild stock is above the point where recruitment would be impaired, the sockeye fishery is considered to exceed this scoring issue. McDonald Lake sockeye have also failed to meet escapement goals from 2006 to 2009 and was also designated as a stock of management concern. However, returns have rebounded in 2010 and 2011 and were removed as a stock of concern in 2012 because of the strength of natural run returns and strong fry production in the lake (Heinl *et al*. 2011). During 2008, many of the SEAK sockeye salmon fisheries did not meet their targeted escapement goals because of widespread weak run returns. This appears to be primarily related to marine survival conditions rather than to any management actions (Munro & Volk 2012). The overall trend indicates the stocks are consistently well above a level that might cause recruitment to be impaired. Chum salmon have failed to meet escapement goals in Northern Southeast Inside (NSI) subarea for all of the years 2009 - 2011. The NSI area is also an area where hatchery enhancement of chum salmon has led to high levels of straying.

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PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
			This escapement goal was reduced in 2012 by the addition of additional historical data to the database. However, two of the three previous years (2009-2010) would have failed to meet this revised escapement level. Region wide returns of Pacific sockeye salmon stocks have reduced in recent years relative to previous years (Peterman & Dorner 2011). Escapements would have exceeded the current escapement goal 5 of the last 9 year using the original goal and 6 of the last 9 years using the revised goal. The recent downturn in production is not unprecedented and likely reflects"" the declining productivity of the marine environment in SEAK. Most of the other seven chum escapement goals in SEAK have been met during the past 5 yrs.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, Chinook, coho and pink salmon. (Munro & Volk 2012). Chum salmon have fluctuated around the recent escapement target, but not in the most recent three years in the NSI subarea, and that escapement goal has recently been reduced (Piston & Heinl 2011a, 2012a, 2012b). The assessment team notes that the target reference point (lower bound of the escapement goal), which serves in Alaska fisheries as a limit reference point, is being based on a time series of return rates, rather than on evidence that may reflect negative interactions with the large remote releases of hatchery reared chum salmon. As such, the chum fishery is considered to meet this level of performance but no higher.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapement of all species has consistently exceeded 50% of the lower bound of the escapement goal range in the last ten years, and there is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired (MSC 2012a). The fishery meets this level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, Chinook, coho and pink salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in each of the past 10 years (Munro & Volk 2012). Chum salmon, and therefore the SEAK fishery overall, does not meet this level of performance.
References			Heinl *et al*. (2011), Munro & Volk 2012, MSC (2012a), Peterman & Dorner (2011), Piston & Heinl (2011a), Piston & Heinl (2012a), Piston & Heinl (2012b).

Stock Status relative to Reference Points for each UoC

SEAK	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	effective and precautionary LRP.		above the escapement goal the majority of the time. Because the lower bound of the escapement goals is highly precautionary, the stock status indicates that there is a low probability of recruitment overfishing (see Munro & Volk 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 1: SEAK

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The SEAK fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye (Heinl *et al* 2011), Chinook (Der Hovanisian *et al*. 2011), coho (Shaul *et al*. 2011), chum (Piston & Heinl 2011a) and pink (Piston & Heinl 2011b) salmon and were reviewed in Munro & Volk (2012). Escapement goals have been used to manage the fishery for 10 or more years except for chum salmon, which have been in place for four years. Chum salmon escapement goals were revised downward in 2012 (Piston & Heinl 2011a), based on inclusion of additional data from earlier years. The assessment team has concern with methods of escapement goal estimation for chum salmon that depend upon relative return rates over time when the return rates may be impacted by competition with hatchery remote releases, spawning ground competition or genetic impacts of outbreeding or inbreeding depression. Piston and Heinl (2012a, 2012b) estimated high rates of straying in NSI near 10% with ranges from 0-65%, based on a subsample of streams investigated for hatchery otolith marks. Total harvests of chum salmon from hatchery stocks in SEAK exceed 75% of the total harvest (Vercessi 2012) and are approaching levels where there is concern that the hatchery releases will impact wild stock production. Therefore, the key issue is the need to remove hatchery strays from the spawner count when evaluating performance against the goal. Piston & Heinl (2012b) evaluated the effect of hatchery strays on the escapement goal, which is determined by the percentile method, and concluded that hatchery strays since 1990 had a minimal effect on the determination of the escapement goal level. This was because the time series used for escapement goal evaluation extended back to the 1960s. Overall, fishery meets this level of performance for this PI.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goal approach for sockeye, Chinook, coho, pink and chum establishes an effective LRP for these species, the lower bounds of which are set above the level at which there is an appreciable risk of impairing reproductive capacity. The fishery exceeds this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production; this is consistent with the intent of this SI. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region [sockeye (Heinl *et al*. 2011), Chinook (Der Hovanisian *et al*. 2011), coho (Shaul *et al*. 2011), chum (Piston & Heinl 2011a) and pink (Piston & Heinl 2011b)]. The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. The fishery exceeds this level of performance for sockeye, Chinook, coho and pink salmon. For chum salmon, escapement goals estimation is based on a percentile method and, in recent years, a significant amount of hatchery straying has occurred. However, the stocks have been maintained at a level consistent with high yields and, consequently, the chum fishery meets this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. However, the increased releases of hatchery fish and their common property harvests in Southeast Alaska have created additional concerns for wild stocks and their subcomponents that are addressed under PI 1.3.1.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			The escapement goal approach used by ADF&G in the SEAK Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The SEAK Troll fishery harvest rates of a broad range of terminal stocks are low and follow allocation criteria established by the US Canada Treaty (PSC 2012).
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the SEAK Management Area is such that the stocks of sockeye, Chinook, coho and pink salmon are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. However, the chum fishery, and therefore this UoC overall, does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the SEAK Management Area provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high degree of certainty.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Der Hovanisian *et al*. (2011), Eggers *et al*. (2011), Heinl *et al*. (2011), Munro & Volk (2012), Piston & Heinl (2011a), Piston & Heinl (2011b), Piston & Heinl (2012a), Piston & Heinl (2012b), PSC (2012), Shaul *et al*. (2011), Vercessi (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 1: SEAK

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no stocks of concern in the SEAK UoC.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no stocks of concern in the SEAK UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			Hatchery replacements were used in the past decade for recovery of Hugh Smith sockeye salmon but have since been curtailed and that run is now made up entirely of wild stock.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no stocks of concern in the SEAK UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no stocks of concern in the SEAK UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			Hatchery replacements were used in the past decade for recovery of Hugh Smith sockeye salmon but have since been curtailed.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no stocks of concern in the SEAK UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			Hatchery replacements were used in the past decade for recovery of Hugh Smith sockeye salmon but have since been curtailed.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 1: SEAK

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			In-season harvests of each species and effort in each fishing district are monitored daily by the manager. Numerous counting weirs, aerial overflights and field foot surveys are conducted during the fishery throughout SEAK. This information is used to effectively control harvests in order to meet the TRP. For the troll fishery, harvests are closely monitored to achieve Treaty quotas and the fishery is not a factor in the conservation of these stocks at the current rate of exploitation (PSC 2012).
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance for sockeye, Chinook, coho and pink salmon. The team did not believe the effects of high hatchery composition of the catch (> 75%) on achieving past or future escapement goals for wild chum salmon have been fully evaluated. As such, the fishery can meet this level of performance but no higher for this SI.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP.
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online. Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Stocks are at or above target levels during most of the years since accurate records have been obtained. As stocks become mixed with hatchery fish, there is concern that strays and harvest rates on the mixed stocks may confound abundance based

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			management. As the effects of high hatchery composition of the catch (> 75%) on achieving past or future escapement goals for wild chum salmon have not been fully evaluated, the fishery cannot meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Munro & Volk 2012.). The fishery meets this level of performance.
References			Munro & Volk (2012), PSC (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**95**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 1: SEAK

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance. The SEAK and Yakutat Troll fishery that primarily target Chinook salmon is based on large scale models of fish abundance from stocks across western North America (PSC 2012). Because of the low exploitation rates on any specific component stock as a result of this fishery and the abundance based approach to total allowable harvests in any year, the team considered that the SEAK Troll salmon fishery meets this level of performance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The sockeye, coho, pink and chum fisheries exceed this level of performance. Local Chinook stocks (within SEAK) generally meet escapement goals, because of local control of harvest rates. For the Chinook troll fishery, harvest targets are set preseason based on forecasted abundance using models of an aggregated of a large array of Chinook stocks from western North America (PSC 2012). Although harvest rates of any specific stock are low, there are small components of depressed stocks, including EPT stocks from the western United States. Consequently the precision of managing these stocks would not be considered to account for a wide range of uncertainties when compared with more terminal harvests of local stocks where inseason estimates of abundance are used to adjust harvest effort. However, the main uncertainties are accounted for and so the Chinook fishery meets this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance for sockeye, Chinook, coho and pink salmon. For chum, there is evidence that the tools can be effective in achieving escapement goals. The chum fishery therefore meets this level of performance.
100	**b**	**N**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The sockeye, coho, pink and chum fisheries are managed based on in-season

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. These fisheries meet this level of performance. However, the Chinook fishery does not meet this level of performance, and so the SEAK fishery overall does not meet this level of performance.
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for each species (sockeye, Chinook, coho and pink) has usually been achieved in each of the past 10 years (Munro & Volk 2012; PSC 2012), indicating that harvest control rules are effective. Chum, and therefore the SEAK fishery overall, does not meet this level of performance.
References		Munro &.Volk (2012), PSC (2012).	

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
1	**SEAK**	**80**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 1: SEAK

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify sockeye populations throughout the region. Coded wire tagging is used for monitoring coho and Chinook harvest, supplemented by genetic work for the Chinook fishery. Otolith marking is employed in much of the hatchery production. The fishery is managed closely and fleet/fisher composition is known. The availability of data means that the fishery is considered to exceed this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			Sockeye, Chinook, coho and pink salmon exceed this level of performance. Only a small proportion of the chum salmon streams are monitored, and there is understood to be difficulty in identifying chum versus pink salmon when conducting aerial surveys (Heinl 2005). Stray hatchery chum salmon can confound escapement counts of wild chum salmon in some streams in NSI, but overall, the data are collected with sufficient frequency to support the harvest control rule; chum salmon meets this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored for commercial removals by district using fish tickets. Good information is also collected on subsistence and sport fishing harvest, and values are reported. The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			Sockeye, Chinook, coho and pink salmon exceed this level of performance. Stock specific harvest information is not available for the vast majority of chum salmon streams in SEAK, and chum are predominantly harvested in mixed stock fisheries far from their spawning grounds (Heinl 2005). Escapements are monitored incidentally to counts of pink salmon, but information on 83 streams is sufficient to estimate the significance of fishery harvest on stock components (e.g., Piston & Heinl 2011); chum salmon meets this level of performance.

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District. Limnological data are available for all of the major sockeye salmon lakes. For Chinook, coho, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy, provides information beyond that strictly required for the strategy, and is comprehensive, so allowing the fishery to meet this level of performance.
	b	**N**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., weir counts) or on a weekly basis (aerial counts on streams). Managers recognize and understand the uncertainty in estimates. Sockeye, Chinook, coho and pink salmon meet this level of performance, whereas chum does not meet this level of performance. The SEAK fishery overall therefore does not meet this level of performance.
	d	**N**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys document the spawning escapement of stock components (individual streams) of pink and chum salmon; weir counts are used for many sockeye and Chinook streams. Harvest data are available for each fishing district. Aerial surveys document the relative abundances of sockeye in tributary streams connected to the rearing lakes. The troll fishery has been subject to extensive stock of origin analysis using GSI methods. Sockeye, Chinook, coho and pink salmon meet this level of performance. Chum harvests are of mixed stocks or in hatchery terminal areas. Composition and harvest rates from specific systems and hatchery components are not well defined compared with the other species. Because of the large component of hatchery stocks in the harvest, the estimates of the significance of fish harvests on stock components is not well defined for chum salmon. Chum, and therefore the SEAK fishery overall, does not meet this level of performance.
References			Heinl (2005), Piston & Heinl (2011a).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 1: SEAK

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (Munro & Volk 2012).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports, including in SEAK. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement and so the fishery meets this level of performance.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Sockeye, Chinook, coho and pink salmon exceed this level of performance. For chum salmon, the major component stocks (83 streams) are well defined in terms of timing and geographic range (e.g., the geographic location (i.e. spawning areas) and there is a clear rationale for conservation, fishery management and stock assessment requirements. Chum salmon meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Sockeye and Chinook are considered to exceed this level of performance. For coho, pink and chum salmon, reasonable numbers of monitored stocks are dispersed throughout the SEAK region, and research has indicated that the productivity of salmon stocks within several hundred kilometres is correlated (Mueter *et al*. 2007). These fisheries meet this level of performance.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty, and stock status is evaluated relative to reference points in a probabilistic manner. The fishery meets this level of performance.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for sockeye for decades and the assessment process has been shown to be robust. The sockeye fishery meets this level of performance. Chinook, coho, pink and chum, and therefore the SEAK fishery overall, do not meet this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for SEAK salmon, and so the fishery does not meet this level of performance.
	f	**N**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range (e.g., CWT data are available for coho and Chinook, the geographic location (i.e. spawning areas) and timing of runs of other species is understood), and they can be effectively conserved and managed. Sockeye, Chinook, coho and pink salmon meet this level of performance. Chum, and therefore the fishery overall, does not meet this level of performance.
	g	**N**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions on sockeye and Chinook salmon; these species therefore meet this level of performance. For coho, pink and chum salmon, it is not clear that indicator streams are correlated with the full range of stocks; these species therefore do not meet this level of performance.
References			Mueter *et al*. (2007), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 1: SEAK

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	Y	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. The impact of enhancement activities on wild stocks of all five salmon species (i.e., sockeye, Chinook, coho, pink and chum) are addressed through regional planning teams and addressed through actions by the Alaska BOF where significant allocation or economic concerns arise. The rates of straying of chum salmon were compared with relative rates of recent escapements (where the recent escapements were compared relative to the pre-hatchery escapements). The parents of the recent escapements were likely subject to ranges in the rates of straying for a sample of chums systems in the Northern Southeast Inside (NSI) subarea. There was no evidence of any correlation between recent declines in escapements relative to levels of straying observed in the recent investigations of Piston & Heinl (2011a, 2012a, 2012b). Because of uncertainty of chum remote releases on wild stock status, we addressed this issue under the SG80 guidelines. Although the straying rates on average are high (>9%) in the NSI, this rate of straying did not appear to be universal throughout SEAK. Because of the limited data set and lack of evidence of the relationship of straying rates to subsequent relative rates of return of chum salmon, the assessment team considers that chum salmon meet this scoring level. Lower levels of sockeye, Chinook, coho and pink enhancement occur in SEAK, and these species exceed this level of performance.
80	**a**	**N**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. Sockeye salmon enhancement activities have resulted in both fry and various levels of pen rearing in sockeye salmon. Although evidence of potential negative effects of pen reared sockeye smolts on spawners aggregated areas in McDonald Lake have occurred in the past, the discontinuation of this practice and resulting achievement of escapement goals with wild fish have been observed including the removal of this stock as a species of management concern by ADF&G (Heinl *et al*. 2011). Therefore, the team has concluded that sockeye salmon meet this performance level. In 2012, returning hatchery-produced fish accounted for 13% of the sockeye, 22% of the Chinook, 29% of the coho and 1% of the pink salmon taken in the commercial CPH. At these levels of production, it is considered that it is highly likely that enhancement activities do not have significant negative impacts on wild stocks. Chinook, coho and pink salmon meet this level of performance. Investigations of chum salmon hatchery straying in the NSI subarea indicate extensive straying into wild streams (Piston & Heinl 2012a, Piston & Heinl 2012b), including from remote release sites, with averages exceeding 9 % of the total escapement and with ranges > 60% in individual streams. The presence of such large straying rates suggests that enhancement activities for this species may have negative impacts on the local adaptation of wild stocks through introgression with the hatchery fish, which has a risk of decreasing the reproductive performance and diversity of wild stocks. In addition, there is a risk that such activities may impact wild rearing chum salmon by competition. In Taku Inlet SEAK, Sturdevant *et al*. (2012) suggested hatchery chum did not impact growth of wild chum. The chum fishery does not meet this level of performance due to high straying, and a condition is introduced (Condition 1).

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			This condition may be met through existing work being undertaken to look at chum straying (i.e., ADF&G 2012f). However, the assessment team noted an apparent bias in the language of the 'important questions' raised by the ADF&G (2012f) document and, given the complexities of this type of research, we therefore recommend strongly that, if the client uses this study to help address this condition, these 'important questions', and the methodology and findings for any resulting work, are subjected to external expert peer review. This would also be consistent with the approach take n for the high-profile WASSIP program. ADF&G (2012f) notes that the study will require investigation (and presumably funding) through year 2023 for chum salmon. If these studies clearly demonstrate the currently observed level of straying does not impair wild stocks, this condition under PI 1.3.1 will be removed. However, if they do demonstrate likely significant negative effects, changes will be required to the current aquaculture practices or fisheries management regime to reduce straying. The assessment team also notes that this fitness study does not address potential demographic effects of high straying.
100	**a**	**N**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Hatchery enhancement activities for sockeye, Chinook and coho have been undertaken in a number of systems. There is insufficient evidence for the assessment team to conclude that there is a high degree of certainty that these enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. As such, sockeye, Chinook and coho do not meet this level of performance. Chum salmon did not meet the SG80 level of performance. For pinks, the enhancement levels are small, and so there is a high degree of certainty that the activities do not have significant negative impacts on wild stocks. As such, pink salmon meets this level of performance.
References			ADF&G (2012f), Heinl *et al*. (2011), Piston & Heinl (2011a), Piston & Heinl (2012a), Piston & Heinl (2012b), Sturdevant *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**60**	**1**

Evaluation Table: PI 1.3.2 – UoC 1: SEAK

PI 1.3.2			Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The impact of enhancement activities on wild stocks of all five salmon species (i.e., sockeye, Chinook, coho, pink and chum) has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. Current policies and regulations are in place statewide that are precautionary and regulate enhancement activities. The fishery exceeds this performance level.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The fishery exceeds this performance level.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			Chinook, coho and pink salmon exceed this level of performance. A range of policies, statutes and regulations promote the protection of wild salmon. These include Salmon Regional Planning Plans, ADF&G Genetics Policy, the FRED Division Statute 1971, the PNP Hatchery Permitting Statute, the Regional Planning Statute 1976, the BOF Hatchery Management Policy, Fish Transport Regulations 1981, the PNP Regulations 1985, the Genetics Policy 1985, the Pathology Policy 1988, Wild and Enhanced Stock Statute 1992, Sockeye Salmon Culture Policy 1994, and the BOF Sustainable Salmon Policy 2000. The Policy for Management of Sustainable Salmon Fisheries (5AAC 39.222) requires that '*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*'. Also, that '*Plans and proposals for development or expansion of salmon fisheries and enhancement programs should effectively document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks.*' Policy for the Management of Mixed-Stock salmon fisheries (5AAC 39.220) accords the highest priority to the conservation of wild salmon stocks. The Regional Planning Team Review Regulation (5AAC 40.170) provides review criteria which must be considered and include provisions for the protection of the naturally occurring stocks from any adverse effects which may originate from a proposed hatchery. Within SEAK, past practices of using pen reared sockeye salmon have been designed to recover depressed stocks from overharvest or poor survival and lead to recovery. However, the establishment of an OEG that has no limit on the composition of hatchery components for Hugh Smith Lake adult returns in meeting escapements is not precautionary but does meet the requirement of a partial strategy, in particular because there have been no enhancement activities since 2003, and the last adults from that stocking program returned to the lake in 2007 (Brunette & Piston 2011). Similarly, monitoring of escapements from indicator stocks and monitoring hatchery composition has provided ADF&G with needed data to regulate future hatchery releases and remote release sites and constitutes a partial strategy, but does not address potential competitive effects nor does their appear to be a complete strategy as to what are the limits to hatchery releases where risks to wild stock management and their productivity will be compromised. Sockeye and chum salmon meet this level of performance.
	b	**N**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			Sockeye releases have previously been used to supplement poor rates of return at McDonald and Hugh Smith Lakes, and sockeye have been planted at many other lakes in Southeast Alaska, usually to support the recovery of depressed stocks or to seed systems for the purpose of developing new fisheries (Heinl *et al*. 2011). On occasion, pen reared sockeye have been used to provide a source of adult returns back to the lake, but this is not carried out at present. Sockeye, Chinook, coho and pink salmon exceed this level of performance. For chum salmon, the assessment team noted the high levels of hatchery salmon relative to wild chum salmon, and the levels of straying that have been observed in the NSI (Piston and Heinl 2012a; 2012b). As such, the assessment team concluded that there was concern that the hatchery management strategies were not being implemented to the extent that the fisheries would meet this level of performance. A condition is therefore introduced (Condition 2). Condition 2 is closely related to the one introduced for SI 80a in PI 1.3.1. Essentially, the assessment team sees two options that would allow the chum fishery to meet the SG80 level of performance for this SI. The first option is to reduce production levels and/or straying rates so that introgression and demographic effects are no longer a concern. The second option is to demonstrate that higher levels of straying, as previously observed, do not significantly negatively impact wild stocks (e.g., the study by ADF&G (2012f)), which is discussed in Condition 1). The MSC guidance for this PI states that "*A likelihood of minimizing the numbers and proportions of hatchery fish interbreeding with wild fish in natural spawning areas would be expected to be supported by the use and evaluation of proven artificial production and harvest management strategies. Common examples typically include: a) Ensuring release at sites and with strategies that are likely to maximize imprinting and homing, and b) Scaling hatchery release numbers to a level that is consistent with not exceeding hatchery stray benchmarks in concert with other strategies*"**.** The assessment team also notes that the efficient harvest of hatchery fish without over-harevsting the wild-component is another approach for reducing stray salmon. The preferred option is to minimize straying, especially given the long period need to conduct the fitness study.
100	**a**	**N**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			SEAK enhancement and fishery strategies for sockeye, Chinook, coho and pink salmon meet this performance level based on regulations, policies and practices of ADF&G. Chum salmon hatched and reared in aquaculture facilities compose the majority of the harvest in SEAK and there is not a comprehensive strategy in place that has examined risks and limits to hatchery contributions and their ecosystem impacts, specifically as related to competition with wild stocks. The current system of reviewing PARs from each hatchery that wishes to expand, will likely result in ultimate failure if there is not an over-reaching guideline as to how much enhancement will be allowed in total before risks outweigh benefits. This component of the strategy falls short of this level of performance.
	b	**N**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			SEAK enhancement and fishery strategies for sockeye, Chinook, coho and pink salmon meet this performance level based on escapement levels of wild salmon into respective streams and responsiveness of the Department to change strategies if wild salmon do not meet the lower end of the escapement goals consistently. Sockeye and chum salmon, and therefore the SEAK fishery overall, do not meet this level of performance.
References			Brunette & Piston (2011), Heinl *et al*. (2011), Piston & Heinl (2011a), Piston & Heinl (2012a).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**70**	**2**

Evaluation Table: PI 1.3.3 – UoC 1: SEAK

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The impact of enhancement activities on wild stocks of all five salmon species (i.e., sockeye, Chinook, coho, pink and chum) has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. There are some relevant data available on straying and hatchery contribution to the harvest along with a significant number of long term estimates of escapement that were used to establish escapement goals for all species. The sockeye, Chinook, coho and pink fisheries exceed this level of performance. The chum fishery meets this level of performance,
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fisheries for sockeye and pink salmon exceed this level of performance. The fisheries for Chinook, coho and chum meet this level of performance because there are good policies and regulations in place that require that the effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
80	**a**	**N**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Sufficient relevant information is available through thermal marking of sockeye in some systems on a short-term basis, and coded-wire tagging of sockeye, Chinook and coho more routinely, such that these species can be said to meet this level of performance. Pink salmon exceed this level of performance. Given high levels of chum hatchery production and the relatively low abundance of wild chum salmon, the assessment team considers that the evaluation of the effect of fishery harvest on wild chum salmon is important. For several years, the contribution of hatchery chum to the mixed stock fishery was monitored, but this is no longer the case. The chum fishery therefore does not meet this level of performance, and a condition is introduced (Condition 3). For Condition 3, we that note that this is likely to be facilitated by the near 100% thermal marking of hatchery chum in SEAK, and anticipate that ADF&G's ongoing study in the region (ADF&G 2012f) may help the fishery to meet this condition
	b	**N**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			For sockeye, typically, fry are planted directly in to lakes with broodstock being acquired from the same stock from where the fry are being restocked. Limnological studies are typically conducted prior, during and after stocking to evaluate of impact of stocking on lake productivity. Very low levels of straying occur in sockeye so net productivity can be accurately assessed, and stocking typically does not occur in excess of lake productivity. Sockeye meets this level of performance. Pink salmon exceed this level of performance because the level of enhancement is so low in comparison to wild pink salmon production.

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Although the assessment team is aware of some studies and assessments that include estimates of the impacts of enhancement activities on wild stock status of Chinook, coho and chum salmon, but it is not clear that this work has included consideration of the impact of enhancement on productivity and diversity of wild stocks. A condition is therefore introduced (Condition 3). For Condition 3, the assessment team is especially concerned that the effect of remote releases is accounted for in the assessments because remote-released salmon likely have a higher rate of straying. For chum salmon, we that note that this is likely to be facilitated by the near 100% thermal marking of hatchery chum in SEAK, and anticipate that ADF&G's ongoing study in the region (ADF&G 2012f) may help the fishery to meet this condition.
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Sampling of coded wire tags, genetic information, and otolith marks, provide a comprehensive range of relevant information on the harvests and escapements of enhanced fish into the common property harvests. In the case of chum salmon, the information base has been limited for determining escapement strays, and it is uncertain if evaluations are going to be continued in problem areas in the future. Consequently the data used to make determinations is not considered comprehensive by the assessment team. Sockeye, Chinook, coho and chum do not meet this level of performance. The level of pink production is so low that the fishery can be said to exceed this level of performance.
	b	**N**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The assessment team found insufficient information on the effects of enhancement activities on the wild stock status, productivity and diversity of the wild stocks. Sockeye, Chinook, coho and chum salmon do not meet this level of performance. The level of hatchery pink production is so low that the fishery can be said to meet this level of performance.
References			ADF&G (2012f)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**60**	**3**

Evaluation Table PI 1.1.1 – UoC 2: Yakutat

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Chum salmon is classed as an IPI species in the Yakutat Unit of Certification. As such, the Yakutat fishery is considered to target only sockeye, Chinook, coho and pink salmon. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			The fishery exceeds this level of performance for pink salmon. Sockeye, Chinook and coho salmon meet this level of performance because they surpass the lower bound escapement goal in a majority of the last nine years (Munro and Volk 2012).
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, coho and pink salmon. Chinook salmon meet this level of performance because they have only not met the lower bound escapement goal twice in the past nine years.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Pink salmon are meeting their escapement goals and there is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired. Some Chinook, coho and sockeye salmon stocks have dipped below the lower limit BEG up to two to three times during the last nine years (Munro & Volk 2012, Woods & Zeiser 2012a); however the assessment team determined that there is a high degree of certainty that escapements are above the point where recruitment would be impaired.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Sockeye, coho, and pink salmon are all meeting their escapement goals a majority of the time, especially over recent years. There is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired. Chinook salmon from the Situk River dipped below the lower bound BEG twice in the past nine years, and both occurrences occurred in the past four years. Therefore the fishery overall does not meet this level of performance.
References			Munro & Volk (2012), Woods & Zeiser (2012a).

Stock Status relative to Reference Points for each UoC			
YAKUTAT	**Type of reference point**	**Value of reference point**	**Current stock status relative to reference point**

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 2: Yakutat

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The Yakutat fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, coho and pink salmon (Der Hovanisian & Geiger 2005, Bernard and Jones III 2010, Eggers & Bernard 2011, Munro & Volk 2012). Escapement goals have been used to management the fishery for 10 or more years. Goals are considered to be BEG except for Lost River coho and sockeye salmon that are SEG. The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, Chinook, coho, and pink salmon are an effective LRP, as noted in 80a. The fishery exceeds this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describe the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region. The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primary terminal and can be managed by real time escapement counts or in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. The fishery meets this level of performance.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used in the Yakutat Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Yakutat Management Area is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. The fishery meets this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Yakutat Management Area provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Yakutat fishery does not meet this level of performance.
References			Bernard & Jones III (2010), Dann *et al*. (2011), Dann *et al*. (2012a), Der Hovanisian & Geiger (2005), Eggers & Bernard (2011), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**95**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 2: Yakutat

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no stocks of concern in the Yakutat UoC.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no stocks of concern in the Yakutat UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement (hatchery or lake fertilization) activities.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no stocks of concern in the Yakutat UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no stocks of concern in the Yakutat UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no stocks of concern in the Yakutat UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 2: Yakutat

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			The fishery meets this level of performance. Woods and Zeiser (2012b) explain: "*Set gillnet fisheries in the Yakutat area are managed by adjusting fishing times and areas in response to inseason assessments of run strength. These actions are taken to provide adequate spawning escapements and to allow harvests of salmon that are surplus to escapement goals. Inseason assessment methods include both fishery performance and spawning escapement information. In the glacial systems, fishery performance data is utilized form management because poor visibility prevents the accurate observations of spawning escapements. Biological Escapement Goals (BEG) and Sustainable Escapement Goals (SEG) have been established for all major areas and salmon species in the Yakutat area*."
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring of spawning escapements or fishery performance, reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. The fishery meets this level of performance.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online (e.g., Woods and Zeiser 2012a). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro and Volk 2012). Stocks are generally at or above target levels. The fishery meets this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Escapement goals and management plans are routinely reviewed and improved as necessary. The fishery meets this level of performance.
References			Munro & Volk (2012), Woods & Zeiser (2012a), Woods & Zeiser (2012b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**100**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 2: Yakutat

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each day or week (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance (Woods & Zeiser 2012a,b).
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement a, catch per effort. Fisheries are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The fishery meets this level of performance. The lower escapement goal for pink salmon has been achieved in each of the past nine years (Munro & Volk 2012). The lower escapement goal for sockeye, Chinook, and coho salmon occasionally dip below the lower bound, but, depending upon stock, have been above the lower bound 2/3 or more of the last nine years (Munro & Volk 2012).
References			Munro & Volk (2012), Woods & Zeiser (2012a), Woods & Zeiser (2012b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 2: Yakutat

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts, float surveys, and age composition provide information of stock structure and escapement for Chinook, sockeye, coho, and pink salmon. Genetics stock structure data are collected on sockeye and Chinook salmon for use in GSI studies elsewhere in SEAK where harvest composition is monitored (Woods & Zeiser 2012a).
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on both subsistence and sport fishing harvest. Genetic stock identification is used to monitor the composition of Chinook and sockeye salmon in other SEAK fisheries.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District. For Chinook, coho, pink and chum salmon, catch, effort and escapement data are available. Genetic stock structure data are available for sockeye and Chinook salmon. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance.
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., weir counts during daylight) or on a weekly basis (aerial counts on streams). See Woods and Zeiser (2012a,b). Managers recognize and understand the uncertainty in estimates. The fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys document the spawning escapement of stock components (individual streams) of pink and coho salmon; weir counts are used for sockeye and Chinook salmon. Catch per unit effort is monitored for glacial systems when visual counts are not possible. Harvest data are available for each fishing district. Harvests and escapements of the early and late sockeye runs are monitored. Aerial surveys document the relative abundances of sockeye in tributary streams connected to the rearing lakes. The fishery meets this level of performance.
References			Woods & Zeiser (2012a), Woods & Zeiser (2012b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 2: Yakutat

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Yes, stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Yakutat Area stocks are well defined for the purpose of managing the fishery and maintain robust populations. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and coho salmon are monitored by aerial surveys. Sockeye and Chinook salmon escapement is monitored through weir counts. The fishery is considered to exceed this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			ADF&G is well aware of the relevant biology of the species and the nature of the fishery. ADF&G has done extensive genetic studies of stock structure and considers the relatively fine structure of sockeye and Chinook salmon populations in contrast to the relatively coarse population structure of the other species (e.g., Dann *et al*. 2009a; Templin *et al*. 2011b,c). Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and is evaluating stock status relative to reference points in a probabilistic manner. The fishery meets this level of performance.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust. ADF&G routinely considers various alternative strategies to develop and evaluate escapement goals (Munro & Volk 2012). The fishery meets this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Yakutat salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries are individual monitored using aerial surveys or weirs. The fishery is considered to meet this level of performance.
References			Dann *et al*. (2011), Munro & Volk (2012), Templin *et al*. (2011b), Templin *et al*. (2011c).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 2: Yakutat

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	Y	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Yakutat.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Yakutat.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Yakutat.
References			

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
2	**YAKUTAT**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 2: Yakutat

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Yakutat.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			There is no enhancement in Yakutat.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Yakutat.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			There is no enhancement in Yakutat.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Yakutat.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Yakutat.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 2: Yakutat

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Yakutat.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			There is no enhancement in Yakutat.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Yakutat.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			There is no enhancement in Yakutat.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Yakutat.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			There is no enhancement in Yakutat.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
2	**YAKUTAT**	**100**	**N/A**

P1: UoC 3 – PWS

The information below on the PWS assessment is repeated from the PWS introduction on P. 35.

The assessment team concluded that the Prince William Sound (PWS) Unit of Certification should remain under assessment pending further analysis of 1) an ADF&G multi-year study relating to hatchery wild salmon stock interactions and how outcomes might influence future management practices, and 2) evidence relating to hatchery releases on the productivity of PWS herring.

The 2007 recertification of the Alaska salmon fishery placed conditions on PWS centered on Performance Indicators under Principle 1 and evaluation of whether the high levels of hatchery pink salmon straying, and to a lesser extent chum salmon straying, into PWS streams and the likely change in diversity and genetic composition is detrimentally impacting wild stocks. A corollary was to account for strays when developing target reference points and evaluating spawning escapement goals.

Based on recent straying studies *(*Brenner *et al.* 2012, Habicht *et al.* 2012*)*, ADF&G has initiated a large-term data collection and analysis program for PWS pink and Southeast chum salmon. A program objective is to answer key questions about the effects of high straying in PWS streams on subsequent offspring survival and "fitness" compared to offspring in PWS streams known to have low stray rates. However, the program materials made available to the assessment team did not include a detailed study design.

The assessment team will need additional information, to be gathered at a site visit in due course, to determine how this long-term program can be successfully incorporated into the PWS management framework. Beyond consideration of existing and future research studies, the assessment team will need to be in a position at this site visit to determine whether any future ADF&G management practice can reasonably address scoring indicators in the MSC Standard. The PWS hatcheries annually release 1.5 billion juveniles and provide 45 million adult salmon for harvest, primarily pink salmon. Hatchery fish contribute upwards of 90% of the salmon harvest and in some years provide harvest opportunity when wild stocks might not.

Current ADF&G management practices do not consider or alternatively exclude hatchery fish when developing PWS escapement goals. It is well documented that 50% of the PWS streams contain more than 10% hatchery pink salmon and in some cases may account for up to 80% of the escapement. This level of straying occurs even though ADF&G management does everything available to harvest all hatchery fish while achieving adequate escapement. Contrast these straying rates with the PWS hatchery planning document that identifies a 2% stray rate objective.

The assessment team has therefore concluded that additional time is needed for the consideration and development of measures that account for strays in escapement goals and to determine how such measures in conjunction with research and innovative management can evaluate impacts on productivity and effectively reduce straying levels in the streams.

There is some evidence to suggest that PWS enhancement activities may cause detrimental ecological impacts that negatively impact PWS herring (Deriso et al. 2008, Pearson et al. 2012) in addition to wild pink salmon (Hilborn and Eggers 2000, 2001; Wertheimer et al. 2001, 2004). Specifically, exceptionally high levels of pink salmon hatchery releases may cause density dependent mortality of herring that inhibits the recovery of herring abundance in PWS. Much of the evidence on herring was developed during and after litigation flowing from the *Exxon Valdez* oil spill. NOAA scientists dispute the published studies, but they have yet to publish alternative explanations for the inability for herring to recover. Additional time is, therefore, also needed to further evaluate the ecological effects of large hatchery production on PWS herring productivity.

Evaluation Table PI 1.1.1 – UOC 4: Copper/Bering Districts

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Pink and chum are considered IPI species in the Copper/Bering Districts UoC, and will be dealt with as retained species under Principle 2. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			The fishery easily exceeds this level of performance for Copper River Chinook, coho, and sockeye salmon, and for Bering River coho salmon. Bering River sockeye salmon missed the lower bound in four of the last nine years (although the 2011 escapement of 28,000 was substantially above the lower bound of 20,000) (Munro & Volk 2012), but given the approach of calculating escapement goal ranges it is still highly likely that the stock is above the point where recruitment would be impaired. Overall, the fishery meets this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for Copper River Chinook, coho, and sockeye salmon and Bering River coho salmon. The Bering River sockeye salmon missed the lower bound in four of the last nine years (although the 2011 escapement of 28,000 was substantially above the lower bound of 20,000) (Munro & Volk 2012), and so it can still be said that the stock is fluctuating around its target reference point. The fishery meets this performance.
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Coho salmon have been over the lower limit SEG in nine of nine years in both Copper and Bering River. Chinook salmon have been over the lower bound in seven of nine years (barely lower in one). Copper River sockeye have been above the lower bound in nine of nine years. The fishery fails to meet this level of performance because Bering River sockeye salmon missed the lower bound in four of the last nine years (four of the last six years although the 2011 escapement of 28,000 was substantially above the lower bound of 20,000) (Munro and Volk 2012).
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			In general, there is a high degree of certainty that the wild stocks have been fluctuating around their target reference points or above in recent years. However, the fishery fails to meet this level of performance because Bering River sockeye salmon missed the lower bound in four of the last nine years (although the 2011 escapement of 28,000 was substantially above the lower bound of 20,000) (Munro & Volk 2012).

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
References	Munro & Volk (2012).

Stock Status relative to Reference Points for each UoC

COPPER/BERING	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Sustainable escapement goals (SEGs).	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**80**	**N/A**

Evaluation Table: PI 1.1.2 – UOC 4: Copper/Bering Districts

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The Copper/Bering fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Yes, quantitative escapement goals have been developed for sockeye, Chinook, and coho salmon and were reviewed in 2011 (Fair *et al*. 2011). Escapement goals have been used to management the fishery for 10 or more years. Goals are all considered to be SEG.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, Chinook, coho salmon are an effective LRP, as noted in 80a.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Fair *et al*. 2011). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. . Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primary terminal and can be managed by real time escapement counts or in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non-target stocks have been determined (e.g., Dann *et al*. 2011, 2012a, Templin *et al*. 2011a). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Copper/Bering Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Copper/Bering Management Area is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. The fishery meets this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Copper/Bering Management Area provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Copper/Bering fishery does not meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Fair *et al*. (2011), Munro & Volk (2012), Templin *et al*. (2011a).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**95**	**N/A**

Evaluation Table: PI 1.1.3 – UOC 4: Copper/Bering Districts

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no stocks of concern in the Copper/Bering UoC.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			N/A
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			Enhancement activities are not used as rebuilding strategy. There are enhancement activities that are designed to expand the value of the sockeye salmon fishery; egg box incubator facilities at Gulkana Hatchery may be responsible for 25% or more of the adult returns to the Copper River (Botz *et al.* 2012). Escapement goals have been revised up accordingly (Botz *et al.* 2011, Fair *et al.* 2011).
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no stocks of concern in the Copper/Bering UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no stocks of concern in the Copper/Bering UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			Enhancement activities are not used as rebuilding strategy.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no stocks of concern in the Copper/Bering UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			Enhancement activities are not used as rebuilding strategy.
References			Botz & Somerville (2011), Botz *et al*. (2012), Fair *et al*. (2011).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UOC 4: Copper/Bering Districts

PI 1.2.1			There is a robust and precautionary harvest strategy in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative sockeye and Chinook and coho spawning escapements are monitored with respect to escapement curves based on historical timing. This information is used to effectively control harvests in order to meet the TRP. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort, mark/recapture), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. The fishery meets this level of performance.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are typically reported every year in annual management reports, which are available online (e.g., Botz *et al*. 2012). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro and Volk 2012). Stocks are at or above target levels, and so the fishery meets this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Fair *et al*. 2011). The fishery meets this level of performance.
References			Botz *et al*. (2012), Fair *et al*. (2011), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**100**	**N/A**

Evaluation Table: PI 1.2.2 – UOC 4: Copper/Bering Districts

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific times and areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance for Chinook and coho salmon. However, for sockeye salmon in the Bering River the signal is not clear. The failure to meet escapement goals in four of the last six years may signal cyclic productivity or possibly ineffectiveness of tools in those circumstances. Still, the sockeye salmon fishery meets this level of performance because of the generally strong escapements during the past nine years (the misses in 2008 and 2009 were minor) and the especially strong escapement in the most recent year, 2011.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The extent of inseason monitoring and fine-scale management means that the fishery meets this level of performance.
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The fishery does not meet this level of performance for sockeye. As such, the fishery overall does not meet this level of performance. The escapement goal for Chinook and coho have generally and uniformly been achieved in each of the past nine years (Munro & Volk 2012), indicating that harvest control rules are effective for these species.

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**90**	**N/A**

Evaluation Table: PI 1.2.3 – UOC 4: Copper/Bering Districts

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify sockeye and Chinook salmon populations throughout the watersheds (Ackerman 2010, Ackerman *et al*. 2011, Templin *et al*. 2011a). The assessment team is aware that genetic data are generally less informative for coho salmon populations on this geographic scale. Nevertheless, the fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Detailed information is collected on subsistence and sport fishing and personal use harvest (Botz *et al*. 2012). The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District. Upper Copper River and Copper River Delta runs of sockeye salmon have separate escapement goals and are monitored. Extensive tagging, radio telemetry, and genetic data have been assembled to characterize these stocks (Templin *et al*. 2008, Botz *et al*. 2012). Genetic data for Chinook salmon has been contributed to the coast wide data base used to monitor high-seas migration and removals in the form of walleye pollock by catch (Templin 2011b). These information sets support the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance.

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement with a high degree of certainty. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., weir counts 10 min per hour during daylight) or on a weekly basis (aerial counts on streams). See Botz *et al*. 2011, 2012). Managers recognize and understand the uncertainty in estimates. The fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys and weir counts document the spawning escapement of sockeye, Chinook, and coho salmon. Harvest data are available for each fishing district. Harvests and escapements of the river and delta subcomponents of sockeye salmon runs are monitored. The fishery meets this level of performance.
References			Ackerman (2010), Ackerman *et al*. (2011), Botz & Somerville (2011), Botz *et al*. (2012), Templin *et al*. (2008), Templin *et al*. (2011a), Templin *et al*. (2011b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UOC 4: Copper/Bering Districts

PI 1.2.4			There is an adequate assessment of the stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			Studies of stock structure for sockeye and Chinook salmon were completed in 2011 facilitating allocation of harvest to specific stock groups (e.g. Ackerman 2010, Ackerman *et al*. 2011, Templin *et al*. 2011). The assessment team is aware that genetic data are generally less informative for coho salmon populations on this geographic scale and such analyses are not appropriate. The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement at this level of performance.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Copper/Bering stocks are well defined for the purpose of managing the fishery and maintain robust populations. ADFG continues to improve information on genetic structure of component populations of Chinook and sockeye salmon and is starting to document harvest at the specific population level (e.g., Ackerman *et al*. 2011, Templin *et al*. 2011). The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because the individual stock components are monitored by aerial

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			surveys, weir counts, and mark recapture evaluations. The fishery is considered to exceed this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing and genetic stock structure. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and is evaluating stock status relative to reference points in a probabilistic manner. The fishery meets this level of performance.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have typically remained robust. Alternative approaches to escapement goal development have been considered (Fair *et al*. 2011). Nevertheless, sockeye salmon escapements temporarily faltered in the Bering River in recent years, and so the fishery overall cannot be said to meet this high level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Copper/Bering salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because the individual stocks are monitored by escapement surveys. The fishery is considered to meet this level of performance.
References			Ackerman (2010), Ackerman *et al*. (2011), Fair *et al*. (2011), Templin *et al*. (2008).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UOC 4: Copper/Bering Districts

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. The fishery meets this level of performance because it can be argued that it is likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
80	**a**	**N**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. The enhancement activity in the Copper/Bering Districts UoC is the egg box program for sockeye salmon at Gulkana Hatchery. Condition 29 from the 2007 MSC assessment of the Alaska salmon fishery was to "*Conduct a review of the Gulkana sockeye hatchery program with emphasis on potential impacts to wild stocks*." When the fourth audit was undertaken for the previous assessment, a review was apparently scheduled but no results were available. It was therefore accepted that Condition 29 should be reviewed at reassessment, and either closed out or carried over in to a new certification if the fishery was recertified, depending on progress. ADF&G has taken a somewhat precautionary stance by not approving permit alteration requests for increased production and additional points of stocking. Nevertheless, the results of a Gulkana review were not available to the assessment team at the time of writing this new assessment report (April 2013). As such, the fishery does not meet this level of performance and, consistent with MSC guidance (MSC 2013a), existing Condition 29 is effectively carried over to this new assessment as new Condition 4. It may, though, be noted that the fourth audit conclusion for Condition 29 stated: "*It is difficult to determine from these hatchery evaluations whether the evaluation of the Gulkana Hatchery in 2012 will be sufficiently detailed to meet the intent of this condition*." With that in mind, it is also important that controversies surrounding PWSAC's recent requests to increase the permitted release numbers (permit alteration request or PAR- ADF&G 2009a, Regnart 2010) uncovered potential issues including genetics, pathology, and management that will need to be addressed in the review if the fishery is to meet the SG80 level of performance for PIs 1.3.1, 1.3.2 and 1.3.3 in the Copper/Bering UoC.
100	**a**	**N**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. The fishery does not meet this level of performance.
References			ADF&G (2009a), MSC (2013a), Regnart (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**60**	**4**

Evaluation Table: PI 1.3.2 – UOC 4: Copper/Bering Districts

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The fishery meets this level of performance because there are genetic and pathology policies and hatchery permitting regulations in place to protect wild stocks from detrimental impacts of enhancement.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The fishery meets this level of performance because the practices and protocols in place are considered likely to be effective based on plausible argument.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			The fishery meets this level of performance because here is a **partial strategy** in place.
	b	**N**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			No comprehensive studies have been conducted on the effect of stocking of Gulkana Hatchery sockeye into Crosswind and Summit lakes. Neither straying studies nor studies of genetic impacts have been done. Biologists attest that '*managing wild stock sockeye salmon spawning escapement for the Copper River is complicated by large returns of enhanced fish with similar run timing . . .*" (ADFG 2009a). The fishery does not meet this level of performance, and Existing Condition 29 is carried over to this new assessment as new Condition 4 (see notes in PI 1.3.1, SG 80a). This will need to be completed in order for the fishery to meet this level of performance.
100	**a**	**N**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			The fishery does not meet this level of performance.
	b	**N**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			The fishery does not meet this level of performance.
References			ADF&G (2009a).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**70**	**4**

Evaluation Table: PI 1.3.3 – UOC 4: Copper/Bering Districts

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The fishery meets this level of performance because the return of hatchery fish is estimated based upon strontium marks.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fishery meets this level of performance because area managers take into account the effect of enhancement activities when making management decisions.
80	**a**	**N**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Contribution of enhanced fish to harvest is estimated based upon preseason forecasts and recovery of strontium marks in the fishery (Botz *et al*. 2012). However, no research has been reported on the potential impacts of hatchery strays into wild stock escapement, so the fishery does not meet this level of performance. New Condition 4, a development of existing Condition 29 that was carried-over from the previous certification, needs to be completed in order for the fishery to meet this level of performance (see notes in PI 1.3.1, SG 80a).
	b	**N**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			As for SI 80a, the fishery does not meet this level of performance, and new Condition 4 needs to be completed in order for the fishery to meet this level of performance (see notes in PI 1.3.1, SG 80a).
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The fishery does not meet this level of performance.
	b	**N**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The fishery does not meet this level of performance.
References			ADF&G (2009a), Botz *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
4	**COPPER/BERING**	**60**	**4**

Evaluation Table PI 1.1.1 – UoC 5: Lower Cook Inlet

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Chinook and coho are classed as IPI species in the Lower Cook Inlet (LCI) Unit of Certification. As such, the LCI fishery is considered to target only sockeye, pink and chum salmon. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, pink and chum and have exceeded the lower end of the TRP (escapement goal (SEG)) in most of the past 10 years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. Four of five sockeye salmon escapement goals achieved or exceeded their SEG's in 2010, while the sixth system has no formal escapement goal. The 12 chum systems have exceeded the lower end of the escapement goals 85% of the time over the past 9 years. The 17 pink salmon systems have exceeded the lower end of the escapement goals > 90% of the time over the past 9 years (Munro & Volk 2012). The lower bound of the escapement goals are a conservative LRP as ADF&G closes fisheries at this level.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, chum and pink salmon. Although escapement goals have generally been met, returns have been week and the harvests have primarily been cost recovery on the enhanced projects (Hammarstrom & Ford 2011, Hollowell *et al*. 2012). Chum salmon have rebounded in recent years and are providing a significant contribution to the commercial fisheries.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Sockeye, pink and chum salmon are usually meeting their escapement goals and there is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired (Munro & Volk 2012).
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, pink , and chum salmon have exceeded the lower end of the TRP (escapement goal (SEG or BEG)) in most of the past 10 years (Munro & Volk 2012). However, because some of the years, sockeye, chum and pink escapements were not obtained, the fishery does not meet this guidepost.
References			Munro & Volk (2012); Hammarstrom & Ford 2011; Hollowell *et al*. 2012

Stock Status relative to Reference Points for each UoC

LCI	Type of reference	Value of reference point	Current stock status

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	point		**relative to reference point**
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012) or all significant fisheries harvests have been curtailed.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 5: Lower Cook Inlet

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			There are multiple sampling sites and escapement goals for sockeye, with aerial surveys for pink and chum salmon (Otis *et al* 2010, Munro & Volk 2012). The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The LCI fisheries are relatively terminal with many subdistricts that are used to regulate harvest on the many systems that are monitored in season (Hammarstrom & Ford 2011, Hollowell *et al*. 2012). The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, pink and chum stocks (Munro & Volk 2012, Otis *et al*. 2010). The methods used for the escapement goals are well documented and appropriate.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, chum and pink salmon are an effective conservative LRP (Otis *et al*. 2010) as the estimates are the lower bound of the TRP, where fisheries are curtailed. This value is well above any risk of impairing reproductive capacity. The fishery exceeds this scoring level for sockeye, pink and chum salmon.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describe the 12 methods that may be used to develop escapement goals with Otis *et al*. (2010) detailing the methods used in LCI. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region. The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. The fishery exceeds this scoring level for sockeye, chum and pink salmon.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance based" strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non-target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. In LCI, hatchery enhanced fisheries have historically dominated production and harvest areas are terminal with closely monitored escapements. Many of the enhancement activities have been curtailed in recent years and many of the available purse seine permits have not participated in the fishery. Consequently, harvest management is highly precautionary with low exploitation rates common in LCI. The fisheries generally are targeting a single stock and there are many subdistricts that are used for time and area closure to regulate escapements. The fishery exceeds this scoring level.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the LCI Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired (Otis *et al*. 2010). The fishery meets this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the LCI Management Area is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. Limnological studies and detailed studies into the life history of sockeye salmon are prevalent

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			in LCI and are a primary tool used in developing hatchery stocking rates, escapement goals and supporting lake fertilization programs. The escapement goals developed as SEG's for pink and chum salmon are based on aerial surveys and there is uncertainty in enumeration as well as understanding the biological significance of the escapements. Consequently, the fishery does not meet this performance level.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the LCI Management Area provides a high degree of certainty in protecting subcomponent stocks because of the terminal nature of most of the fisheries. However, the dominance of hatchery programs and the use of stocks from Hidden Lake for sockeye salmon enhancement with poor or mixed success (Hammarstrom & Ford 2011), suggests there needs attention to obtaining brood stock, rather than using what is available. As such, the LCI fishery does meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012), Eggers *et al*. (2011), Munro & Volk (2012), Hammarstrom & Ford (2011).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**85**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 5: Lower Cook Inlet

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no stocks of concern in LCI (Munro & Volk 2012).
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no stocks of concern in LCI (Munro & Volk 2012).
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			Enhancement activities are not used as rebuilding strategy.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no stocks of concern in LCI (Munro & Volk 2012).
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no stocks of concern in LCI (Munro & Volk 2012).
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			Enhancement activities are not used as rebuilding strategy.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no stocks of concern in LCI (Munro & Volk 2012).
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			Enhancement activities are not used as rebuilding strategy.
References			Munro & Volk (2012)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 5: Lower Cook Inlet

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative sockeye spawning escapements are monitored with respect to escapement curves based on historical timing and at least weekly aerial surveys are conducted for pink and chum salmon. This information is used to effectively control harvests in order to meet the TRP. LCI has many subdistricts used to fine tune the fishery in meeting escapement goals for each of the monitored systems. The fishery exceeds this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance for sockeye, chum and pink. Emergency Order authority, periodically reviewed escapement goals and BOF approved harvest management plans work together to ensure the stock is maintained at a sustainable level.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. The fishery meets this level of performance for sockeye, pink and chum salmon.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are made available online at the ADF&G website (http://www.adfg.alaska.gov/index.cfm?adfg=home.main). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Stocks are at or above target levels for most years. In the case of sequential poor harvests or escapements below the lower bound of the TRP (SEG or BEG), actions are taken and recovery plans are completed. The Chinook and coho stocks are primarily the focus of sport fisheries in LCI and are considered an IPI.

PI 1.2.1			There is a robust and precautionary harvest strategy in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Management actions are reported every year in annual Area Management Reports.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (Otis *et al*. 2010) and statistics are reported annually (Munro & Volk 2012). The fishery meets this level of performance.
References			Munro & Volk (2012); Otis *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**100**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 5: Lower Cook Inlet

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for each species (sockeye, pink and chum) has been achieved in most of the past 10 years except for the stocks of concern (Munro & Volk 2012), indicating that harvest control rules are effective. There are no stocks of concern in LCI. The fishery meets this level of performance.
References			Munro & Volk (2012)

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
5	**LCI**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 5: Lower Cook Inlet

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement (Hammarstrom & Ford 2011, Hollowell *et al*. 2012).
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on subsistence and sport fishing harvest (Hammarstrom & Ford 2011, Hollowell *et al*. 2012). LCI has primarily terminal fisheries and no significant catches that cannot accurately be assigned to their stock of origin. The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District for sockeye salmon. Limnological data are available for all of the major lakes system and are used in determining escapement goals. For sockeye, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance (Hammarstrom & Ford 2011, Hollowell *et al*. 2012).
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously on the primary sockeye systems

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			and weekly by aerial surveys on the pink and chum systems (weirs) Managers recognize and understand the uncertainty in estimates (Otis *et al*. 2010).
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. Harvest data are available for each fishing district. Harvests and escapements of the sockeye and major pink and chum runs are monitored for numerous systems in LCI. The fishery meets this level of performance.
References			Hammarstrom & Ford (2011), Hollowell *et al*. (2012), Otis *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**LCI**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 5: Lower Cook Inlet

PI 1.2.4			There is an adequate assessment of the stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points) or harvest rates are estimated where escapements have limited monitoring and exploitation rates are low.
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF (Otis *et al*. 2010, Munro & Volk 2012). The escapement goal review and the BOF review meet the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			LCI stocks are well defined for the purpose of managing the fishery and maintain robust populations because of the terminal nature of most of the fisheries. The 2010 and 2011 poor returns to many of the pink and sockeye salmon systems resulted in still most systems meeting escapement goals because of the rapid response of management. Most of the fisheries met only cost recovery goals of the CIAA. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are usually not used as a source of information for making management decisions in LCI. The fishery exceeds this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and is evaluating stock status relative to reference points in a probabilistic manner (Munro & Volk, 2012). LCI fisheries are generally stock specific and terminal.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust. Alternative approaches to escapement goal development have been considered (Munro & Volk 2012). In LCI, escapement goals and in season management of terminal fisheries determines outcomes.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of regular external review of escapement goal evaluations for salmon. ADF&G and BOF do not routinely have external reviewers outside of ADF&G. Consequently the fishery does not meet this scoring level.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions. The fishery is considered to meet this level of performance.
References			Munro & Volk (2012); Otis *et al*. (2010)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 5: Lower Cook Inlet

PI 1.3.1			Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			The impact of enhancement activities on wild stocks of salmon has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Enhancement activities have been dominant in LCI with major sockeye salmon programs and in the recent past, major pink salmon programs. There are several systems with sockeye salmon stocking and lake fertilization programs. Sockeye fry plants are highly regulated using strict genetic and disease guidelines and fisheries are usually small and terminal. Limnology data are available on receiving lakes and usually have targeted systems with limited spawning capacity (CIRPT 2007). Recent reviews of all of the hatchery programs that are currently or have in recent history supported the LCI fisheries have been completed (Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012). The hatcheries were generally in compliance with the exception of the Port Graham which is no longer operational because of economic reasons. The Trail Lakes hatchery currently supports the sockeye salmon fisheries. As the systems that are being enhanced were barren originally, stock selection from other systems usually has followed advice of genetic laboratories. The curtailment of Tustumena brood stock as a gamete for sockeye hatchery operations has resulted in Hidden Lake gametes being used to support these systems, with apparently poor success. Because these fisheries are harvested terminally, there is little risk to wild stocks. There has been generally a major curtailment of hatchery operations throughout Cook Inlet. The fishery meets the level of performance.
100	**a**	**N**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Because of the intensity of the research associated with the enhancement activities and their limited impact on fisheries, the salmon hatcheries associated with stocking LCI systems are considered to have a high level of understanding. However, the introduction of Hidden Lake stock into the previously stocked systems appears to be more an issue of availability than adaptability of this stock to the lakes where it has been introduced. Therefore the degree of certainty that they do not impact wild salmon stocks negatively in this area is reduced. The hatcheries underwent a recent review (Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012, Hammarstrom & Ford 2011) and all hatcheries that are currently in operation have received good reviews in compliance with state policies and regulations designed to protect wild stocks. Port Graham Hatchery, which received poor reviews is not currently operational. Because the hatchery program has been in a state of flux and performances have been poor recently, the fishery was considered not to be meeting this level of performance.
References			CIRPT (2007); Stopha (2012a); (2012b); (2013); Stopha and Musslewhite 2012; Hammarstrom & Ford (2011)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**80**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 5: Lower Cook Inlet

PI 1.3.2			Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The impact of enhancement activities on wild stocks of salmon has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. Current policies and regulations are in place state-wide that are precautionary and regulate enhancement activities. The fishery exceeds this performance level.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The fishery exceeds this performance level.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			A range of policies, statutes and regulations promote the protection of wild salmon. These include Salmon Regional Planning Plans, ADF&G Genetics Policy, the FRED Division Statute 1971, the PNP Hatchery Permitting Statute, the Regional Planning Statute 1976, the BOF Hatchery Management Policy, Fish Transport Regulations 1981, the PNP Regulations 1985, the Genetics Policy 1985, the Pathology Policy 1988, Wild and Enhanced Stock Statute 1992, Sockeye Salmon Culture Policy 1994, and the BOF Sustainable Salmon Policy 2000. The Policy for Management of Sustainable Salmon Fisheries (5AAC 39.222) requires that '*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*'. Also, that '*Plans and proposals for development or expansion of salmon fisheries and enhancement programs should effectively document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks.*' Policy for the Management of Mixed-Stock salmon fisheries (5AAC 39.220) accords the highest priority to the conservation of wild salmon stocks. The Regional Planning Team Review Regulation (5AAC 40.170) provides review criteria which must be considered and include provisions for the protection of the naturally occurring stocks from any adverse effects which may originate from a proposed hatchery.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			Despite the historic high level of hatchery production in LCI, the terminal fisheries on hatchery stocks have provided the evidence that these strategies are currently protecting wild stocks from hatchery detrimental impacts (CIRPT 2007, Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012, Hammarstrom & Ford 2011). The historically poor performance of the Port Graham hatchery in meeting ADF&G regulations and guidelines suggest the previous monitoring program and enforcement of the standards may have been lax and resulted in poor hatchery performance and uncertainty in effects of the releases on the fisheries. Nevertheless, it is considered that there is some objective basis for confidence that the strategy is effective and allows the fishery to meet this level of performance.

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			LCI enhancement and fishery strategies for all targeted salmon species, meet this performance level based on regulations, policies and practices of ADF&G and that enhancement activities focus on terminal on hatchery stocks (CIRPT 2007, Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012, Hammarstrom & Ford 2011).
	b	**N**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			The historically poor performance of the Port Graham hatchery in meeting ADF&G regulations and guidelines means that the fishery does not meet this level of performance.
References			CIRPT (2007); Stopha (2012a); (2012b); (2013); Stopha and Musslewhite 2012; Hammarstrom & Ford (2011)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**90**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 5: Lower Cook Inlet

PI 1.3.3			Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The impact of enhancement activities on wild stocks of salmon has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. LCI exceeds this level of performance.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fisheries exceed this level of performance because there are good policies and regulations in place that require that the effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Because of terminal fisheries, there is sufficient information on the contribution of enhanced fish to the harvest and wild escapements of the stock (CIRPT 2007, Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012, Hammarstrom & Ford 2011).
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			The genetic policies of the Department, limnological review of carrying capacity and monitoring programs of escapement returns on sockeye salmon enhancement provide estimates of the program on wild stock status, productivity and diversity (CIRPT 2007, Stopha 2012a, Stopha 2012b, Stopha 2013, Stopha & Musslewhite 2012, Hammarstrom & Ford 2011). The fishery meets this level of performance.
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Because of the terminal harvest areas, there has been little research on straying and evaluations of the harvest. Although this is understandable, given the scale of the program, the fishery does not meet this level of performance because there is not a comprehensive range of relevant information, when compared with other areas of Alaska where hatchery releases are a large component of the harvests.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The assessment team found the limnological and genetic information available to evaluate the impacts of the enhancement activities as appropriate and takes into account the major features relevant to the biology of the enhances species. The enhancement activities on species other than sockeye salmon and pink salmon (not currently being produced) are too small and local to have any appreciable risk on stock status, productivity or diversity of wild stocks. The fishery meets this level of performance.
References			CIRPT (2007), Stopha (2012a), Stopha (2012b), Stopha (2013); Stopha & Musslewhite (2012), Hammarstrom & Ford (2011).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
5	**LCI**	**90**	**N/A**

Evaluation Table PI 1.1.1 – UoC 6: Upper Cook Inlet

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, coho and chum and have exceeded the lower end of the TRP (escapement goal (SEG)) in most of the past 10 years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. For pink salmon, there are no formal escapement goals for Upper Cook Inlet but runs are evaluated from commercial fisheries catch rates and escapement counts directed at other species, primarily Chinook and sockeye. Because harvests are small and effort is low for chum, coho and pink salmon, it is highly likely that these stocks are above the point where recruitment is impaired or to impact yield. ADF&G has estimated harvest rates of all of these stocks to be below 25%. Yield is most likely foregone because of low harvest rates on these stocks compared to that which would provide for MSY. Susitna River sockeye salmon are a stock of yield concern and ADF&G has developed the Susitna River Sockeye Salmon Action Plan to facilitate recovery. The sonar counters reliability at estimating escapements of sockeye into the Yetna has been questioned. Four Chinook salmon stocks have been designated as stocks of management concern as they have consistently failed to meet the lower end of their escapement goals. These are the Chuitna River, Theodore River, Lewis River, and Alexander Creek. Willow Creek and Goose Creek are stocks of yield concern. Chinook stocks throughout southcentral and southwestern Alaska have had poor returns over the past five years, primarily related to marine rearing conditions and unrelated to the harvest rates. In 2012, major closures of sockeye salmon fisheries that intercept Chinook salmon resulted in lowered exploitation rates on the depressed stocks. ADF&G is continuing to research the causes of the decline and have decreased harvest rates on all commercial fisheries where the fishery is no longer considered to be a significant factor in affecting the recovery of the depressed stocks. Action plans have been implemented for the depressed Chinook stocks (ADF&G 2011b, ADF&G 2011c, ADF&G 2011d).
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, Coho, chum and pink salmon. Chinook meets this level of performance because directed commercial fisheries do not occur and bycatch levels have been reduced to insignificant harvest rates. There is no evidence to suggest harvests are related to the decline and no evidence of recruitment overfishing (Shields and Dupuis, 2012; Munro & Volk 2012).
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Sockeye, coho, and chum salmon are meeting their escapement goals and there

PI 1.1.1			The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
			is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired. Pink exploitation rates are very low and the evidence suggests fisheries have minimal impact on stock status (Willette *et al*. 2003). For Chinook salmon, the level of fishing effort is considered low enough that it would not impair recruitment. There is a large amount of research data on stock composition and harvest rates to support the high degree of certainty criteria of minimal impacts of the commercial fisheries on the stocks that are depressed (Barclay *et al*. 2010; 2012).
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, coho, and chum salmon have exceeded the lower end of the TRP (escapement goal (SEG or BEG)) in most of the past 10 years (Munro & Volk 2012). However, because escapement data are limited and the lack of formal escapement goals for many of chum, pink and coho systems, the fishery does not meet this guidepost because there are no formal TRPs. In addition, the Chinook and sockeye salmon fisheries have not met the lower end of the escapement goals in all of the past ten years and therefore do not meet this level of performance.
References			ADF&G (2011b), ADF&G (2011c), ADF&G (2011d), Barclay *et al*. (2010), Barclay *et al*. (2012), Munro & Volk (2012), Shields & Dupuis (2012), Willette *et al*. (2003).

Stock Status relative to Reference Points for each UoC

UCI	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP. Harvest rate for other stocks.	Variable, depending on stock (see Munro & Volk 2012) Not formally defined by harvest rates are likely below 10% (Willette *et al* 2003).	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012) or all significant fisheries harvests have been curtailed.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 6: Upper Cook Inlet

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			There are multiple sampling sites and escapement goals for sockeye salmon and Chinook salmon (Shields & Dupuis 2012). In Upper Cook Inlet, there are limited numbers of escapement goals for the other species, but the department has estimated exploitation rates on the stocks, which are low compared to most commercial fisheries for this species (Willette *et al*. 2003). The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The low exploitation rates allow for conservative management and limited effects on inherent diversity and reproductive capacity of the chum, coho and pink stocks and all subcomponents (Willette *et al*. 2003). Stock components have been well defined (Barclay *et al*. 2010, Barclay *et al*. 2012). The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, and some chum and coho stocks. There are none for pink salmon because of low exploitation rates of these stocks. Escapement goals have been used to manage the UCI fishery for 10 or more years. Quantitative reference points have not been developed for pink salmon and very limited for chum and coho salmon because fishing effort is low. ADF&G has provided estimates of harvest rates on these stocks and all are low compared to most commercial salmon fisheries and are unlikely to be a significant factor. The estimates of harvest rates and other long term escapement studies of Chinook, sockeye and some coho and one chum system are considered appropriate reference points for the wild stock management of UCI. In the large river escapement counts for Chinook and sockeye, escapements of coho, chum and pink stocks are enumerated, even though formal escapement goals may not be established. Consequently, evidence of harvest rates are available for some stocks (Willette *et al*. 2003; Munro and Volk 2012; Shields & Dupuis 2012). The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye and Chinook are an effective LRP, as noted in 80a. For pink and many of the stocks of coho and chum, estimates of harvest rates are well below the levels where there is a significant risk of impairing reproductive capacity. Other stocks that may have higher harvest rates have monitored escapements (Willette *et al*. 2003, Munro & Volk 2012, Shields & Dupuis 2012). The fishery exceeds this scoring level for sockeye and Chinook salmon and meets this level for pink, chum and coho salmon.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region. The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. In UCI, the allocation of fish to sport fisheries result in frequent high escapements where yield to the commercial fisheries may be foregone to support high demand recreational fisheries that have relatively low harvest rates on the escapement. The low exploitation rates of the commercial fisheries on coho, chum and pink salmon assure productivity is not at risk as a result of the fishery (Willette *et al*. 2003). The fishery exceeds this scoring level for sockeye and Chinook salmon and meets this level for pink, chum and coho salmon.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a “limit reference point”. Large interannual variations in run returns are common in Pacific salmon and this “abundance” based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska’s fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non-target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			In UCI, the presence of commercially important sport fisheries and guiding operations for recreational anglers, stock abundance in the escapements are subject to intense scrutiny in terminal area, with many tagging studies and local escapement counts, in addition to both commercial and sport fishing harvest data. Consequently, escapements remain high unless marine survival is an issue and exploitation rates are relatively low compared to other commercial fisheries in Alaska. Consequently, harvest management is highly precautionary.
100	**b**	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the UCI Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. Harvests of coho, chum and pink salmon are at rates below those commonly observed in other Alaska salmon fisheries. However, because pink salmon does not have an escapement goal, the fishery overall cannot meet this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the UCI Management Area is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. Limnological studies and detailed studies into the life history of Chinook salmon and coho salmon are prevalent in UCI and the use of this information in formulating harvest policy is common. The low harvest rates for chum, pink and coho provide a high degree of certainty that harvests do not impact the ecological role of the stock. However, because pink salmon does not have an escapement goal, the fishery overall cannot meet this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the UCI Management Area provides a high degree of certainty in protecting subcomponent stocks, as noted above, because of the numerous research components on all salmon species in the area, both as result of sport fishing related research and investigations in salmon life history as result of historical and ongoing research related to the proposed Susitna hydroelectric project (Barclay *et al*. 2010, Barclay *et al*. 2012). As such, the UCI fishery does meet this level of performance.
References			Munro & Volk (2012), Dann *et al*. (2011), Dann *et al*. (2012a), Eggers *et al*. (2011), Barclay *et al*. (2010), Barclay *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 6: Upper Cook Inlet

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are six Chinook stocks of concern based on both yield (2) and management (4) issues and there is one sockeye stock of yield concern. All directed commercial fisheries have been closed or severely reduced and sportfish harvests have been curtailed. The fishery exceeds this level of performance (Munro & Volk 2012).
	b	**Y**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			Extensive escapement monitoring occurs on all stocks of concern to determine if the stocks are recovering. There is no evidence that the depletion of the stocks of concern was the result of commercial fishing (Shields & Dupuis, 2012).
	c	**Y**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			Enhancement activities are primarily directed at enhancement of fisheries in UCI rather than focusing on stock rebuilding. Harvest management and research as to causes for declines are the primary tools used for recovery (CIRPT 2007).
80	**a**	**Y**	Where stocks are depleted rebuilding strategies are in place.
			The BOF requires recovery plans for stocks of concern. The Department has developed or is in the process of developing recovery plans for all stocks listed as of management concern (ADF&G 2011b, ADF&G 2011c, ADF&G 2011d).
	b	**Y**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			As stocks are not depleted as a result of the fishery, ongoing research continues to look for the causes of decline of Chinook stocks and the Susitna sockeye salmon. Directed fisheries on these stocks are reduced to not significantly impact recovery. Declines are likely related to marine conditions unrelated to the fishery. The fishery meets this level of performance.
	c	**Y**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			Stock enhancement activities have been considered in the past to recover stocks that have failed for reasons unrelated to fishery harvests. Regardless of the cause, fisheries are curtailed well before reach limits where recruitment would be impaired and harvest management is the primary tool used for stock recovery. The UCI enhancement activities have been greatly reduced and are of minor concern in management or the recovery of depleted fisheries (CIRPT 2007).
100	**a**	**N**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			Although Chinook salmon decline is likely marine based, and Susitna sockeye decline is poorly understood, the precise cause of the declines of all of the stocks of concern are unknown and until research demonstrates a cause and effect, the rebuilding of the stock in any specific timeframe is uncertain. However, it is highly certain that commercial fishing is not a significant contributor to the decline nor will its curtailment assure rebuilding takes place in any specific timeline. The fishery for Chinook and Susitna sockeye salmon cannot currently

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			meet this level of performance.
	c	**Y**	Enhancement activities are **not used** as a stock rebuilding strategy. Although enhancement has been used in the past to rebuild stocks, the current recovery plans do not have enhancement as a stock rebuilding strategy (CIRPT 2007). However, proper enhancement activities, such as habitat restoration or conservation hatcheries to maintain stock genetic diversity would be considered by the AT to be good stewardship practices and would be contrary to this scoring guideline level. The fishery currently meets this scoring level.
References			ADF&G (2011b), ADF&G (2011c), ADF&G (2011d), CIRPT (2007), Munro & Volk (2012), Shields & Dupuis (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**90**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 6: Upper Cook Inlet

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative sockeye and Chinook spawning escapements are monitored with respect to escapement curves based on historical timing. This information is used to effectively control harvests in order to meet the TRP. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance for sockeye, Chinook, and meets this level for coho, chum and pink. For coho, chum and pink salmon the elements of the harvest strategy (low harvest rate, catch, effort and large system escapement monitoring, Emergency Order authority) work together to ensure the stock is maintained at a sustainable level.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**N**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species or the harvest rates are so low that the fishery is not a factor in affecting escapement levels. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. Estimates of low harvest rates have been made for coho, pink and chum stocks that have few formal escapement goals. The fishery meets this level of performance for Chinook and sockeye but not for coho, pink and chum salmon because of the lack of formal escapement goals and established reviews of the fishery that occur for Chinook and sockeye.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are made available online at the ADF&G website (http://www.adfg.alaska.gov/index.cfm?adfg=home.main). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012).

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Stocks are at or above target levels for most years. In the case of sequential poor harvests or escapements below the lower bound of the TRP (SEG or BEG), actions are taken and recovery plans are completed. The Chinook stocks are primarily the focus of sport fisheries and large harvests of sockeye salmon, the primary target of UCI commercial fisheries are foregone to maintain escapements of Chinook salmon. For sockeye, inseason management actions are reported every year.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (Hasbrouk & Edmundson 2007, Fair *et al*. 2010, Fair *et al*. 2011). For coho, pink and chum ADF&G recognises that fishing effort is low. The fishery meets this level of performance.
References			Fair *et al*. 2010, Fair *et al*. (2011), Hasbrouk & Edmundson (2007), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**95**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 6: Upper Cook Inlet

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for each species (sockeye, Chinook, chum, coho) has been achieved in most of the past 10 years except for the stocks of concern (Munro & Volk 2012), indicating that harvest control rules are effective. For coho, chum and pink salmon, there are limited escapement goals but exploitation rates and effort continues to be low. The stocks of concern declines are not related to historic harvests or escapements. The fishery meets this level of performance.
References			Munro & Volk (2012)

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
6	**UCI**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 6: Upper Cook Inlet

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify sockeye populations throughout the watershed.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on subsistence and sport fishing harvest. Extensive monitoring of the genetic composition of the stocks and harvest composition has been completed in the past and there is an excellent understanding of harvest composition (Barclay *et al*. 2010, Barclay *et al*. 2012, Willette *et al*. 2003). The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District for sockeye salmon. Limnological data are available for all of the major lakes system and are used in determining escapement goals. For sockeye, Chinook, coho, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance (Shields & Dupuis, 2012).
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., Didson sonar counts on the Kenai River or weirs) Managers recognize and understand the uncertainty in estimates (Shields & Dupuis, 2012).
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. Harvest data are available for each fishing district. Harvests and escapements of the sockeye and Chinook runs are monitored for numerous systems in UCI. The coho, pink and chum runs are monitored in some systems but the harvest rates are low. The fishery meets this level of performance.
References			Barclay *et al*. (2010), Barclay *et al*. (2012), Shields & Dupuis (2012), Willette *et al*. (2003).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 6: Upper Cook Inlet

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points) or harvest rates are estimated where escapements have limited monitoring and exploitation rates are low.
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF (Fair *et al*. 2010, Fair *et al*. 2011, Hasbrouk & Edmundson 2007, Munro & Volk 2012). The escapement goal review and the BOF review meet the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			UCI stocks are well defined for the purpose of managing the fishery and maintain robust populations. Much of development of Genetic Stock Identification (GSI) using sophisticated genetic tools originated in UCI stocks from the ADF&G genetics laboratory (Barclay *et al*. 2010; 2011).The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are usually not used as a source of information for making management decisions except of the stocks with limited harvest rates. Escapement of coho, pink and chum salmon have limited monitoring but data are acquired coincidental with monitoring escapements of sockeye and Chinook salmon in

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			addition to abundance in the catch. Estimates of harvest rates have been made for stocks without escapement goals and are low compared to other stocks with more intensive targeted fisheries (Willette *et al*. 2003, Shields & Dupois, 2012). The fishery exceeds this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**N**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and is evaluating stock status relative to reference points in a probabilistic manner (Munro & Volk, 2012). Many of the chum, coho and pink salmon stocks do not have a formal escapement goal because conservatively estimated exploitation rates do not indicate the fishery is a significant factor in determining escapements. Because harvest rates are not estimated annually, there is some uncertainty, although very small, that harvests remain an insignificant factor. Consequently the fishery on chum, coho and pink salmon does not meet this scoring criteria.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust. Alternative approaches to escapement goal development have been considered (Munro & Volk, 2012). Harvest rates are very low on chum, pink and coho salmon and many of the stocks of these species, consequently do not have escapement goals established. The assessment approach for these species has not been rigorously explored and consequently this scoring level is not achieved.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of regular external review of escapement goal evaluations for salmon, although outside consultants have addressed escapement goals for controversial fisheries with allocation concerns, such as the Kenai River sockeye salmon runs. However the ADF&G and BOF do not routinely have external reviewers outside of ADF&G. Consequently the fishery does not meet this scoring level.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because of the low harvest rates on chum, coho and pink salmon.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Sockeye and Chinook escapements are monitored through weir counts. The fishery is considered to meet this level of performance.
References			Barclay *et al*. (2010), Barclay *et al*. (2011), Munro & Volk (2012), Willette *et al*. (2003), Shields & Dupois (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**90**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 6: Upper Cook Inlet

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. Enhancement activities are relatively limited in UCI with major programs in Tustumena lake recently curtailed. There are some systems with sockeye salmon and Chinook hatchery plants and lake fertilization programs. The Chinook hatchery production is primarily focused on terminal sport fisheries. Sockeye fry plants are highly regulated using strict genetic and disease guidelines and fisheries are usually small and terminal. Limnology data are available on receiving lakes and usually have targeted systems with limited spawning capacity (CIRPT 2007, Shields & Dupuis 2012). The fishery exceeds the level of performance.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. Because of the intensity of the research associated with the enhancement activities and their limited impact on fisheries, the salmon hatcheries associated with stocking UCI systems are considered to have a high degree of certainty that they do not impact wild salmon stocks negatively in this area. The hatcheries underwent a recent review (Stopha 2012) and all hatcheries that are currently in operation have received good reviews in compliance with state policies and regulations designed to protect wild stocks.
References			CIRPT (2007), Shields & Dupuis (2012), Stopha (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 6: Upper Cook Inlet

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The impact of enhancement activities on wild stocks of all five salmon species has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. Current policies and regulations are in place state-wide that are precautionary and regulate enhancement activities. The fishery exceeds this performance level.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The fishery exceeds this performance level.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			A range of policies, statutes and regulations promote the protection of wild salmon. These include Salmon Regional Planning Plans, ADF&G Genetics Policy, the FRED Division Statute 1971, the PNP Hatchery Permitting Statute, the Regional Planning Statute 1976, the BOF Hatchery Management Policy, Fish Transport Regulations 1981, the PNP Regulations 1985, the Genetics Policy 1985, the Pathology Policy 1988, Wild and Enhanced Stock Statute 1992, Sockeye Salmon Culture Policy 1994, and the BOF Sustainable Salmon Policy 2000. The Policy for Management of Sustainable Salmon Fisheries (5AAC 39.222) requires that '*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*'. Also, that '*Plans and proposals for development or expansion of salmon fisheries and enhancement programs should effectively document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks.*' Policy for the Management of Mixed-Stock salmon fisheries (5AAC 39.220) accords the highest priority to the conservation of wild salmon stocks. The Regional Planning Team Review Regulation (5AAC 40.170) provides review criteria which must be considered and include provisions for the protection of the naturally occurring stocks from any adverse effects which may originate from a proposed hatchery.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			The fishery exceeds this scoring level.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			UCI enhancement and fishery strategies for all salmon species, meet this performance level based on regulations, policies and practices of ADF&G and that enhancement activities are low and fisheries are terminal on hatchery stocks. Guideline (Shields & Dupois 2012).
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			Because of the low level of hatchery production in UCI and terminal fisheries on hatchery stocks, the evidence that these strategies for protecting wild stocks from

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			hatchery detrimental impacts is clear (CIRPT 2007).
References			CIRPT (2007), Shields & Dupois (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 6: Upper Cook Inlet

PI 1.3.3			Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The impact of enhancement activities on wild stocks of salmon has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. UCI exceeds this level of performance.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fisheries exceed this level of performance because there are good policies and regulations in place that require that the effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Because of terminal fisheries and marking programs or genetic analysis, and relatively small numbers of released fisheries, there is sufficient information on the contribution of enhanced fish to the harvest and wild escapements of the stock (Shields & Dupois 2012, CIRPT 2007).
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			The genetic policies of the Department, limnological review of carrying capacity and monitoring programs of escapement returns on sockeye salmon enhancement provide estimates of the program on wild stock status, productivity and diversity (CIRPT 2007, Shields & Dupois 2012). Other stocking is primarily addressed at sport fishing opportunities for small terminal fisheries. The fishery meets this level of performance.
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Because of the small programs and terminal harvest areas, there has been little research on straying and evaluations of the harvest. Although this is understandable, given the scale of the program, the fishery does not meet this level of performance because there is not a comprehensive range of relevant information, when compared with other areas of Alaska where hatchery releases are a large component of the harvests.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The assessment team found the limnological and genetic information available to evaluate the impacts of the enhancement activities as appropriate and takes into account the major features relevant to the biology of the enhances species. The enhancement activities on species other than sockeye salmon are too small and local to have any appreciable risk on stock status, productivity or diversity of wild stocks. The fishery meets this level of performance.
References			CIRPT (2007), Shields & Dupois (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
6	**UCI**	**90**	**N/A**

Evaluation Table PI 1.1.1 – UoC 7: Bristol Bay

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Coho is classed as an IPI species in the Bristol Bay Unit of Certification. As such, the Bristol Bay fishery is considered to target only sockeye, Chinook, pink and chum salmon. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			The fishery exceeds this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye salmon have exceeded the lower end of the TRP (escapement goal (SEG or OEG)) in each of the past nine years (Munro & Volk 2012) in all drainages except the Kvichak River. The Kvichak River did not meet escapement in 2003 and 2004 but has met or exceeded the lower end of the goal in the seven years since. Escapements of Chinook salmon have generally exceeded the lower end of the respective TRPs; the smaller stocks inhabiting the Naknek, Alagnak, and Eggegik rivers do not have a targeted fishery and escapements have bounced around the lower end of the TRPs. The relatively large Nushagak River has a targeted fishery and escapements exceeded the lower end of the TRP in each of the past nine years (Munro & Volk 2012). Odd-year pink salmon are largely absent in Bristol Bay. Until recently, even-year pink salmon in Bristol Bay were harvested through a relatively low effort by locally based vessels; CPUE and sonar counts were used to manage the fishery. The fishing effort increased in 2010 and 2012, and ADF&G established a lower end SEG of 165,000 for the even-year run that will go into effect in 2014 (Eric Volk, ADF&G, pers. comm.). Nushagak River chum salmon are incidentally taken in large numbers in the fishery for sockeye salmon; escapement exceeded the lower-bound SEG of 190,000 in eight of the last nine years. Overall, for all species, it can be said that there is a high degree of certainty that the stocks are above the point where recruitment would be impaired.
	b	**Y**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			As described above, the fishery meets this level of performance for sockeye, Chinook and chum salmon based on the fishery performance against escapement goals.

PI 1.1.1			The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
			Although an escapement goal has not been used to manage the fishery to date, pink salmon can be said to meet this level of performance because of the exceedingly low effort historically, at least until the recent price increase. In 2010, fishing pressure increased, and the department responded by proposing an SEG of 165,000 that will go into effect in 2014 (Eric Volk, ADF&G, personal communication) The fishery achieved the future SEG of 165,000 pink salmon in 7 of the last 10 even numbered years (Fair *et al.* 2012).
References			Fair *et al.* (2012), Jones *et al.* (2012), Munro & Volk (2012)

Stock Status relative to Reference Points for each UoC

Bristol Bay	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Optimal EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 7: Bristol Bay

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals (SEG) have been developed for sockeye, Chinook, chum and pink salmon and were reviewed in 2012 (Fair *et al.* 2012). Escapement goals are well reviewed and incorporate input from outside experts. It is considered that the fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, Chinook, pink and chum are an effective LRP, as noted in 80a. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production, which is consistent with the text of this SI. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Nemeth *et al.* 2010). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primary terminal and can be managed by real time escapement counts or in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, has resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g., Dann *et al.* 2011, 2012a). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks.
100	**b**	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in Bristol Bay is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. However the Nushagak River has an established OEG of 235,000, well below the 340,000 established as the lower bound of the escapement goal, to facilitate harvests of other stocks when a large differential in run returns occurs. Although the risk to the fishery is not large, this OEG does not meet the level of precaution afforded most other Alaskan fisheries. Consequently, the fishery does not meet this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in Bristol Bay is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. This approach is consistent with the text of this SI, and so the fishery meets this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in Bristol Bay provides some substantial certainty in protecting subcomponent stocks of sockeye salmon, but we have no direct evidence that this is true for Chinook, pink and chum. Therefore, these fisheries do not meet this level of performance.
References			Dann *et al.* (2011), Dann *et al.* (2012a), Jones *et al.* (2012), Munro& Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 7: Bristol Bay

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			The fishery exceeds this level of performance.
	b	**Y**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			The fishery exceeds this level of performance.
	c	**Y**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement activities of any type in Bristol Bay.
80	**a**	**Y**	Where stocks are depleted rebuilding strategies are in place.
			The Kvichak River stock was listed as a stock of concern. Rebuilding strategies include area restrictions and reduced fishing time which shifts efforts away from the Kvchak District to harvest surpluses that still occurred in other districts.
	b	**Y**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			Yes, conservative area and time closures during contributed to the rebuilding of Kvichak River sockeye salmon evidenced by the stock exceeding the lower bound SEG in all five of the most recent years (Munro & Volk 2012).
	c	**Y**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement activities of any type in Bristol Bay.
100	**a**	**Y**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			Kvichak River sockeye salmon are currently listed as a stock of concern because of escapements below the lower bound of the SEG that were observed prior to 2005. Conservative management actions played an important role in the rebuilding of this stock that has met or exceeded the lower end of the goal in the seven years since (Munro & Volk 2012). ADF&G recommends removal of the stock of concern designation, and positive action by the Alaska BOF is anticipated during winter 2012. No other stocks of concern exist in Bristol Bay.
	c	**Y**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement activities of any type in Bristol Bay.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 7: Bristol Bay

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Yes, monitoring in place includes aerial, tower, and sonar counts as well as the monitoring of daily fish tickets. Stock structure is monitored by age composition analyses in some watersheds. Commercial catch in the districts is monitored by genetic stock identification (e.g., Dann *et al.* 2011).
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (tower counts, sonar counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online (Jones *et al.* 2012). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Stocks are at or above target levels. For sockeye, as noted above, inseason management actions are reported every year, including comprehensive stock identification. The fishery meets this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years by the Alaska BOF (e.g., Fair *et al.* 2012). This review process is consistent with the text of this SI, and allows the fishery to meet this level of performance.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References		Dann *et al.* (2011), Jones *et al.* (2012), Munro & Volk (2012).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 7: Bristol Bay

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. It is considered that this in-season management approach accounts for a wide range of uncertainties, and so the fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goals for sockeye, Chinook, and chum salmon have been achieved in each of the past 10 years (*Munro & Volk* 2012), indicating that harvest control rules are effective. The escapement goals for even year pink salmon were developed consistent with the developing fishery. The fishery meets this level of performance.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 7: Bristol Bay

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on subsistence and sport fishing harvest. Tag studies provided estimates of removal of sockeye salmon in Alaska Peninsula fisheries; since 2008, ADF&G has collected genetic data to solidify these estimates (i.e., WASSIP). The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			Aerial surveys, sonar counts and age composition, and genetic data on sockeye, pink, and Chinook salmon provide information of stock structure and escapement. Genetic studies have been conducted to identify sockeye and chum salmon populations throughout Bristol Bay. There is a long history of monitoring of harvest and spawning escapement by District. Early and late components of the sockeye run are monitored, and sockeye recruitment data extend for more than 50 years (Fair 2003, Baker *et al.* 2009). Limnological data are available. The University of Washington Alaska Salmon Program maintains three field camps where scientists conduct extensive study on all species, in cooperation with ADF&G, of environmental data, fleet composition, and fishery effects, so allowing the fishery to meet this level of performance (see for example Flynn *et al.* 2004, Hilborn 2006, Bue *et al.* 2008, Kendall *et al.* 2011, Quinn *et al.* 2012). This comprehensive range of information allows the fishery to meet this level of

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			performance.
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., tower counts 10 min per hour during daylight) or on a weekly basis (aerial counts on streams). See Fair *et al.* (2003) and other references in this section. Managers recognize and understand the uncertainty in estimates, and so the fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, tower counts and aerial surveys document the spawning escapement of stock components (individual streams) of sockeye salmon; sonar counts are used for pink, sockeye and Chinook salmon. Harvest data are available for all species for each fishing district. Harvests and escapements of the early and late sockeye runs are monitored. Aerial surveys document the relative abundances of sockeye salmon in tributary streams connected to the rearing lakes. Extensive genetic data are available for harvests of chum and sockeye salmon within Bristol Bay as well as along the migration corridor into the bay (e.g., WASSIP, Dann *et al.* 2011, Dann *et al.* 2012).
References			Baker *et al.* (2009), Bue *et al.* (2008), Fair (2003), Dann *et al.* (2011), Dann *et al.* (2012a), Fair (2003), Flynn & Hilborn (2004), Hilborn (2006), Kendall & Quinn (2011), Quinn *et al.* (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 7: Bristol Bay

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (research staff and not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Bristol Bay stocks are well defined for the purpose of managing the fishery and maintain robust populations. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because of the intense usage of tower and sonar counts and aerial surveys.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. ADF&G provides a leadership role among salmon management agencies for using genetic methods to determine stock structure (e.g., Dann *et al.* 2012b). The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and are evaluating stock status relative to reference points in a probabilistic manner (e.g. Munro & Volk 2012). The fishery meets this level of performance.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust. ADF&G incorporates latest approaches for assessments and is currently using genetic stock composition to re-allocate harvests among districts in order to refine and update brood tables. The fishery meets this level of performance.
	e	**Y**	The assessment has been **internally and externally** peer reviewed.
			ADF&G sometimes incorporates input from external scientists when making decisions. In 2005, a team of external experts were contracted by ADF&G to review the escapement goals. The fishery meets this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because of the detailed data available from tower and sonar counts and aerial surveys. The fishery meets this level of performance.
References			Dann *et al.* (2012b)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 7: Bristol Bay

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	Y	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Bristol Bay.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Bristol Bay.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no enhancement in Bristol Bay.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 7: Bristol Bay

PI 1.3.2			Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Bristol Bay.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			There is no enhancement in Bristol Bay.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Bristol Bay.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			There is no enhancement in Bristol Bay.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Bristol Bay.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			There is no enhancement in Bristol Bay.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 7: Bristol Bay

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Bristol Bay.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			There is no enhancement in Bristol Bay.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Bristol Bay.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			There is no enhancement in Bristol Bay.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no enhancement in Bristol Bay.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			There is no enhancement in Bristol Bay.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**100**	**N/A**

Evaluation Table PI 1.1.1 – UoC 8: Yukon

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Sockeye and pink salmon are considered IPI species in the Yukon UoC because few sockeye are present and because few pink salmon are harvested even though abundance can be high in lower areas in some years. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Between 2007 and 2011, escapement goals in the Yukon (Alaska portion) have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012). Thus, it is highly likely that the wild stocks are above the point where recruitment would be impaired because lower escapement goals are set well above the point at which recruitment would be impaired and escapements that did not reach the lower goal did not miss by much. It is considered that coho and chum salmon exceed this level of performance (see below), while Chinook meets this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance.
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Between 2007 and 2011, escapement goals in the Yukon (Alaska portion) have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012), indicating that the stocks are above the point where recruitment would be impaired. However, given that Chinook escapements fall below the lower escapement goal in 33% of recent years, the assessment team cannot conclude this with a high degree of certainty for Chinook. As such, the fishery does not meet this level of performance.
	b	**Y**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Between 2007 and 2011, escapement goals in the Yukon (Alaska portion) have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012). The quantitative measures provide a high degree of certainty for the stocks that have goals and allow the fishery to meet this level of performance.
References			ADF&G (2012a), ADF&G (2012b), Estensen *et al*. (2012), Munro & Volk (2012).
Stock Status relative to Reference Points for each UoC			

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
YUKON	**Type of reference point**	**Value of reference point**	**Current stock status relative to reference point**
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).
UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
8	**YUKON**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 8: Yukon

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			The YMA salmon fisheries are managed to achieve spawning escapement goals in a number of tributaries and at the US/Canada border (Brannian *et al*. 2006, Estensen *et al*. 2012). There are 16 goals in the YMA, 7 for Chinook, 2 for summer chum, 6 for fall chum, and 1 for coho. In addition, there are 3 goals for Canadian stocks, 1 for Chinook and 2 for fall chum. These goals are based on weirs, counting towers, peak aerial counts, and sonar projects. Eight of the YMA goals are BEGs and 8 are SEGs. Between 2007 and 2011, escapement goals have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012). The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for Chinook, chum and coho salmon are an effective LRP, the lower bounds of which are set above the level at which there is an appreciable risk of impairing reproductive capacity. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Brannian *et al*. 2006, Munro & Volk 2012). The methods used reflect the type of information that is available, and allow the fishery to meet this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat in most areas

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			of the watershed are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. A number of goals are developed for each species (except for coho in the Yukon, which has one goal) and this provides a means to maintain subcomponents. Alaskan salmon fisheries are managed by either fixed escapement goals where the fisheries are primary terminal and can be managed by real time escapement counts or in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False Pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g., Dann *et al.* 2011, 2012a). The assessment team is unaware of any evidence showing that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. As such, the fishery meets this level of performance.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Yukon Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Yukon Management Area is such that the stocks are to be maintained at a sustained yield, which takes the ecological role of the stock into account. However, given the availability of data and limited spatial coverage of the data for each species the assessment team cannot conclude this with a high degree of certainty.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Yukon Management Area provides some

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Yukon fishery does not meet this level of performance.
References			ADF&G (2012a), ADF&G (2012b), Dann *et al*. (2011), Dann *et al*. (2012a), Brannian *et al*. (2006), Estensen *et al*. (2012), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 8: Yukon

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no stocks of management concern in the Yukon UoC. Although the Chinook stocks are not currently providing the desired level of harvest, they are meeting escapement goals 67% of the time and they are not considered depleted.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no stocks of management concern in the Yukon UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement (hatchery or lake fertilization) activities in the Alaska portion of the Yukon. A small Chinook hatchery exists in Canada that is not considered relevant to this assessment.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no stocks of management concern in the Yukon UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no stocks of management concern in the Yukon UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities in the Alaska portion of the Yukon.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no stocks of management concern in the Yukon UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities in the Alaska portion of the Yukon.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 8: Yukon

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason, managers use a series of gillnet test fisheries and mainstem sonar projects to monitor timing and abundance of each of the targeted species. Managers compare CPUE in the test fisheries and counts in the mainstem sonar with historical estimates as a means to determine whether there is sufficient abundance to open commercial fisheries while also meeting escapement goals. This monitoring is considered sufficient to determine whether the harvest strategy is working, and so the fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			Inseason, managers use a series of gillnet test fisheries and mainstem sonar projects to monitor timing and abundance of each of the targeted species. Managers compare CPUE in the test fisheries and counts in the mainstem sonar with historical estimates as a means to determine whether there is sufficient abundance to open commercial fisheries while also meeting escapement goals. Between 2007 and 2011, escapement goals have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho (Munro & Volk 2012). This, goals for Chinook have been met most of the time even though ocean conditions have been unfavourable. In 2013, the BOF adopted a plan to protect the early wave of Chinook from commercial and subsistence fishing so that these fish can pass through to Canada. The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			Coho and chum salmon exceed this level of performance. Chinook meets this level of performance, because, although the escapement goals were not met in 67% of the recent years, they are not consistently being met.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy as described above is designed to achieve stock management objectives. The fishery meets this level of performance.
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			The escapement goal review provides evidence that the strategy is fully evaluated (Munro & Volk 2012). However, Chinook escapements are not consistently

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			achieving the lower escapement (target) goal, and therefore Chinook does not meet this high standard whereas the other species do. Overall, the fishery does not meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years. Goals in the Yukon were briefly examined in 2012 but no changes in the goals were recommended (Conitz *et al*. 2012). Performance against the goals is documented on a regular basis (Munro & Volk 2012). The fishery is considered to meet this level of performance.
References		Conitz *et al*. (2012), Munro & Volk (2012).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**95**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 8: Yukon

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			Spawning escapement goals have been developed and the fishery is managed to achieve these goals. Inseason, managers use a series of gillnet test fisheries and mainstem sonar projects to monitor timing and abundance of each of the targeted species. Managers then compare CPUE in the test fisheries and counts in the mainstem sonar with historical estimates as a means to determine whether there is sufficient abundance to open commercial fisheries while also meeting escapement goals. Evaluation of performance against the goals indicates the harvest control rules are well defined and working to ensure that exploitation is reduced as LRP's are approached. Failure to meet goals in some years (e.g., Chinook) is often the result of low returns rather than commercial harvests.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The somewhat consistent inter-annual timing of runs and inseason monitoring of run size and fishery exploitation mean that uncertainty is minimised. Harvest control rules are designed to allow for subsistence harvests and for meeting escapement goals of salmon entering Canada. Managers recognize uncertainties in relationships between CPUE and runs sizes, and the uncertainty in abundance estimates generated at Pilot Station sonar. Thus, the harvest rules account for the main uncertainties and the fishery meets this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			Annual performance and monitoring indicate the tools are working to achieve escapement goals, even though ocean conditions for Chinook are poor. ADF&G recognized the need to pass more Chinook upstream to Canada and in January 2013 the BOF adopted a new strategy to fully protect the early Chinook wave and allow it to proceed to Canada. The fishery meets this level of performance.
100	**b**	**N**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The harvest control rules consider major uncertainties, but the assessment team concludes that a wide range of uncertainties are not fully considered through this very large watershed. Therefore, this performance indicator is not met.
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			The lower escapement goal for each species (Chinook, chum, coho) is typically met (Munro & Volk 2012). Between 2007 and 2011, escapement goals have been achieved 67% of the time for Chinook, 80% for summer chum, 87% for fall chum, and 100% of the time for coho. Given that Chinook did not meet the goal in 33% of the years, the assessment team concludes that Chinook did not meet this high standard, even though ocean conditions were largely responsible for the low Chinook runs. The fishery overall, does not meet this high standard.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**80**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 8: Yukon

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, mainstem sonar counts, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify Chinook and chum populations within the watershed. Summer and fall chum stocks are managed separately. Managers recognize that early arriving Chinook tend to migrate farther upriver and into Canada. The fishery is managed closely and fleet/fisher composition is known. The information is considered sufficient to support the harvest strategy and so the fishery meets this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored for commercial removals by district using fish tickets. Good information is also collected on subsistence and sport fishing harvest, and values are reported. The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance for Chinook and chum. For coho, the fishery meets this level of performance because there is one escapement goal, coho abundance is monitored in the mainstem at Pilot Station, and the harvest rate on this late returning species is low.
100	**a**	**N**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			Sufficient information is collected on the salmon stocks for managing the fishery, but the assessment team concludes that it is not comprehensive and does not meet this high standard. In part, the lack of comprehensive information is related the large size of the watershed.
	b	**N**	**All information** required by the harvest control rule is monitored with high

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Information for the harvest control rule is frequently collected but this information does not have a high degree of certainty because the watershed is so large. In general, managers recognize the uncertainties, but the assessment team concludes that, overall, the fishery does not meet this high standard.
	d	**N**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			Information is gathered on salmon removals and there is good information available on Chinook and chum salmon stock components based on genetic sampling throughout the mixed stock fisheries, as well as at Pilot Station (JTC 2012). However, the assessment team concluded that this range of information is not comprehensive (given the vast size of the watershed) and that this high standard is not met.
References			ADF&G (2012a), ADF&G (2012b), Estensen *et al*. (2012), JTC (2012), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**80**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 8: Yukon

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			Spawning escapements are monitored for each targeted species and directly compared with escapement goals (reference points). The fishery meets this level of performance.
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring as described above. All harvests are documented by district as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The assessment is appropriate for the stock and for the harvest control rule.
	c	**Y**	The assessment **takes uncertainty into account**.
			Managers recognize uncertainty in escapement monitoring and relationships between CPUE and actual abundance of salmon, so basic uncertainties are taken into account when managing the fishery. The fishery meets this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. Stock status is also reviewed by the Yukon Panel, which involves Canadian management biologists. These review processes meet the intent of the MSC peer review requirement of stock status, and the fishery meets this level of performance.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Yukon stocks are well defined for the purpose of managing the fishery and maintain robust populations. For example, managers recognize that early arriving Chinook are mostly destined for the upper watershed (Canada) and this is considered when opening the commercial fishery. Managers recognize that salmon spawn in tributaries throughout the watershed. Overall, all stock abundances are evaluated using test fishery, commercial catch CPUE, and Pilot Station sonar. Details on a few subcomponents are monitored against escapement goals.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Management objectives are developed for additional stocks (e.g., of coho) where formal goals have yet to be developed. This is described in the description of the Yukon fishery (see Section 0). The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			The management system estimates total escapement (index) in the mainstem (not an indicator) using Pilot Station sonar and in some tributaries where counts can be readily made. Managers attempt to meet escapement goals for each of the monitored stocks distributed across much of the basin, plus they have management objectives for additional tributaries where formal goals are not established. Typically the escapement goals are achieved. The management approach and the pattern of meeting escapement goals for the monitored stocks provide evidence for this indicator that allows all Yukon fisheries to meet this level of performance.
100	**a**	**N**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			The assessment is generally appropriate for the stock and the harvest control rule, but the assessment team cannot conclude that it is sufficient to account for major features relevant to the biology of the species and the nature of the fishery. Some information is available on gillnet selectivity for Chinook but it is not comprehensive for males and females throughout the watershed. It is not clear to what extent the relatively low frequency of female Chinook in the adult returns to the spawning grounds is considered. As such, the fishery does not meet this level of performance.
	c	**N**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty but not in a probabilistic manner. This high level of performance is not met.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used in recent years. But the assessment has not been shown to be robust and, while some different ideas have been considered, alternative approaches have not been thoroughly explored. This level of performance is not met.
	e	**Y**	The assessment has been **internally and externally** peer reviewed.
			Management of Yukon salmon is reviewed internally, and there is some review via the Yukon Panel and with Canadian input. Recently, harvet management strategies underwent a review by external and internal experts (http://69.93.224.39/~aykssi/wp-content/uploads/902-Jones-FR.pdf).
	f	**N**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are somewhat well defined in terms of timing and geographic range, and they can be conserved and managed. However, the assessment team does not

PI 1.2.4			There is an adequate assessment of the stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			conclude that there is an unambiguous description of the each stock. As such, the fishery does not meet this level of performance.
	g	**N**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			The assessment team is not aware of findings showing the status of the indicator stocks is well correlated with the full range of stocks. Therefore, the fishery does not meet this level of performance.
References			ADF&G (2012a), ADF&G (2012b), Estensen *et al*. (2012), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**85**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 8: Yukon

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	Y	It is **likely t**hat the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Enhancement is not used in the Alaska portion of the Yukon River.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Enhancement is not used in the Alaska portion of the Yukon River.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Enhancement is not used in the Alaska portion of the Yukon River.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 8: Yukon

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			Enhancement is not used in the Alaska portion of the Yukon River.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			Enhancement is not used in the Alaska portion of the Yukon River.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			Enhancement is not used in the Alaska portion of the Yukon River.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 8: Yukon

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			Enhancement is not used in the Alaska portion of the Yukon River.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			Enhancement is not used in the Alaska portion of the Yukon River.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Enhancement is not used in the Alaska portion of the Yukon River.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			Enhancement is not used in the Alaska portion of the Yukon River.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
8	**YUKON**	**100**	**N/A**

Evaluation Table PI 1.1.1 – UoC 9: Kuskokwim

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Pink salmon is an IPI species in the Kuskokwim Unit of Certification, and will be dealt with as a retained species under Principle 2. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, chum and coho salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in most of the past 10 years (Brannian *et al*. 2006, Munro and Volk 2012), indicating these stocks are consistently well above a level that might cause recruitment to be impaired. Escapement goals for Chinook salmon have not been achieved for 10 of the monitored stocks during most of the recent four year period. Only two Chinook stocks have consistently met their escapement goals. ADF&G reconstructed the total run of Chinook salmon to the Kuskokwim River, based on a new analysis, and concluded that previous goals for tributaries were too high, suggesting that it is likely that Chinook are above the point of recruitment impairment. Both the run reconstruction and escapement goal analysis received external review by the USFWS and associates. Both analyses have been published as technical reports by ADF&G (e.g., Hamazaki *et al*. 2012). In January 2013, the BOF adopted the basinwide Chinook escapement goal and the revised goals for several tributaries. A harvest management plan was adopted by the Board and this plan included safeguards to ensure escapement goals would be met while also providing for subsistence fishing opportunities. Also, based on a recent analysis of subsistence needs in the basin by ADF&G, the Board increased the amount of Chinook recognized to be needed for subsistence in the basin—a decision that provides greater protection of subsistence needs over commercial fishing. The number of large Chinook salmon and the number of female Chinook salmon has declined; the ADF&G recognized this problem and stated that they would continue to track the issue. Given this effort and some external review, the assessment team concluded that it is highly likely that Chinook are above the point of where recruitment would be impaired, and so the fishery meets this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, chum and coho salmon. Although escapement goals for Chinook salmon have not been achieved for 10 of the monitored stocks during most of the recent four year period, a series of new analyses indicate the goals were set too high (see above) and that the revised goals would have been met in most years. The new analyses received review by outside experts. As such, Chinook, and therefore the fishery overall, meets this level of performance.
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no

PI 1.1.1			The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing
			significant effect on the stock status.
			Spawning escapements of chum, coho and sockeye have consistently exceeded the lower escapement goal in the past five years suggesting but only a fraction of stock components have been monitored and the assessment team cannot conclude that there is a high degree of certainty that the wild stock is above the point where recruitment would be impaired. The fishery does not meet this high level of performance. Although new analyses suggest Chinook salmon escapement has been meeting the goals in recent years, the assessment team recognizes that Chinook age and the percentage of females on the spawning grounds is relatively low, therefore the assessment team cannot conclude that there is a **high degree of certainty** that the wild Chinook stock is above the point where recruitment would be impaired. As such, the fishery does not meet this level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Spawning escapements of chum, coho and sockeye have consistently exceeded the lower escapement goal in the past five years suggesting there is a high degree of certainty that the wild stock is has been fluctuating around its target reference point. Chinook are also meeting the revised goals in most years, but the revised analysis is based on numerous assumptions and large females in the escapement are still relatively low. Therefore the fishery overall does not meet this level of performance.
References			Brannian *et al*. (2007), Hamazaki (2011), Hamazaki *et al*. (2012), Munro & Volk (2012).

Stock Status relative to Reference Points for each UoC

KUSKOKWIM	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012, Hamazaki *et al*. 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012, Hamazaki *et al*. 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012, Hamazaki *et al*. 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012, Hamazaki *et al*. 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**80**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 9: Kuskokwim

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The Kuskokwim fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The Kuskokwim fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, chum and coho salmon and were reviewed. The Chinook goal, based on a new run reconstruction, was revised in January 2013 (see text above). The run reconstruction and the escapement goal analysis received external review. Therefore, the fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			In principle, escapement goals are an effective LRP, as noted previously. The fishery exceeds this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describe the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Brannian *et al*. 2006). The methods used reflect the type of information that is available. In the Kuskokwim River, significant changes in escapement goals for Chinook salmon were adopted recently by ADF&G and the Board. Changes have been reviewed by external experts. The method is appropriate for providing the potential for maintaining high returns. Therefore the fishery meets this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are generally consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. For Chinook salmon, females are much less abundant than males on the spawning grounds, and large females have declined in abundance; this is a concern that ADF&G will continue to monitor. Commercial

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			fisheries currently use small mesh as a means to reduce incidental catch of Chinook. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. The fishery meets this level of performance.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Kuskokwim Management Area is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal methods do not explicitly consider precautionary measures with a high degree of certainty or the ecological role of salmon (e.g., see the above issue with regard to fewer large female Chinook in the fishery), therefore the fishery does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach provides some certainty in protecting subcomponent stocks, but we have no direct evidence that this is to a high level of certainty. As such, the fishery does not meet this level of performance.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References			ADF&G 2011a, Brannian *et al*. (2007), Dann *et al*. (2011), Dann *et al*. (2012a), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 9: Kuskokwim

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no formal stocks of concern in the Kuskokwim UoC. Most Chinook stocks have not been meeting the existing goal, but ADF&G reconstructed the total run of Chinook salmon to the Kuskokwim River, based on a new analysis, and concluded that previous goals for tributaries were too high, suggesting that it is likely that Chinook are above the point of recruitment impairment. Both the run reconstruction and escapement goal analysis received external review by the USFWS and associates. Both analyses have been published as technical reports by ADF&G (e.g., Hamazaki *et al*. 2012). In January 2013, the BOF adopted the basinwide Chinook escapement goal and the revised goals for several tributaries.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no formal stocks of concern in the Kuskokwim UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement (hatchery or lake fertilization) activities.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no formal stocks of concern in the Kuskokwim UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no formal stocks of concern in the Kuskokwim UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no formal stocks of concern in the Kuskokwim UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
References		Hamazaki *et al*. (2012).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 9: Kuskokwim

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored regularly by the manager. The test fishery at Bethel is used to guide openings of the commercial fishery based on CPUE of each species and migration timing curves. This information is used to effectively control harvests in order to meet the TRP. A good relationship between the test fishery and Chinook escapement to Kuskokwim tributaries was recently developed. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance for sockeye, coho and chum.. Commercial harvests of Chinook in the Kuskokwim River are incidental and relatively small (avg. 2,634 Chinook 2001-2010) compared with overall escapement goals, and managers have reduced mesh size to further reduce Chinook bycatch, yet Chinook have often been below the previous escapement goal and the number of large Chinook, and females on the spawning grounds has declined. Monitoring exists and with the revision of the escapement goals, there is evidence that it is achieving its objectives. Chinook meets this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort, migration timing), reviewed by managers to determine when to open and close the fishery. The fishing area is split into several fishing districts that are independently managed. Managers have delayed the onset of chum fishing in the Kuskokwim River and reduced mesh size as a means to reduce incidental catch of Chinook (avg. 2,634 Chinook 2001-2010). Although recent escapement goals have not been met for most Chinook stocks, there has been no directed commercial harvest of Chinook since 1987 and only relatively small numbers have been taken incidentally in the chum fishery. A new management plan was adopted by the BOF along with the revised Chinook escapement goals. The fishery meets this level of performance.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online (e.g., Brazil *et al*. 2011). Escapement goals and the methods to derive goals are periodically reviewed (e.g., Brannian *et al*. 2006). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). All stocks are at or above target levels, except for Chinook salmon, whose goals were recently changed. Commercial harvests of Chinook in the Kuskokwim River are incidental and relatively small (avg. 2,634 Chinook 2001-2010) compared with overall escapement goals, and managers have reduced mesh size to further reduce Chinook bycatch, yet Chinook have often been below the previous escapement goal and the number of large Chinook, and females on the spawning grounds has declined. The effect of reduced number of females and reduced size and age has not been fully evaluated. All species meet this high level of performance except Chinook, even though managers have taken significant actions to minimize incidental harvests of Chinook salmon. The new escapement goals and few large female Chinook have not been fully evaluated. Overall, the fishery does not meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			As noted above, inseason management actions are reported every year. Escapement goals and the methods to derive goals are reviewed every three years (Munro and Volk 2012.). Chinook goals were recently reviewed by ADF&G and external reviewers and revised. The fishery meets this level of performance.
References			ADF&G (2011a), Brazil *et al*. (2011), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**95**	**N/A**

Evaluation Table: PI – UoC 9: Kuskokwim

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand. Salmon "harvest control rules" are based on the Bethel test fishery in the Kuskokwim River, and a set fishing schedule in other districts (2 twelve hour periods per week in June and 3 per week in July and August), which may be modified if CPUE is lower or higher than expected for each species. In general, harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery is managed based on inseason monitoring of salmon abundance at the Bethel test fishery and CPUE of the commercial fishery harvests that are allowed as part of the fishing schedule (see above). This approach addresses main uncertainties and allows the fishery to meet this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The available tools (e.g., test fishery CPUE by species, subsistence reports, commercial CPUE) have enabled managers to reduce commercial fishing in order to achieve escapement goals of all salmon species except Chinook salmon (but see revisions to goals above). Commercial harvests of Chinook have been reduced in the chum fishery in order to minimize impacts on Chinook but many Chinook stocks did not meet the earlier goals in the tributaries because overall Chinook abundance returning to the region has been low. The fishery meets this performance level because the tools are appropriate and adequate.
100	**b**	**N**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			Fisheries for sockeye, coho and chum salmon do consider a wide range of uncertainties including upstream subsistence fishing and incidental harvest of Chinook salmon, and so they meet this level of performance. The Chinook fishery does not meet this high standard because it does not yet directly account for the percentage of female Chinook and reduced numbers of larger Chinook, although it does take some actions to reduce these impacts in the chum fishery, e.g., reduced mesh size, and delayed openings. The revised Chinook management plan will reportedly enable subsistence fisheries to proceed while also enabling escapement goals to be met but this new plan remains untested.

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			Small numbers of Chinook salmon are still harvested in the chum fishery even when they will not meet the escapement goals in the tributaries. The new Chinook management plan remains untested. Therefore the evidence does not show the tools are clearly effective for Chinook, and so the fishery overall does not meet this level of performance. Evidence (escapements versus goals) does show that the tools are effective for the other targeted salmon species.
References			Brazil *et al*. (2011), Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**80**	**N/A**

Evaluation Table: – UoC 9: Kuskokwim PI 1.2.3

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition (sockeye, Chinook, coho and chum) provide information of stock structure. Genetic studies have been conducted to identify sockeye, Chinook, coho and chum populations in the Kuskokwim River. The fishery meets this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species in the catch are monitored. Managers recognize that some salmon (Chinook, chum) are taken in the pollock fishery, and that some chum are taken in the False Pass fishery, based on genetic investigations. Subsistence and sport harvests are monitored, although the level of accuracy in subsistence harvests is lower than in commercial fisheries. The fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery meets this level of performance. A reasonable range of information is available on stock components to estimate significance of commercial fishery harvests (weir counts and aerial surveys in tributaries) for all species. Information is less rigorous and accurate for the subsistence fishery, which is not directly part of this MSC review.
100	**a**	**N**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			Available information is adequate for supporting the harvest strategy but it is not comprehensive in part because the watershed is so large. For example, subcomponents of all stocks are not monitored. The fishery does not meet this level of performance.

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			There is high frequency in monitoring in the Bethel test fishery, inseason commercial fishery, and daily weir counts. Aerial surveys are only peak counts. Managers recognize the uncertainty in estimates in that all subcomponents are not monitored, that escapement counts are not available until most fish pass through the commercial fishery, and that commercial fishery CPUE involves uncertainty. Given the general understanding of the data quality, the fishery meets this level of performance.
	d	**N**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A reasonable range of information is available on stock components (weir counts and aerial surveys in tributaries) but not comprehensive for all species because only some subcomponents within each species are monitored in the vast region. Therefore, the fishery does not meet this high level of performance.
References		Brazil *et al*. (2011), Munro & Volk (2012).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**90**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 9: Kuskokwim

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and compared directly with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			Managers are aware of uncertainty in CPUE estimates, aerial escapement counts, and the limited distribution of weirs. Uncertainty is considered in general terms when developing escapement goals. The fishery meets this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports. A more formal evaluation is conducted approximately every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meet the intent of the MSC peer review requirement and so the fishery meets this level of performance.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			The Bethel test fishery is the key tool for managing the Kuskokwim River commercial fishery and this effort samples most salmon populations in the large river. Likewise, CPUE in commercial fisheries in Districts 4 and 5 represent most of the populations in those areas. Weir counts and aerial surveys provide some information on subcomponents. The overall management approach meets the intent of this PI and so the fishery meets this level of performance.
100	**a**	**N**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by district as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The change to smaller mesh recognizes the effects of gillnet selectivity and attempts to reduce impacts on large female Chinook. However, the escapement goals for Chinook (past or present) do not specifically address the decline in Chinook size and the lower frequency of females on the spawning grounds. Therefore, while sockeye, coho and chum salmon meet this level of performance, it is not met for Chinook, and therefore the fishery overall.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty, and stock status is evaluated relative to reference points in a probabilistic (quantitative) manner. The fishery meets this level of performance.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and most stocks have remained relatively robust. Alternative approaches to escapement goal development have been considered (Brannian *et al*. 2006). A revision to Chinook salmon goals and the quantitative analysis have not been reviewed by outside experts and so the fishery does not meet this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Kuskokwim salmon, (except for the recently revised Chinook goal), and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Kuskokwim stocks are well defined in terms of timing and geographic range for the purpose of managing the fishery and maintain robust populations. The Bethel test fishery and commercial CPUE information provides key information for conservation, fishery management and stock assessment requirements. The fishery meets this level of performance.
	g	**N**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			The assessment team is not aware of this type of detailed analysis and so the fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**90**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 9: Kuskokwim

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	Y	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no commercial enhancement in the Kuskokwim UoC.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no commercial enhancement in the Kuskokwim UoC.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There is no commercial enhancement in the Kuskokwim UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 9: Kuskokwim

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			There is no commercial enhancement in the Kuskokwim UoC.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			There is no commercial enhancement in the Kuskokwim UoC.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			There is no commercial enhancement in the Kuskokwim UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 9: Kuskokwim

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			There is no commercial enhancement in the Kuskokwim UoC.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			There is no commercial enhancement in the Kuskokwim UoC.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There is no commercial enhancement in the Kuskokwim UoC.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			There is no commercial enhancement in the Kuskokwim UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
9	**KUSKOKWIM**	**100**	**N/A**

Evaluation Table PI 1.1.1 – UoC 10: Kotzebue

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Sockeye, Chinook, coho and pink salmon are classed as IPI species in the Kotzebue Unit of Certification. As such, the Kotzebue fishery is considered to target only chum salmon. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Chum salmon have met the escapement goals in most years when surveys have been conducted but weather often prohibits aerial surveys (Munro and Volk 2012). Inseason test fishing and CPUE indicate the stocks are not impaired.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance. The test fishing and commercial CPUE and effort is monitored such that the stock is understood to be well above the point that recruitment would be impaired, and any potential or theoretical TRP would be met.
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Poor weather conditions have limited the number of aerial surveys, thereby reducing certainty (Menard 2012, Menard and Kent 2012). However, inseason monitoring of the fishery and test fishing indicate adequate abundance in recent years.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Poor weather conditions have limited the number of aerial surveys, thereby reducing certainty. However, inseason monitoring of the fishery and test fishing indicate adequate abundance in recent years.
References			Menard (2012b), Menard & Kent (2012), Menard *et al*. (2012), Munro & Volk (2012), Volk *et al*. (2009).

Stock Status relative to Reference Points for each UoC

KOTZEBUE	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	effective and precautionary LRP.		above the LRP (see Munro & Volk 2012).
UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	KOTZEBUE	80	N/A

Evaluation Table: PI 1.1.2 – UoC 10: Kotzebue

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals (SEG) have been developed for five chum watersheds in Kotzebue (Munro and Volk 2012, Menard 2012b). The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			Escapement goals and inseason monitoring (600 fish index catch) enable the manager to close fishing well above a level that might impair reproductive capacity. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region. The methods used reflect the type of information that is available. Volk *et al*. (2009) provide escapement goal analyses specific to the AYK region. The fishery meets this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. The primary chum populations in Kotzebue have escapement goals. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False Pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. The fishery meets this level of performance.
100	**b**	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Kotzebue is likely set above a limit reference point at which reproductive capacity would be impaired, but the limited availability of data prevents the assessment team from confirming that it is precautionary (Volk *et al*. 2009). The fishery does not meet this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in Kotzebue is such that the stocks are to be maintained at a sustained yield, which indirectly takes the ecological role of the stock into account, but the assessment team cannot conclude this is with a high degree of certainty. As such, the fishery does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in Kotzebue provides some certainty in protecting subcomponent stocks, but we have no direct evidence that this is to a high level of certainty. As such, the fishery does not meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Menard (2012b), Munro & Volk (2012), Volk *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**80**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 10: Kotzebue

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no depleted stocks in Kotzebue.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no depleted stocks in Kotzebue.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement (hatchery or lake fertilization) activities.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no depleted stocks in Kotzebue.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no depleted stocks in Kotzebue.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no depleted stocks in Kotzebue.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement (hatchery or lake fertilization) activities.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 10: Kotzebue

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason effort and harvests of chum in each fishing subdistrict are monitored by the manager (Menard 2012b, Menard and Kent 2012). Test fishing occurs in a key river and compared with quantitative objectives. This information is used to effectively control harvests in order to meet the TRP. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance. As described above, the chum fishery has a good strategy that emphasizes the goals to maintain escapement and harvests for subsistence (Menard 2012b, Menard and Kent 2012).
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery meets this level of performance. Escapement goal evaluations provide this evidence (Volk *et al*. 2009).
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery includes inseason monitoring and a strategy that is designed to meet TRP (and LRP) objectives (Menard 2012b, Menard and Kent 2012). The fishery meets this level of performance.
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Although inseason monitoring (CPUE in test fishery & commercial fishery) suggest escapements are being maintained, weather conditions prohibit annual aerial surveys that would enable full evaluation. As such, the fishery does not meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Volk *et al*. 2009). The fishery meets this level of performance.
References			Menard 2012b, Menard & Kent 2012, Munro & Volk (2012), Volk *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**95**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 10: Kotzebue

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand. Salmon "harvest control rules" are based on test fishery data and commercial fishing CPUE.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery is managed based on in-season monitoring of abundance and catch per effort. The harvest control rules do not take into account a wide range of uncertainties because only one key watershed is monitored inseason, but the fishery nevertheless meets this SG80 level of performance based on the quality of the information that is available.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			Inseason test fishing and commercial catch data provide evidence that the tools are effective. As such, the fishery meets this level of performance.
100	**b**	**N**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery does not meet this level of performance.
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			Limited escapement surveys due to poor weather condition prevent the fishery from meeting this high level of performance.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
10	**KOTZEBUE**	**80**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 10: Kotzebue

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. The fishery meets this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			Information, such as commercial harvests and CPUE, is collected with sufficient frequency and accuracy to support the harvest control rule, and the test fishery occurs in a key river. The fishery meets this level of performance
	c	**Y**	There is good information on all other fishery removals from the stock.
			All species captured in the commercial fishery are documented on fish tickets; species other than chum salmon typically are used for personal use and are not sold but catch data is recorded. Some information is collected on subsistence and sport fishing harvest. Overall, the fishery meets this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The information collected for chum salmon (test fishery, CPUE, limited aerial surveys) is sufficient to support management of the modest fishery. The fishery meets this level of performance.
100	**a**	**N**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			The information on chum salmon collected in Kotzebue is not considered comprehensive (e.g., weather limits surveys), though it is sufficient to manage the modest commercial fishery. The fishery does not meet this level of performance.
	b	**N**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Information is collected to support the harvest control rule, such as commercial harvests and CPUE. The test fishery occurs in only one key river. Managers

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			recognize that uncertainty exists in the information, but understanding of the inherent uncertainties is not considered sufficient for the fishery to meet this level of performance.
	d	**N**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			The information collected for chum salmon (test fishery, CPUE, limited aerial surveys) is sufficient to support management of the modest fishery but it is not considered comprehensive. As such, the fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**80**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 10: Kotzebue

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored when weather permits and estimates are compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The managers use appropriate monitoring tools to evaluate run status for the goal of achieving escapement and for enabling subsistence harvests. The fishery meets this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The managers recognize uncertainties in the inseason monitoring approaches and this is used when evaluating the potential for a commercial fishery, which has third priority below that of meeting escapement goals and providing subsistence harvests. The fishery meets this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports (Menard *et al.* 2012, Menard 2012b). A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Kotzebue stocks are well defined for the purpose of managing the fishery and maintaining chum populations. The stocks are based on watersheds. Fishing subdistricts are based around the watersheds so that harvests associated with watersheds can be monitored. The fishery meets this performance level.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used per se as a source of information for making management decisions because the majority of chum watersheds are monitored by aerial surveys when weather permits. Aerial surveys often only include a representative portion of the watershed. Chum spend little time in freshwater;

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			survival is largely determined by factors in the ocean, which affects most stocks in common. The fishery meets this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring when weather permits. All harvests are documented by statistical area as a means to support evaluation of stock status associated with each watershed. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**N**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty but the assessment does not evaluate status in a probabilistic manner. The fishery does not meet this level of performance.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goals are relatively new in the Kotzebue area and survey limitations due to poor weather prohibit robust evaluations. The fishery does not meet this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Kotzebue salmon, and so the fishery does not meet this level of performance.
	f	**N**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Chum stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. However, the description of the stocks cannot be considered unambiguous, and so the fishery does not meet this level of performance.
	g	**N**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Key sections of tributaries are surveyed by air for chum escapement but it is not known that these survey areas are well correlated with chum in adjacent areas. As such, the fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**85**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 10: Kotzebue

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no commercial-scale enhancement activities in Kotzebue.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no commercial-scale enhancement activities in Kotzebue.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no commercial-scale enhancement activities in Kotzebue.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 10: Kotzebue

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			There are no commercial-scale enhancement activities in Kotzebue.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			There are no commercial-scale enhancement activities in Kotzebue.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			There are no commercial-scale enhancement activities in Kotzebue.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 10: Kotzebue

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			There are no commercial-scale enhancement activities in Kotzebue.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			There are no commercial-scale enhancement activities in Kotzebue.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			There are no commercial-scale enhancement activities in Kotzebue.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			There are no commercial-scale enhancement activities in Kotzebue.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**KOTZEBUE**	**100**	**N/A**

Evaluation Table PI 1.1.1 – UoC 11: Norton Sound

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of coho and pink salmon have exceeded the lower end of the TRP (escapement goal) in recent years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. Escapements of sockeye, Chinook and chum salmon have fluctuated about the lower escapement goal, even though commercial harvests have been very limited. Chum abundances have increased during the past several years (Menard 2012a). While past mining activities for gold in the Nome area impacted salmon habitat and has reduced the productivity of some streams, commercial fishery impacts are considered to be minimal and the stocks are above the point of impaired recruitment. The fishery meets this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			Escapements of coho and pink salmon have exceeded the lower end of the TRP (escapement goal) in recent years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. Escapements of chum, sockeye, and Chinook salmon have fluctuated about the lower escapement goal even though commercial harvests have been very limited. Chum abundances have increased during the past several years (Menard 2012a). The fishery meets this level of performance.
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Coho and pink salmon are consistently meeting the lower escapement goal, providing a high degree of certainty that they are above impaired recruitment. Escapements of Chinook, sockeye, and chum salmon sometimes fall below the lower escapement goals, therefore the AT cannot conclude with a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired. The fishery does not meet this level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			For the same reasons as listed in SI 100a, there is a high degree of certainty that the stocks of coho and pink salmon have been fluctuating about the TRP, while the same cannot be said for sockeye, Chinook and chum salmon (Munro & Volk 2012). The fishery does not meet this level of performance.
References			Menard (2012a), Munro & Volk (2012).
Stock Status relative to Reference Points for each UoC			

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
NORTON SOUND	**Type of reference point**	**Value of reference point**	**Current stock status relative to reference point**
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).
UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
11	**NORTON SOUND**	**80**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 11: Norton Sound

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, coho, chum and pink salmon and were reviewed in 2006 (Brannian *et al*. 2006) and 2009 (Volk *et al*. 2009) and discussed in 2012 (Conitz *et al*. 2012). Escapement goals have been used to management the fishery for 10 or more years. Most goals are considered to be SEG. The 2012 review led to the recommendation to eliminate the escapement goal for Shaktoolik Chinook salmon because the typically poor weather inhibited accurate spawner counts. There has not been a directed fishery on Shaktoolik Chinook salmon for more than five years. The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, Chinook, coho, pink and chum are an effective LRP, as the managers stop or reduce fishing as the lower goal is approached. The fishery exceeds this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Brannian *et al*. 2006). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. The fishery meets this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat (except near Nome) are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. Most of the watersheds are not large, therefore development of unique populations within each watershed is not likely

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			widespread. Alaskan fisheries are managed by either fixed escapement goals where the fisheries are primary terminal and can be managed by real time escapement counts or in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, has resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g., Dann *et al.* 2011, 2012a). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. The fishery meets this level of performance.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Norton Sound area is precautionary because goals are set above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Norton Sound area is such that the stocks are to be maintained at a sustained yield, and this approach takes the ecological role of the stock into account to some degree, but the assessment team does not consider the approach in Norton Sound takes precautionary issues into account with a high degree of certainty. The fishery therefore does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Norton Sound provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Norton Sound fishery does not meet this level of performance.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References			Brannian *et al*. (2006), Conitz *et al*. (2012), Dann *et al*. (2011), Dann *et al*. (2012a), Munro & Volk (2012), Volk *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**90**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 11: Norton Sound

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There are no depleted stocks in the Norton Sound area, e.g., "stocks of management concern" (Munro and Volk 2012). Stocks of "yield concern" have been designated but these are fluctuating around the TRP and are therefore not considered depleted by MSC standards.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			There are no depleted stocks in the Norton Sound UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no enhancement activities int he Norton Sound UoC.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place.
			There are no depleted stocks in the Norton Sound UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			There are no depleted stocks in the Norton Sound UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			There are no enhancement activities int he Norton Sound UoC.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			There are no depleted stocks in the Norton Sound UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no enhancement activities int he Norton Sound UoC.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 11: Norton Sound

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are routinely monitored by the manager. Test fisheries and commercial fishing indices are evaluated to estimate run strength when a commercial fishery is being considered, based on pre-season forecasts and the presence of buyers. Spawning escapements are monitored inseason with respect to anticipated escapement and historical timing. This information is used to effectively control harvests in order to meet the TRP. Commercial fisheries do not occur unless a buyer is present, e.g., pink salmon. Commercial fisheries also use mesh size to reduce bycatch of species such as Chinook. Fisheries for chum have been curtailed if incidental harvests of Chinook will impact the ability to achieve the escapement goal for Chinook. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance because the managers use pre-season and inseason tools to evaluate whether to open the commercial fishery by Emergency Order while also meeting goals for subsistence harvests and spawning escapement.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			There are a variety of monitoring efforts in place to assist the harvest strategy (test fishery, CPUE, weir counts, aerial surveys). Monitoring data show that fisheries management is responsive to low abundances of Chinook, chum, and sockeye salmon. The fishery meets therefore meets this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into fishing districts so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP, assuming total abundance is sufficient. The fishery meets this level of performance.
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online. Escapement goals and

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Although fisheries management is responsive to low abundances of Chinook, chum, and sockeye salmon, escapements have fallen below the lower escapement goal in some years largely due to low abundances. Additionally, there are pilot efforts by the Norton Sound Economic Development Corporation to plant coho, chum and Chinook eggs in watersheds even though these efforts are not recognized by the ADF&G action plans (see discussion above). The fishery does not meet this level of performance.
	d	**N**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Brannian *et al*. 2006, Volk *et al*. 2009). However, the escapement goal for Chinook in the Shaktoolik River was eliminated due to difficulties in escapement estimation, and a formal approach is needed to manage this fishery, which has been closed to commercial fishing in recent years. Because of the absence of a formal management approach to Chinook, the fishery overall does not meet this level of performance.
References			Brannian *et al*. (2006), Menard (2012a), Menard *et al*. (2012), Munro & Volk (2012), Volk *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**90**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 11: Norton Sound

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement patterns (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Commercial harvest control rules consider both the needs for subsistence harvests and escapement needs. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			Evidence clearly shows that escapement goals of coho and pink salmon are being consistently met, and these species exceed this level of performance. Low overall abundances mean that the lower goal of sockeye, Chinook and chum salmon have not been consistently achieved (Munro & Volk 2012). However, commercial harvests have been greatly restricted and limited to incidental catch for these species, and so the fishery meets this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of test fishery results, spawning escapement, fishermen catch per effort, and species composition. Fishing districts are opened by Emergency Order depending on real-time evaluation of stock abundances. Commercial openings consider incidental harvests of non-target species such as Chinook. Fisheries are closed when no buyer is present. The fishery meets this level of performance.
	c	**N**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			Evidence clearly shows that escapement goals of coho and pink salmon are being consistently met. Although commercial harvests have been greatly restricted and limited to incidental catch for sockeye, Chinook and chum salmon, the lower goal of these species has not been consistently achieved due to low overall abundances (Munro & Volk 2012). Therefore, the assessment team concluded that this high standard was not achieved for sockeye, Chinook and chum salmon.

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References			Munro & Volk (2012), Menard (2012a), Menard *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**90**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 11: Norton Sound

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition (depending on species and stock) in each of the Norton Sound subdistricts provide information about stock structure and escapement. The information gathered for each subdistrict is sufficient for recognizing stock structure and productivity, as needed to support the harvest strategy. The fishery meets this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			All commercial harvests are monitored with fish tickets by species and subdistrict. The fishery meets this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			Information collected on subsistence and sport fishing harvest is adequate for the fishery to meet this level of performance.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			A range of information is available to estimate the significance of fishery harvests on stock components. Information on subsistence harvests is also collected, and overall the fishery meets this level of performance.
100	**a**	**N**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is sufficient information available to implement the harvest strategy but the assessment team does not conclude that this information is comprehensive. As such, the fishery does not meet this level of performance.
	b	**N**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Sufficient information is monitored by the managers to support the harvest control rule, but the assessment team does not consider this monitoring to be conducted at a sufficiently high frequency, degree of certainty or robustness, such that the

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			fishery could be said to meet this level of performance. As such, the fishery does not meet this level of performance.
	d	**N**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A range of information is available to estimate the significance of fishery harvests on stock components. However, this information is not considered by the assessment team to be comprehensive, in part because monitoring is complicated by poor weather that limits aerial surveys and determining species composition (abundant pink salmon can confound estimating the abundance of chum salmon on spawning grounds). Although information on subsistence harvests is collected, they are not estimated with a high degree of precision, and this impacts estimates of the significance of commercial harvests. The fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**80**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 11: Norton Sound

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points) (Munro & Volk 2012).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			Managers recognize the uncertainty in the escapment counts, including limitations impose by weather, when managing the small commercial fishery. The fishery meets this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports, including in Norton Sound. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF, who can declare a stock of concern designation. The escapement goal review and the BOF review meet the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Norton Sound stocks are well defined for the purpose of managing the commercial fishery. Stocks are based on geographical aggregates, or fishing subdistricts, which include one or more watersheds. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a primary source of information for making management decisions because the majority of watersheds supporting each salmon species are monitored by aerial surveys and weirs. The fishery exceeds this level of performance.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by subdistricts as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**N**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges in Norton Sound do not explicitly consider data uncertainty. The assessment does not evaluate stock status relative to reference points in a probabilistic manner. As such, the fishery does not meet this level of performance.
	d	**N**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Although the assessment is adequate for the low level of commercial fishing undertaken in Norton Sound, the assessment team has not found tests of the assessment that demonstrate it is robust. Alternative hypotheses and assessment approaches have not been rigorously explored. The fishery does not meet this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Norton Sound salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a primary source of information for making management decisions because the majority of watersheds in Norton Sound are monitored. The fishery meets this level of performance.
References			Brannian *et al*. (2006), Menard (2012a), Menard *et al*. (2012), Munro & Volk (2012), Volk *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**90**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 11: Norton Sound

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			As noted in the description of this UoC (see Section 2.3.5), pilot studies are underway that plant somewhat small numbers of coho, chum, and Chinook eggs into streams that have relatively few fish of these species (http://www.nsedc.com/reestablishment.html). The assessment team concluded that it is highly likely that the small level of current stocking of eggs do not have significant negative impacts on wild stocks. However, future assessments should consider whether the hatchery program has grown, and evaluate it accordingly. Salmon Lake is periodically fertilized to enhance growth and production of sockeye salmon, although evidence of the benefits is equivocal. The fishery meets this level of performance.
100	**a**	**N**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Although the assessment team was able to conclude that it is highly likely that the small level of current stocking of eggs do not have significant negative impacts on wild stocks, the team was not aware of work that demonstrated how the fishery was able to meet this higher level of performance.
References			http://www.nsedc.com/reestablishment.html

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**80**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 11: Norton Sound

PI 1.3.2			Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The fishery exceeds this level of performance.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The low level of egg plants suggests the current practices will be effective in not impacting wild stocks. The fishery exceeds this level of performance.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			The purpose of the small egg planting programs is to help rebuild spawning populations in areas where relatively few salmon presently return (http://www.nsedc.com/reestablishment.html). Some of these areas have been degraded by mining activities. ADF&G genetics policy and fish transport policy provide a level of assurance that stocks will not be mixed. All salmon are thermally marked. The fishery meets this level of performance.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			The low level of egg plants provides some objective basis for confidence that the practices will be effective in not impacting wild stocks. Very few adult hatchery salmon have been recovered (C. Lean, NSEDC, personal communication). The fishery meets this level of performance.
100	**a**	**N**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			The strategy in place to protect wild stocks is not considered comprehensive, and so the fishery does not meet this level of performance.
	b	**N**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			The assessment team is not aware of a thorough examination of the strategy that would allow the Norton Sound fishery to meet this level of performance.
References			http://www.nsedc.com/reestablishment.html

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**80**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 11: Norton Sound

PI 1.3.3			Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The fishery exceeds this level of performance.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			All hatchery salmon are thermally marked. The numbers of eggs and location of planting are documented and reported on the ADF&G website (http://mtalab.adfg.alaska.gov/CWT/Reports/hatcheryrelease.asp). Marked fish are used to verify whether some planted eggs have returned as adults but the level of stocking effort is too low to be accounted for in the limited commercial fisheries. According to C. Lean (NSEDC), "*I can document very few marks returning. Besides the possibility of no returns, there is the fact that we have collected very few adults from the intended return sites. There have been returns to the streams where we released coho varying from about 300 to 100 from brood pair collections of 15 to 30 pairs. On Chum we have one year where we planted about 50,000 eggs and got back 24 adults over 2 years. That is about a 1:1 spawner to adult return.*" A formal report has not been prepared regarding this information, but data tables showing releases by location are available. The fishery meets this level of performance.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			Coho and chum are thermally marked but the level of adult returns is extremely small and the goal is to provide spawners back to areas where few wild fish currently spawn. Therefore, the AT concludes that the intent of this guidepost is met.
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The program is small and the information is not comprehensive. As such,t he fishery does not meet this level of performance.
	b	**N**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The assessment has not been formally documented in a report. This program does not appear to be integrated into the ADF&G action plans. Overall, the fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
11	**NORTON SOUND**	**80**	**N/A**

Evaluation Table PI 1.1.1 – UoC 12: Kodiak

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, coho, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in the majority of the past 10 years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. For Chinook, retention has been terminated for fisheries that intercept depressed stocks and sport fishing has been curtailed. The decline in Chinook has been a broad regional marine survival issue affecting many stocks in southcentral and southwest Alaska. The fishery exceeds this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, coho, chum and pink salmon. Chinook meet this level of performance because stock levels returning are unrelated to commercial fishing and the majority of the past 10 years the stock has been within the escapement goal range. Karluk Chinook are listed as a stock of management concern (Munro & Volk 2012), but all directed commercial fisheries have been closed and sportfish harvests have been curtailed. The fishery overall meets this level of performance.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Sockeye, coho, chum and pink salmon are meeting their escapement goals and there is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired. For Chinook, the fishery requires non-retention and because of timing, intercepts relatively few of the local depressed stocks. There is no current significant impact of the fishery. Overall, the fishery meets this level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, coho, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in majority of the past 10 years (Munro & Volk 2012) but have not consistently exceeded the escapement goal lower bound in all of the past 10 years. Pink salmon have consistently exceeded escapement goals. The fishery does not meet this level of performance.
References			Munro & Volk (2012).

Stock Status relative to Reference Points for each UoC			
KODIAK	**Type of reference**	**Value of reference point**	**Current stock status**

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
	point		**relative to reference point**
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP except Karluk Chinook, which is a Stock of Management Concern (see Munro & Volk 2012). Commericial fisheries have had many years of non-retention and sport fisheries have been heavily regulated and an action plan developed.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 12: Kodiak

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, coho, pink and chum salmon and were reviewed in 2010 (Nemeth *et al*. 2010b). Escapement goals have been used to manage the fishery for 10 or more years. Goals vary among the fisheries with BEG's and SEG's, and with one OEG established for early run Upper Station (Olga Lakes) sockeye salmon stock. The BOF has established this at a lower level than the ADF&G has indicated for a BEG for the run to facilitate harvest of the stronger early run timing Fraser Lake. Elaborate harvest strategies have been in place over time to address difficult conservation and allocation issues when harvesting the stocks returning to these southern Kodiak Island systems. With the OEG in place, escapements of the early run have been at least half of the lower bound of the biological escapement goal, which is equivalent to the usual interpretation of a limit reference point. In Alaska fisheries, which are usually terminal, fishing is generally terminated if the lower range of the targeted biological escapement goals is not met. Consequently, although not optimal, the OEG will not likely jeopardize the long term viability of the Upper Station early run, although it is likely below the level that will provide MSY (Nemeth *et al*. 2010b). The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The lower bound of the escapement goals for coho, sockeye, Chinook, pink and chum are an effective LRP, as noted in 80a. The OEG for Upper Station early run sockeye salmon is less conservative than the lower bounds of the BEG's but is likely an effective LRP. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Nemeth *et al.* 2010b). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. However, the increased releases of hatchery fish and their common property harvests in Kodiak, have been a concern to sustainability of wild stocks. Although Kodiak total hatchery harvests to wild harvests ratio remains relatively small, expansion plans have created concerns that are discussed elsewhere. In the Kodiak area, most of the fisheries are managed by real time escapement counts that have few subcomponents. In the case of pink and chum fisheries, where multiple small to medium streams support the fisheries (in addition to some large ones), frequent overflights and long term data sets support the contention that small subcomponent stocks are protected. Overall, the fishery meets this level of performance.
100	**b**	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Kodiak Management Area is typically precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. All species other than sockeye are considered to meet this performance level. Because the OEG established for sockeye salmon for early run Upper Station sockeye salmon would not be considered precautionary, sockeye salmon do not meet this level of performance. Overall, the fishery does not meet this level of performance.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Kodiak Management Area is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. All species except sockeye salmon meet this level of performance. For sockeye, the Upper Station early run sockeye OEG allows fishing at below the lower range of the BEG, so consequently sockeye do not meet this level of performance. Karluk lake escapement goals have varied over time with significant levels of evidence indicating long term fishing of large runs has decreased the productivity of the lake over time by reducing nutrient input from carcasses (Gregory-Eaves *et al*. 2003). Although higher escapements in recent years have resulted in poor returns apparently because of competition of excess numbers of fry, reducing escapements without a long term plan to increase productivity would not be considered precautionary in considering the ecological role of the stocks. Overall, the fishery does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Kodiak Management Area provides details of escapements into different run timing units as well as annual inventory of virtually all streams supporting sockeye, Chinook and pink salmon runs. There is less certainty and detail on coho runs in small systems and chum runs for providing a high degree of certainty in protecting subcomponent stocks. As such, the Kodiak fishery does not meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Eggers *et al*. (2011), Gregory-Eaves *et al*. (2003), Munro & Volk (2012), Nemeth *et al*. (2010b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**80**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 12: Kodiak

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			Karluk River Chinook is considered as stock of management concern and is currently depleted (Munro and Volk 2012). All directed commercial fisheries have been closed and sportfish harvests have been curtailed. The fishery exceeds this level of performance.
	b	**Y**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			The Karluk Chinook fishery has a weir counting escapements in real time. As commercial fishing is not likely related to the decline and sportfishing has been curtailed, recovery will likely be related to ocean survival conditions. Major research efforts are underway attempting to understand causes for this regional decline in Chinook stocks. The fishery exceeds this level of performance.
	c	**Y**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			Kodiak Management Area has two major hatcheries that have been primarily used to develop enhanced hatchery stocks in areas where runs were minimal or non-existent. Local small Chinook runs and some coho stocking has primarily been directed at sportfishing opportunities where large runs have been developed by fishways at Frazer Lake and by annual hatchery seeding (Spiridon Lake). Lake fertilization has been used in the past and is currently being contemplated for use on Karluk Lake for rehabilitation. Limited short term hatchery stocking has been used as part as restoration planning but has never been used for allowing incidental harvests of depleted stocks as most of Kodiak's salmon fisheries can effectively manage escapements in real time by escapement counts by use of terminal fisheries (KRPT 2011). The fishery exceeds this level of performance.
80	**a**	**Y**	Where stocks are depleted rebuilding strategies are in place.
			See SG 60a- the fishery exceeds this level of performance.
	b	**Y**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			See SG 60b- the fishery meets this level of performance.
	c	**Y**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			See SG 60c- the fishery exceeds this level of performance.
100	**a**	**N**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			Although Chinook salmon decline is unprecedented in the history of the fishery, the precise cause of the decline is unknown and until research demonstrates a cause and effect, the rebuilding of the stock in any specific timeframe is uncertain. However, it is highly certain that commercial fishing is not a significant contributor to the decline nor will its curtailment assure rebuilding takes place in any specific timeline. The fishery for Chinook cannot currently meet this level of performance.

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	c	**N**	Enhancement activities are **not used** as a stock rebuilding strategy. The current stock rebuilding strategy for Karluk Chinook does not include enhancement. However, if the stock requires enhancement to ensure its survival, most likely enhancement activities will be used, based on previous recovery strategies used in KMA for sockeye salmon recovery programs (KRPT 2011). Here is a case where the scoring guideline is not in concert with what the team would consider good stewardship. The Chinook fishery does not meet this scoring guideline.
References		KPRT (2011).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**80**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 12: Kodiak

PI 1.2.1			There is a robust and precautionary harvest strategy in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			In season harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative chum, pink, coho, sockeye and Chinook spawning escapements are monitored with respect to escapement curves based on historical timing, for systems that are monitored. Most of the significant systems producing salmon are monitored by weirs or aerial counts. This information is used to effectively control harvests in order to meet the TRP. In systems where recovery programs are in place, monitoring of in-lake fry or smolt outmigrants are commonly used, primarily for sockeye salmon (KRPT 2011).
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			Fishing performance and management activities are reported every year in annual management reports, which are available online (Jackson *et al*. 2010). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Stocks are at or above target levels with some exceptions. Chinook salmon have undergone recent declines and are a stock of management concern at Karluk Lake. The establishment of an OEG to allow harvests of early run Upper Station sockeye while targeting other stocks in the area indicates that achieving Msy has not been possible for this stock while maintain harvests of other local stocks at a desired level. Consequently the fishery exceeds this level of performance for coho, pink and chum, but only meets this scoring level for Upper Station early sockeye salmon and the Kodiak Chinook stocks. Overall, the fishery meets this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. The fishery meets this level of performance.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Coho, pink and chum salmon meet this level of performance, but sockeye and Chinook do not, and so the fishery overall does not meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Nemeth *et al*. 2010b). The fishery meets this level of performance.
References			Jackson *et al*. (2010). KRPT (2011), Munro & Volk (2012), Nemeth *et al*. (2010b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**95**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 12: Kodiak

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for each species (coho, sockeye, Chinook, chum, pink) has been achieved in most of the past 10 years (Munro and Volk 2012), indicating that harvest control rules are effective. For Chinook salmon, the recent year's failure reflects regional failure most likely associated with adverse marine conditions unrelated to the fishery management regimes or harvest control rules. The fishery meets this ;level of performance.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
12	**KODIAK**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 12: Kodiak

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify sockeye populations throughout the various watersheds. The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on subsistence and sport fishing harvest. Most of Kodiak stocks are terminal with some interceptions of stocks bound for other Alaskan systems. Because of allocative and conservations concerns, much attention has been given to reduce interceptions in this area and to identify the composition of harvests from both local and non-local stocks where there is significant risks of high rates of interception.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District. Early and late components of the sockeye run are monitored if appropriate and escapements from 14 sockeye salmon systems are evaluated. Sockeye recruitment data extend back to 1921 for Karluk Lake. Limnological data are available for all major sockeye salmon lakes in the KMA, with studies dating back to the early 20th century for Karluk Lake. Sediment coring for marine isotope signatures from salmon carcasses has extended decadal escapement time series for several thousand years (Gregory-Eaves *et al*. 2003) on Karluk Lake. For Chinook, coho, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance.

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (weir counts) or on a weekly basis (aerial counts on streams). See (Jackson *et al*. 2010; Foster 2010). Managers recognize and understand the uncertainty in estimates. The fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys document the spawning escapement of stock components (individual streams) of pink and chum salmon; weir counts are used for sockeye and Chinook. Harvest data are available for each fishing district. Harvests and escapements of the early and late sockeye runs are monitored. Coho are monitored on major systems through weir counts during early portions of the run while aerial counts are used in smaller systems. The fishery meets this level of performance.
References			Foster (2010), Gregory-Eaves *et al*. (2003), Jackson *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 12: Kodiak

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports, including Kodiak. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement, and so the fishery meets this level of performance.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Kodiak stocks are well defined for the purpose of managing the fishery and maintain robust populations. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and chum are monitored by aerial surveys. ADF&G published a report showing that escapements of monitored pink and chum salmon in the westward region were highly correlated during 1987-2007 (Finkle and Vining 2009). Sockeye, Chinook and coho, escapement is monitored through weir counts. The fishery exceeds this level of performance.
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and is evaluating stock status relative to reference points in a probabilistic manner. The fishery meets this level of performance.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust. Karluk has demonstrated a long term decline, likely related to nutrient depletion (Gregory-Eaves *et al*. 2003). Alternative approaches to escapement goal development have been considered (Nemeth *et al*. 2010b). The fishery meets this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Kodiak salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for coho, pink and chum are monitored by aerial surveys. Most sockeye, Chinook and some coho escapement is monitored through weir counts. The fishery meets this level of performance.
References			Finkle & Vining (2009), Gregory-Eaves *et al*. (2003), Nemeth *et al*. (2010b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 12: Kodiak

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Kodiak hatcheries and hatchery release sites have been strategically located to reduce likely straying or excessive harvests of wild stocks. Managers have not expressed significant concern about hatchery straying or compounding harvest management with the presence of hatchery stocks in areas where wild stock harvest predominate. The Kodiak fishery meets this scoring level.
80	**a**	**N**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Kodiak does not have a marking program for hatchery releases, an activity essentially universally required in PWS and SEAK, the other regions that have very high production levels of hatchery fish, particularly of chum and pink salmon. Stocking of relatively large quantities of reared sockeye fry in Spiridon Lake have been continuing for over a decade, with periodic evaluations of interceptions in the fishery by use of scale pattern analysis (Nelson and Swanton 1996; Foster 2010). These scales are quite unique and allow visual separation of Spiridon stocks from other migrating salmon. Also, sockeye have a high degree of fidelity to their natal areas (or areas imprinted as fry), so the team believes it is highly likely that sockeye salmon stocks do not have negative impacts on wild stocks. In the case of Chinook, coho, pink and chum, the data are not available to determine if significant straying occurs or if the estimates of harvests of the hatchery versus the wild stocks are accurate. The team is most concerned about the expansion plans as outlined by the Regional Planning Team for the next 30 years where enhancement programs will ultimately provide harvests similar or in excess of wild salmon stocks. Therefore the team has introduced a condition for continued certification that requires an analysis of the risks associated with Chinook, coho, pink and chum salmon straying and uncertainty in stock identification in mixed stock fisheries to ensure that it is highly likely that the current and future enhancement activities do not have a significant negative impact on the local adaptation, reproductive performance and productivity or diversity of wild stocks. In the absence of data on straying, additional data will likely need to be acquired to assess straying risk, given the results of previous studies on chum and pink straying (e.g., Brenner *et al*. 2012; Piston & Heinl 2012a, Piston & Heinl 2012b). Sockeye meets this level of performance, but Chinook, coho, pink and chum, and therefore the fishery overall, do not meet this level of performance. A condition of certification (Condition 5) is therefore introduced. With respect to Condition 5, it is noted that hatchery stocks of all species do not comprise a major part of the harvests in the Kodiak UoC to date, and so the concern raised by the assessment team with respect to meeting the SG 80 level of performance is primarily related to straying into other systems at the current levels of release. The assessment team notes that straying monitoring is facilitated by the near 100% otolith marking of hatchery fish or coded wire tag programs in other regions of the State. A tagging program, including sampling of systems with high risks of straying and commercial landings from areas where mixed wild and hatchery fish are likely, is therefore recommended, at least for pink and chum releases. For Chinook and coho releases, a risk assessment may suffice, but, if future hatchery programs result in significant expansion of releases, these analyses

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			should be sufficiently robust to determine risks to wild stock productivity with the proposed expansions. A complete marking program, implemented as a standard part of the hatchery's operations, would provide greater certainty given future expansion plans. If such a program illustrates minimal risk to wild stocks, it can be terminated unless major expansions in releases occur. The KRAA and ADF&G can address this issue using other means but should have external peer reviewed analysis conducted in support of using existing data to support findings to remove this condition.
100	**a**	**N**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			Because of some uncertainty associated with the Spiridon Lake sockeye salmon program identified by (Musselwhite 2011a; 2011b), sockeye salmon fisheries in KMA also do not meet this level of performance. The other species did not meet the SG80 level of performance. The fishery does not meet this level of performance.
References			Brenner *et al*. (2012), Foster (2010), Musslewhite (2011a), Musslewhite (2011b), Nelson & Swanton (1996), Piston & Heinl (2012a), Piston & Heinl (2012b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**60**	**5**

Evaluation Table: PI 1.3.2 – UoC 12: Kodiak

PI 1.3.2			Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			The impact of enhancement activities on wild stocks of all five salmon species (i.e., sockeye, Chinook, coho, pink and chum) has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. Current policies and regulations are in place statewide that are precautionary and regulate enhancement activities. The fishery exceeds this performance level.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			The fishery exceeds this performance level.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			A range of policies, statutes and regulations promote the protection of wild salmon. These include Salmon Regional Planning Plans, ADF&G Genetics Policy, the FRED Division Statute 1971, the PNP Hatchery Permitting Statute, the Regional Planning Statute 1976, the BOF Hatchery Management Policy, Fish Transport Regulations 1981, the PNP Regulations 1985, the Genetics Policy 1985, the Pathology Policy 1988, Wild and Enhanced Stock Statute 1992, Sockeye Salmon Culture Policy 1994, and the BOF Sustainable Salmon Policy 2000. The Policy for Management of Sustainable Salmon Fisheries (5AAC 39.222) requires that '*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*'. Also, that '*Plans and proposals for development or expansion of salmon fisheries and enhancement programs should effectively document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks.*' Policy for the Management of Mixed-Stock salmon fisheries (5AAC 39.220) accords the highest priority to the conservation of wild salmon stocks. The Regional Planning Team Review Regulation (5AAC 40.170) provides review criteria which must be considered and include provisions for the protection of the naturally occurring stocks from any adverse effects which may originate from a proposed hatchery. Within Kodiak, past practices of sockeye releases in Spiridon Lake and other enhanced systems have taken into account existing wild fisheries, with evaluation of impacts evaluated prior to their development and in the case of Spiridon, the catches have been evaluated for composition of hatchery releases in the wild stock fishery. Sockeye exceeds this level of performance, while Chinook, coho, pink and chum salmon meet this level of performance. Overall, the fishery meets this level of performance.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			The fishery meets this scoring level. Although there is some objective basis, based on the location of releases and patterns of abundance and escapements in the nearby systems, the need for additional analysis or data has been required as a

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			condition under PI 1.3.1, SI 80a.
100	**a**	**N**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			Kodiak enhancement and fishery strategies for sockeye, meet this performance level based on regulations, policies and practices of ADF&G and the scale pattern studies initiated to identify Spiridon Lake hatchery stock in the fishery. Because the other hatchery programs have not had comprehensive evaluation of straying and competition with wild stocks, the fishery overall does not meet this scoring guideline.
	b	**N**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			Because of the lack of marking programs the Kodiak fishery does not meet this level of performance for all species except sockeye. Because of the uncertainty in the scale pattern analysis for sockeye salmon from Spiridon, sockeye fisheries also do not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**80**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 12: Kodiak

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			The impact of enhancement activities on wild stocks of all five salmon species (i.e., sockeye, Chinook, coho, pink and chum) has been considered under the enhancement PIs 1.3.1, 1.3.2 and 1.3.3. There are some relevant data available on straying and hatchery contribution to the harvest along with a significant number of long term estimates of escapement that were used to establish escapement goals for all species. The sockeye, Chinook, coho, and chum and pink fisheries exceed this level of performance.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			The fisheries for Chinook, coho and chum sockeye and pink salmon exceed this level of performance. The fisheries exceed this level of performance because there are good policies and regulations in place that require that the effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
80	**a**	**N**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Sufficient relevant information is available through the major sockeye releases into Spiridon Lake by scale pattern analysis. Sockeye salmon meet this level of performance. As described in PI 1.3.1 SG 80a, there are no tagging programs or risk assessments that indicate the contribution of enhanced Chinook, coho, pink or chum to the harvest and wild escapement of the stock. Therefore a condition is introduced to address this deficiency (Condition 5). With respect to Condition 5, it is noted that hatchery stocks of all species do not comprise a major part of the harvests in the Kodiak UoC to date, and so the concern raised by the assessment team with respect to meeting the SG 80 level of performance is primarily related to straying into other systems at the current levels of release. The assessment team notes that straying monitoring is facilitated by the near 100% otolith marking of hatchery fish or coded wire tag programs in other regions of the State. A tagging program, including sampling of systems with high risks of straying and commercial landings from areas where mixed wild and hatchery fish are likely, is therefore recommended, at least for pink and chum releases. For Chinook and coho releases, a risk assessment may suffice, but, if future hatchery programs result in significant expansion of releases, these analyses should be sufficiently robust to determine risks to wild stock productivity with the proposed expansions. A complete marking program, implemented as a standard part of the hatchery's operations, would provide greater certainty given future expansion plans. If such a program illustrates minimal risk to wild stocks, it can be terminated unless major expansions in releases occur. The KRAA and ADF&G can address this issue using other means but should have external peer reviewed analysis conducted in support of using existing data to support findings to remove this condition.
	b	**N**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			For sockeye, typically, fry are planted directly in to lakes with broodstock being acquired from the same stock from where the fry are being restocked.

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Limnological studies are typically conducted prior, during and after stocking to evaluate of impact of stocking on lake productivity. Very low levels of straying occur in sockeye so net productivity can be accurately assessed, and stocking typically does not occur in excess of lake productivity. Sockeye meets this level of performance. Although the assessment team is aware of some studies and assessments that include estimates of the impacts of enhancement activities on wild stock status of Chinook, coho, pink and chum salmon, because of the lack of information on straying rates, the impact of Kodiak enhancement activities on the productivity and diversity of wild stocks has not been adequately estimated. Therefore, the team does not consider that there has been an adequate assessment of the impacts of enhancement activities for the fishery to meet this level of performance, and has introduced a condition in order to meet this scoring guideline (Condition 5 - see note against SI 80a, above).
100	**a**	**N**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			Sampling of scales provides an adequate assessment of the impacts of Spiridon sockeye releases on wild stocks (Nelson & Swanton 1996), and sockeye meets this level of performance. However, because of the lack of a marking program, there is uncertainty as to the impact of other hatchery releases of Chinook, coho, pink and chum on wild stocks. These species, and the fishery overall, do not meet this level of performance.
	b	**N**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			The assessment team found insufficient information on the effects of enhancement activities on the wild stock status, productivity and diversity of the wild stocks. Because of some uncertainty with the scale pattern analysis for Spiridon Lake sockeye returns (Musselwhite 2011a; 2011b), sockeye, Chinook, coho, pink and chum salmon do not meet this level of performance.
References			Musslewhite (2011a), Musslewhite (2011b), Nelson & Swanton (1996).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
12	**KODIAK**	**60**	**5**

Evaluation Table PI 1.1.1 – UoC 13: Chignik

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			There are considered to be no IPI species in the Chignik salmon fishery. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Escapements of sockeye, Chinook, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in each of the past 10 years (Munro & Volk 2012), indicating the stocks are consistently well above a level that might cause recruitment to be impaired. For coho, ADF&G states that fishing effort is low; most of the run enters freshwater after the commercial season ends (Anderson & Nichols 2012), indicating that it is highly likely that coho stocks are above the point where recruitment would be impaired. The fishery meets this level of performance.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery exceeds this level of performance for sockeye, Chinook, chum and pink salmon. Coho meets this level of performance because, although no quantitative TRP has been defined, the CPUE and effort is monitored such that the stock is understood to be well above the point that recruitment would be impaired, and any potential or theoretical TRP would be met. The comecial fishery typically stops fishing near the mid-point of the coho run. Field studies by the University of Washington have shown that the Chignik coho population is robust (Ruggerone & Rogers 1992).
100	**a**	**N**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Sockeye, Chinook, chum and pink salmon are meeting their escapement goals and there is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired. For coho, the level of fishing effort is considered low enough that it would not impair recruitment, including because the fishery ceases before the mid-point of the run. However the absence of a formal TRP for coho prevents the fishery from meeting this higher level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, Chinook, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (SEG)) in each of the past 10 years (Munro & Volk 2012). Coho, and therefore the fishery overall, does not meet this guidepost because there is no formal TRP.

PI 1.1.1	The stock is at a level which maintains high productivity and high probability of recruitment overfishing
References	Ruggerone & Rogers (1992), Anderson & Nichols (2012), Munro & Volk (2012).

Stock Status relative to Reference Points for each UoC

Chignik	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP (see Munro & Volk 2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**80**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 13: Chignik

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The Chignik fishery exceeds this level of performance for sockeye, Chinook, chum and pink salmon, and quantitative escapement goals were reviewed in 2010 (Nemeth *et al*. 2010). Quantitative reference points have not been developed for Chignik coho because fishing effort is low on this late returning species (Anderson & Nichols 2012). However, coho escapements to the lake system (the dominant coho stock) are monitored via weir from the beginning of the run in early August through early September, which is prior to the mid-point of the run. Commercial fishing typically ceases in early September before the mid-point of the coho migration, and coho production continues to be productive and near maximum productivity. Past studies have indicated harvests of coho have been low, leading to high predation-related mortality on sockeye fry. The low effort on coho and practice of ceasing fishing before the mid-point of the coho migration allows the fishery to meet the SG60 level.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**N**	Reference points are appropriate for the wild stock and can be estimated.
			Quantitative escapement goals have been developed for sockeye, Chinook, chum and pink salmon and were reviewed in 2010 (Nemeth *et al*. 2010). Escapement goals have been used to management the fishery for 10 or more years. Goals are considered to be SEG except for Chinook (BEG), and these species meet this level of performance. Coho salmon escapements to the Chignik lake system (the dominant coho stock) are monitored via weir from the beginning of the run in early August through early September, which is prior to the mid-point of the run. Nevertheless, in recent years fishing has occurred daily during this period and quantitative reference points have not been developed for Chignik coho, and so coho does not meet this level of performance and a condition is therefore introduced (Condition 6). With respect to Condition 6, it is recommended that an escapement goal or equivalent is developed, based on catch and effort information for lake coho using the early part of run that is counted by weir through August and sometimes in to early September. Techniques are available to estimate coho escapement from harvest & effort when weir data are not available.
	b	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, Chinook, pink and chum are an effective LRP, as noted in 80a. For coho, see discussion in SI 60a and SI 80a, above. Coho does not meet this level of performance and a new condition is introduced (Condition 6).
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Although a variety of methods are used to develop the escapement goals for sockeye, Chinook, pink and chum salmon, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g., Nemeth *et al.* 2010). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. For coho, see the discussion in SI 60a and SI 80a, above. Coho does not meet this level of performance and Condition 6 is therefore introduced.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**N**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The escapement goal methodologies, the management approach to slow fishing as the lower goal is approached, and the relatively pristine habitat are consistent with the goal of maintaining the diversity and reproductive capacity of each stock subcomponent. However, as previously described, because there is no escapement goal for coho (see discussion in SI 60a and SI 80a, above) the fishery overall cannot meet this level of performance and Condition 6 is introduced. Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the Troll fisheries of Southeast and Yakutat Alaska or the False Pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a “limit reference point”. Large interannual variations in run returns are common in Pacific salmon and this “abundance” based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska’s fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g., Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks.

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**b**	**N**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Chignik Management Area for sockeye, Chinook, pink and chum salmon is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. However, coho does not currently have a limit or target reference point and so the fishery does not meet this level of performance.
	c	**N**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Chignik Management Area for sockeye, Chinook, pink and chum salmon is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. Coho does not currently have a limit or target reference point and therefore the fishery overall does not meet this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The management approach in the Chignik Management Area provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Chignik fishery does not meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Eggers *et al*. (2011), Munro & Volk (2012), Nemeth *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**60**	**6**

Evaluation Table: PI 1.1.3 – UoC 13: Chignik

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**N/A**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place. There are no stocks of concern in the Chignik UoC.
	b	**N/A**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe. There are no stocks of concern in the Chignik UoC.
	c	**N/A**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts. There are no enhancement (hatchery or lake fertilization) activities.
80	**a**	**N/A**	Where stocks are depleted rebuilding strategies are in place. There are no stocks of concern in the Chignik UoC.
	b	**N/A**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe. There are no stocks of concern in the Chignik UoC.
	c	**N/A**	Enhancement activities are **very seldom used** as a stock rebuilding strategy. There are no enhancement (hatchery or lake fertilization) activities.
100	**a**	**N/A**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**. There are no stocks of concern in the Chignik UoC.
	c	**N/A**	Enhancement activities are **not used** as a stock rebuilding strategy. There are no enhancement (hatchery or lake fertilization) activities.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**N/A**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 13: Chignik

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative sockeye and Chinook spawning escapements are monitored with respect to escapement curves based on historical timing. This information is used to effectively control harvests in order to meet the TRP. For coho, daily escapements through the Chignik weir are monitored through August and early September. The fishery meets this level of performance.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance for sockeye, Chinook, chum and pink. For coho, the elements of the harvest strategy (low harvest rate, exploitation ceasing prior to the midpoint of the run, catch, effort and early escapement monitoring, Emergency Order authority) work together to ensure the stock is maintained at a sustainable level. The fishery overall meets this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			Chinook, pink and chum exceed this level of performance. For sockeye, inseason management actions are reported every year but budget cuts have eliminated inseason sockeye stock identification. For coho, evidence exists that the harvest strategy is achieving its objectives, but the harvest strategy has not been fully evaluated. Both species meet this level of performance, but no higher.
100	**a**	**N**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each sockeye, Chinook, pink and chum. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. These species meet this level of performance. However, coho, and therefore the fishery overall, does not meet this level of performance.
	b	**N**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Fishing performance and management activities are reported every year in annual management reports, which are available online (e.g., Anderson and Nichols 2012). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro and Volk 2012). Stocks are at or above target levels. Sockeye and coho do not meet this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (e.g., Nemeth *et al*. 2010). For coho, ADF&G recognises that fishing effort is low. The fishery meets this level of performance.
References			Anderson & Nichols (2012), Munro & Volk (2012), Nemeth *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**90**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 13: Chignik

PI 1.2.2		There are well defined and effective harvest control rules in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. The fishery meets this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for sockeye, Chinook, chum, and pink has been achieved in each of the past 10 years (Munro & Volk 2012), indicating that harvest control rules are effective. For coho, the early weir count data are available and effort reportedly continues to be low. The fishery meets this level of performance.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
13	**CHIGNIK**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 13: Chignik

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species are monitored. Good information is collected on subsistence and sport fishing harvest. A portion of sockeye harvests at Cape Igvak (90% prior to July 25; Kodiak UoC) and Stepovak (80% prior to July 25; Peninsula UoC), are allocated to Chignik stock. Using this approach, management attempts to account for harvests of Chignik sockeye in other management areas.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District. Early and late components of the sockeye run are monitored, and sockeye recruitment data extend back to 1922. Aerial surveys, weir counts and age composition provide relevant information of stock structure and escapement. Genetic studies have been conducted to identify sockeye populations throughout the watershed. Limnological data are available. For Chinook, coho, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance.
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., weir counts 10 min per hour during daylight) or on a weekly basis (aerial counts on streams). See Anderson & Nichols (2012) for more information. Managers recognize and understand the uncertainty in estimates. The fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys document the spawning escapement of stock components (individual streams) of pink and chum salmon; weir counts are used for sockeye and Chinook. Harvest data are available for each fishing district. Harvests and escapements of the early and late sockeye runs are monitored. Aerial surveys document the relative abundances of sockeye in tributary streams connected to the rearing lakes. The early portion of the coho run is monitored and the late portion of the run is not harvested. The fishery meets this level of performance.
References			Anderson & Nichols (2012)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 13: Chignik

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points). The stock status of coho is reflected by the low effort, catch reporting and the early reporting of the run as recorded in weir counts.
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance, except for coho which meets this level. For coho, the level is met because the assessment recognizes the uncertainty because the latter portion of the coho runs is not fished or fished at a very low harvest rate.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports, including in Chignik. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meet the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Chignik stocks are well defined for the purpose of managing the fishery and maintain robust populations. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and chum are monitored by aerial surveys. ADF&G published a report showing that escapements of monitored pink and chum salmon in the westward region were highly correlated during 1987-2007 (Finkle and Vining 2009). Sockeye, Chinook and coho, escapement is monitored through weir counts. The fishery exceeds this level of performance.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**N**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and are evaluating stock status for sockeye, Chinook, pink and chum salmon relative to reference points in a probabilistic manner. Coho, and therefore the fishery overall, does not meet this level of performance.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust, although habitat in the upper lake (Black) has declined in recent decades in response to natural changes. Alternative approaches to escapement goal development have been considered (Nemeth *et al*. 2010). The fishery meets this level of performance.
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Chignik salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. As such, the fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and chum are monitored by aerial surveys. Sockeye, Chinook and coho escapement is monitored through weir counts. The fishery meets this level of performance.
References			Finkle & Vining (2009), Nemeth *et al*. (2010).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 13: Chignik

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			No hatcheries operate in the Chignik UoC.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			No hatcheries operate in the Chignik UoC.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			No hatcheries operate in the Chignik UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 13: Chignik

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			No hatcheries operate in the Chignik UoC.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			No hatcheries operate in the Chignik UoC.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Chignik UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 13: Chignik

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			No hatcheries operate in the Chignik UoC.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			No hatcheries operate in the Chignik UoC.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Chignik UoC.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			No hatcheries operate in the Chignik UoC.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
13	**CHIGNIK**	**100**	**N/A**

Evaluation Table PI 1.1.1 – UoC 14: Peninsula/Aleutian Islands

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock.
			Chinook is classed as an IPI species in the Peninsula/Aleutian Islands Unit of Certification. As such, the Peninsula/Aleutian Islands fishery is considered to target only sockeye, coho, pink and chum salmon. The fishery exceeds this level of performance.
80	**a**	**Y**	It is **highly likely** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			In the three coho systems monitored for escapements, the lower thresholds were exceeded 85% of the time over the past 9 years of monitoring. For chum salmon they exceeded the lower bound 85% of the time over the 9 years of monitoring the district escapements. Pink salmon exceeded the lower bound 13 out of 17 years of monitoring (alternative years only had targeted escapements). Sockeye salmon exceeded lower escapement goals 90% of the time over the past 9 years for the 14 established escapement goals. Escapement trends and monitoring appears to be improving and failure to achieve the lower bounds of the escapement goals are less likely to occur than exceeding the upper bounds, with an overall success rate of exceeding the lower bounds of approximately 90% (Munro and Volk 2012). Swanson Lagoon sockeye have been declared a stock of concern because of natural blockage to the entrance of the lagoon. The directed fishery has been closed. These data indicate that the stocks are consistently well above a level that might cause recruitment to be impaired.
	b	**Y**	The wild stock is at or fluctuating around its target reference point.
			The fishery meets this level of performance for sockeye, coho, pink and chum salmon, but does not exceed it- see SI 100b.
100	**a**	**Y**	There is a **high degree of certainty** that the wild stock is above the point where recruitment would be impaired or fishery impacts are so small as to have no significant effect on the stock status.
			Sockeye, coho, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (BEG or SEG)) in 90% of the past 9 years (Munro & Volk 2012). There is therefore a high degree of certainty that the wild stock is above the point where recruitment would be impaired, and the fishery meets this level of performance.
	b	**N**	There is a **high degree of certainty** that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, **over recent years**.
			Escapements of sockeye, coho, chum and pink salmon have exceeded the lower end of the TRP (escapement goal (BEG or SEG)) in 90% of the past 9 years (Munro & Volk 2012), but has not achieved 100%. Consequently the Peninsula/Aleutian Islands fishery does not meet this scoring level.
References			Munro & Volk (2012).

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Stock Status relative to Reference Points for each UoC			
Peninsula/Aleutian Islands	**Type of reference point**	**Value of reference point**	**Current stock status relative to reference point**
Target reference point	Escapement goals (EGs) including Sustainable EGs and Biological EGs.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, and all stocks are fluctuating within the EG range (see Munro & Volk 2012).
Limit reference point	The lower bound of the EG acts as an effective and precautionary LRP.	Variable, depending on stock (see Munro & Volk 2012)	Variable, depending on stock, but all stocks are above the LRP in most years. In 2012 the Swanson Lagoon sockeye was proposed as a stock of management concern and was declared a stock of concern by the Board in 2013 (see Munro & Volk 2012).
UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
14	**Peninsula/Aleutian Islands**	**90**	**N/A**

Evaluation Table: PI 1.1.2 – UoC 14: Peninsula/Aleutian Islands

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.
			The fishery exceeds this level of performance.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Reference points are appropriate for the wild stock and can be estimated.
			There are 13 escapement goals for sockeye, three for coho, two for pink (different for odd and even years) and six for chum salmon. Escapement goals are largely based on stock-recruitment relationships with consideration of sockeye habitat conditions, including lake euphotic volume and zooplankton biomass (Wittiveen *et al*. 2009). Escapement goals were reviewed in 2012 (Sagalkin & Erickson 2012) with minor recommendations for changes, specifically to drop goals where survey information is unreliable and little fishing effort is occurring. The escapement goals are set as either SEG's and BEG's, with no OEG's in the Peninsula/Aleutian Islands. The methods for determining goals vary but are described by Munro & Volk (2012). The Department closes or minimizes fisheries when stocks are below the lower end of the escapement goals, which effectively serve as a conservative LRP, far above the level where recruitment would be impaired. The range of the escapement goals (which are target reference points) are designed to obtain high yields with conservative boundaries to ensure fisheries are sustainable. The fishery meets this level of performance.
	b	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.
			The escapement goals for sockeye, coho, pink and chum are an effective LRP, as noted in 80a. The fishery exceeds this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.
			Although a variety of methods are used to develop the escapement goals, the methods are consistent with maintaining the potential for relatively high production. Munro & Volk (2012) describes the 12 methods that may be used to develop escapement goals. Escapement goal reports for each management area provide details on the methods selected to develop the goals in that region (e.g. Wittiveen *et al*. 2009). The methods used reflect the type of information that is available. Typically, the escapement goals are based on many years of data. The fishery exceeds this level of performance.
	d	**N/A**	Key low trophic level species, the target reference point takes into account the ecological role of the stock.
			Pacific salmon species are not low trophic level species, and so this Scoring Issue is not scored.
	e	**Y**	Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
			Alaskan Fisheries are managed by either fixed escapement goals where the fisheries are primarily terminal and can be managed by real time escapement counts or, in the case of long established interception fisheries, such as the False pass fishery on the Alaska Peninsula, a quota is established at a low percentage of the forecasted run size such that the fishery has low risk to the targeted or non-targeted fish stocks being exploited. In the case of escapement goals, there are often multiple stocks being exploited where salmon have similar timing. Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non-target stocks have been determined (e.g. Dann *et al*. 2011, Dann *et al*. 2012a, Eggers *et al*. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks. The fisheries of southwestern Alaska have had recent extensive examination of stock components as part of the WASSIP program and there is an extensive set of information that addresses the genetics, catch and escapement of the subcomponents of the salmon fisheries in the Peninsula/Aleutian Islands (http://www.adfg.alaska.gov/index.cfm?adfg=wassip.reports). The fishery meets this level of performance.
100	**b**	**Y**	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of **precautionary issues**.
			The escapement goal approach used by ADF&G in the Peninsula/Aleutian Islands is precautionary because it is set well above a limit reference point at which reproductive capacity would be impaired. The fishery meets this level of performance.
	c	**Y**	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a **higher level**, and takes into account relevant precautionary issues such as the ecological role of the stock with a **high degree of certainty.**
			The escapement goal approach in the Peninsula/Aleutian Islands is such that the stocks are to be maintained at a sustained high yield, which takes the ecological role of the stock into account with a high degree of certainty. The fishery meets this level of performance.
	e	**N**	Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive

PI 1.1.2		Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			capacity of each stock subcomponent.
			The management approach in the Peninsula/Aleutian Islands provides some certainty in protecting subcomponent stocks, as noted above, but we have no direct evidence that this is to a high level of certainty. As such, the Peninsula/Aleutian Islands fishery does not meet this level of performance.
References			Dann *et al*. (2011), Dann *et al*. (2012a), Eggers *et al*. (2011), Munro & Volk (2012), Sagalkin & Erickson (2012), Wittiveen *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**95**	**N/A**

Evaluation Table: PI 1.1.3 – UoC 14: Peninsula/Aleutian Islands

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.
			There is one stock of concern in the Peninsula/Aleutian Islands with recommendations were made in September 2012 to consider the Swanson Lagoon sockeye salmon to be a stock of management concern (Regnart & Swanson, 2012) and was approved by the in the February, 2013 meeting. There were no directed fisheries on this stock in 2012.
	b	**Y**	Monitoring is in place to determine whether they are effective in rebuilding the stock within the **specified** timeframe.
			The stock is routinely monitored during annual Peninsula escapement surveys.
	c	**Y**	Enhancement activities are **not routinely used** as a stock rebuilding strategy but may be temporarily in place as a conservation measure to preserve or restore wild diversity threatened by human or natural impacts.
			There are no significant enhancement (hatchery or lake fertilization) activities.
80	**a**	**Y**	Where stocks are depleted rebuilding strategies are in place.
			There is no directed fishery on the Swanson Lagoon sockeye.
	b	**Y**	There is **evidence** that they are rebuilding stocks, or it is **highly likely** based on simulation modelling or previous performance that they will be able to rebuild the stock within the **specified** timeframe.
			The Swanson lagoon stock is depleted because of natural habitat changes and is unrelated to fishing. Plans for recovery by altering habitat are not currently available but directed fishing has been curtailed and recovery should occur as soon as the lagoon blockage is removed
	c	**Y**	Enhancement activities are **very seldom used** as a stock rebuilding strategy.
			No evidence or plans to use enhancement methods for stock recovery.
100	**a**	**N**	Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete **within the specified timeframe**.
			The recovery will depend upon habitat modification or intervention. No plans are currently available to intervene with natural blockage of access to the lagoon.
	c	**Y**	Enhancement activities are **not used** as a stock rebuilding strategy.
			There are no significant enhancement (hatchery or lake fertilization) activities.
References			Regnart & Swanson (2012)

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**95**	**N/A**

Evaluation Table: PI 1.2.1 – UoC 14: Peninsula/Aleutian Islands

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The harvest strategy is **expected** to achieve wild stock management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy is **likely** to work based on prior experience or plausible argument.
			The fishery exceeds this level of performance.
	c	**Y**	Monitoring is in place that is expected to determine whether the harvest strategy is working.
			Inseason harvests of each species and effort in each fishing district are monitored daily by the manager. Daily and cumulative sockeye and some coho spawning escapements are monitored with respect to escapement curves based on historical timing. This information is used to effectively control harvests in order to meet the TRP. For other species weekly aerial counts of spawning escapements are used to monitor and open or close fisheries in real time.
80	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and the elements of the harvest strategy **work together** towards achieving management objectives reflected in the target and limit reference points.
			The fishery exceeds this level of performance.
	b	**Y**	The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.
			The fishery exceeds this level of performance.
100	**a**	**Y**	The harvest strategy is responsive to the state of the wild stock and is **designed** to achieve stock management objectives reflected in the target and limit reference points.
			The fishery has effective TRP and LRP proxies (escapement goals) for each target species. The harvest strategy consists of in-season monitoring (weir counts, aerial surveys, age data, catch per effort), reviewed by managers to determine when to open and close the fishery. The fishing area is split into numerous fishing districts and statistical areas so that the manager can close specific locations as a means to protect the local spawning stock and achieve the TRP. Major interception fisheries have low exploitation rates on target stocks and have preseason quotas established to regulate allocations. The fishery meets this level of performance.
	b	**Y**	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
			Fishing performance and management activities are reported every year in annual management reports, which are available online (e.g., Murphy & Wilburn 2012; Wilburn & Murphy 2012; Poetter & Keyse 2012; Poetter 2012). Escapement goals and performance against the goals are periodically summarized and reviewed throughout the state in a single comprehensive report (e.g., Munro & Volk 2012). Stocks are at or above target levels. The fishery meets this level of performance.
	d	**Y**	The harvest strategy is periodically reviewed and improved as necessary.
			Escapement goals and the methods to derive goals are reviewed every three years (Wittiveen *et al*. 2009). The fishery meets this level of performance.

PI 1.2.1		There is a robust and precautionary harvest strategy in place	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
References			Munro & Volk (2012), Murphy & Wilburn (2012), Wilburn & Murphy (2012), Poetter & Keyse (2012), Poetter (2012), Wittiveen *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Evaluation Table: PI 1.2.2 – UoC 14: Peninsula/Aleutian Islands

PI 1.2.2			There are well defined and effective harvest control rules in place
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Generally understood** harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.
			The fishery exceeds this level of performance.
	c	**Y**	There is **some evidence** that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Well defined** harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
			The fishery meets this level of performance because there is timely in-season monitoring of stock abundances and the ability by managers to quickly open and close specific areas of the fishery depending on the information at hand compared with historical spawning escapement patterns. Salmon "harvest control rules" are based on the expected escapement each week or so (based on historical data and timing) in order to achieve the total stock escapement goal for the entire run. Harvests are regulated so that escapement of salmon occurs throughout the run, generally in proportion to total abundance.
	b	**Y**	The **selection** of the harvest control rules takes into account the **main** uncertainties.
			The fishery exceeds this level of performance.
	c	**Y**	**Available evidence indicates** that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The **design** of the harvest control rules takes into account a **wide range** of uncertainties.
			The fishery is managed based on in-season monitoring of spawning escapement, catch per effort and age composition. Fishing districts are opened and closed on a daily or hourly basis depending on real-time evaluation of stock abundances. This level of precision allows the fishery to meet this level of performance.
	c	**Y**	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
			The lower escapement goal for each species (sockeye, coho, chum, pink) has been achieved in 90% of the past 9 years (Munro and Volk 2012), indicating that harvest control rules are effective. The fishery meets this level of performance.
References			Munro & Volk. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Evaluation Table: PI 1.2.3 – UoC 14: Peninsula/Aleutian Islands

PI 1.2.3			Relevant information is collected to support the harvest strategy
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Some** relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.
			The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	d	**Y**	Some relevant information is available on the significance of fishery harvests on various stock components.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient** relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.
			Aerial surveys, weir counts and age composition provide information of stock structure and escapement. Genetic studies have been conducted to identify chum and sockeye populations throughout the region where the catch may have originated. Previous conditions from the last MSC certification in 2007 have been met with the submission of the findings of the WASSIP program (http://www.adfg.alaska.gov/index.cfm?adfg=wassip.reports). The fishery exceeds this level of performance.
	b	**Y**	Stock abundance and fishery removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	There is good information on all other fishery removals from the stock.
			All salmon species and all fisheries are monitored. Good information is collected on subsistence and sport fishing harvest. Using this approach, management attempts to account for harvests of local stocks in other management areas and interceptions of stocks bound for other areas. The recent WASSIP program has provided extensive genetic mapping of stock origins, catches and escapements.
	d	**Y**	Information is sufficient to estimate the significance of fishery harvests on stock components
			The fishery exceeds this level of performance.
100	**a**	**Y**	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
			There is a long history of monitoring of harvest and spawning escapement by District and specific important local stocks. Limnological data are available for many lakes in the Peninsula/Aleutian Islands area (Honnold *et al*. 1996). For the target sockeye, coho, pink and chum salmon, catch, effort and escapement data are available. This information supports the harvest strategy and is comprehensive, so allowing the fishery to meet this level of performance.
	b	**Y**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of

PI 1.2.3		Relevant information is collected to support the harvest strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
			Daily harvests by fishing district are monitored through fish tickets which are considered to be sufficiently accurate to manage the fishery and escapement. Data are available on a near real time basis and used to manage the fishery. Spawning escapements are monitored almost continuously (e.g., weir counts 10 min per hour during daylight) or on a weekly basis (aerial counts on streams). Managers recognize and understand the uncertainty in estimates. The fishery meets this level of performance.
	d	**Y**	A comprehensive range of information is available to estimate the significance of fishery harvests on stock components.
			A comprehensive range of information is available to estimate the significance of fishery harvests on stock components. For example, aerial surveys document the spawning escapement of stock components (individual streams) of pink and chum salmon; weir counts are used for sockeye and coho. Harvest data are available for each fishing district. The fishery meets this level of performance.
References		Honnold *et al*. 1996.	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Evaluation Table: PI 1.2.4 – UoC 14: Peninsula/Aleutian Islands

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**b**	**Y**	The assessment estimates stock status relative to reference points.
			The fishery meets this level of performance because spawning escapements are monitored and directly compared with escapement goals (reference points).
	c	**Y**	The assessment **identifies major sources** of uncertainty.
			The fishery exceeds this level of performance.
	f	**Y**	The majority of stocks are defined with a clear rationale for conservation, fishery management and stock assessment requirements.
			The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is some scientific basis for the indicator stocks.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule.
			The fishery exceeds this level of performance.
	c	**Y**	The assessment **takes uncertainty into account**.
			The fishery exceeds this level of performance.
	e	**Y**	The assessment of stock status is subject to peer review.
			Stock status is evaluated annually in area management reports, including all components of the Peninsula/Aleutian Islands. A more formal evaluation is conducted every three years when an escapement goal report is prepared by regional staff (typically not the fishery managers) to determine whether the spawning escapements were meeting the escapement goals. The escapement goal review is considered by the Alaska BOF. The escapement goal review and the BOF review meets the intent of the MSC peer review requirement.
	f	**Y**	The stocks are well defined and include details on the major component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			With the recent results of the WASSIP program, stocks are well defined for the purpose of managing the fishery and maintain robust populations. The fishery exceeds this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, there is evidence of coherence between the status of the indicator stocks and the status of other stocks they represent with the management unit to the extent a high likelihood exists of tracking stock status for lower productivity stocks (i.e., those at higher conservation risk).
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and chum are monitored by aerial surveys. ADF&G published a report showing that escapements of monitored pink and chum salmon in the westward region were highly correlated during 1987-2007 (Finkle & Vining 2009). Sockeye and coho, escapement is monitored through weir counts while the chum and pink fisheries use multiple stream escapement counts to regulate effort in fishing districts.

PI 1.2.4		There is an adequate assessment of the stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**Y**	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
			Stocks incorporate populations that are managed as a group and they are specifically-defined, along with escapement goals, and monitoring. All harvests are documented by statistical area as a means to support evaluation of stock status. The harvest and escapement monitoring incorporates biological features such as migration timing. The fishery meets this level of performance.
	c	**Y**	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
			Escapement goal ranges consider data uncertainty and evaluate stock status relative to reference points in a probabilistic manner. The fishery meets this level of performance.
	d	**Y**	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
			Escapement goal management has been used for decades and the stocks have remained robust with increasing trends. Alternative approaches to escapement goal development have been considered (Wittiveen *et al*. 2009).
	e	**N**	The assessment has been **internally and externally** peer reviewed.
			The assessment team is not aware of external review of escapement goal evaluations for Peninsula/Aleutian Islands salmon, and so the fishery does not meet this level of performance.
	f	**Y**	There is an unambiguous description of the each stock, including its geographic location, run timing, and component stocks with a clear rationale for conservation, fishery management and stock assessment requirements.
			Stocks are well defined in terms of timing and geographic range, and they can be effectively conserved and managed. The WASSIP program has provided extensive documentation of the stock composition of catch and escapement throughout this region. The fishery meets this level of performance.
	g	**Y**	Where indicator stocks are used as the primary source of information for making management decisions on larger groups of stocks in a region, the status of the indicator stocks is well correlated with the full range of stocks, not just correlated with the most productive stocks in the management unit.
			Indicator stocks are not used as a source of information for making management decisions because the majority of tributaries for pink and chum are monitored by aerial surveys. Sockeye, and coho escapement is monitored through weir counts.
References			Finkle & Vining (2009), Wittiveen *et al*. (2009).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**95**	**N/A**

Evaluation Table: PI 1.3.1 – UoC 14: Peninsula/Aleutian Islands

PI 1.3.1		Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no significant enhancement activities in the Peninsula/Aleutian Islands.
80	**a**	**Y**	It is **highly likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no significant enhancement activities in the Peninsula/Aleutian Islands.
100	**a**	**Y**	There is a **high degree of certainty** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
			There are no significant enhancement activities in the Peninsula/Aleutian Islands.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Evaluation Table: PI 1.3.2 – UoC 14: Peninsula/Aleutian Islands

PI 1.3.2		Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Practices and protocols** are in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	The practices and protocols in place are **considered likely** to be effective based on plausible argument.
			No hatcheries operate in the Peninsula/Aleutian Islands.
80	**a**	**Y**	There is a **partial strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	There is **some objective basis for confidence** that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
			No hatcheries operate in the Peninsula/Aleutian Islands.
100	**a**	**Y**	There is a **comprehensive strategy** in place to protect wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	There is **clear evidence** that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement.
			No hatcheries operate in the Peninsula/Aleutian Islands.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Evaluation Table: PI 1.3.3 – UoC 14: Peninsula/Aleutian Islands

PI 1.3.3		Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.
			No hatcheries operate in the Peninsula/Aleutian Islands.
80	**a**	**Y**	Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
			No hatcheries operate in the Peninsula/Aleutian Islands.
100	**a**	**Y**	A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.
			No hatcheries operate in the Peninsula/Aleutian Islands.
	b	**Y**	The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.
			No hatcheries operate in the Peninsula/Aleutian Islands.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
14	**Peninsula/Aleutian Islands**	**100**	**N/A**

Principle 2

Evaluation Table: PI 2.1.1

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Main retained species are **likely** to be within biologically based limits (if not, go to scoring issue d below).
			With the exception of troll gears in SEAK and Yakutat UoCs, non-salmonids may not be retained and sold in the Alaska salmon fishery. Small quantities of other finfish may, though, be taken and retained for personal use (i.e. they may be retained but not sold) (SOA 2007). These fish, including steelhead (*Oncorhynchus mykiss*), that are retained for personal use must be recorded on the fish tickets. Within Alaska, steelhead are most commonly found in the Southeast Alaska UoC (Augerot & SotS 2004), but the quantities harvested even there are reportedly very small, with an annual average of 108 steelhead reported harvested in all commercial salmon gears from 2002 to 2011 (Harding & Coyle 2011). In SEAK and Yakutat, a variety of groundfish may be retained by troll fishermen. These mainly comprise of lingcod (*Ophiodon elongates*) and a variety of rockfish species from the family Sebastidae (see Table 5). From 2005 – 2010, lingcod made up an average of 57.4% of the reported groundfish catches, black rockfish (*Sebastes melanops*) made up an average of 25.5%, while no other species comprised more than 5% of the troll catch (NPFMC *et al*. 2011). Lingcod plus the top five species of rockfish accounted for an average of 95.1% of the total annual groundfish catch in Southeast Alaska (SEAK plus Yakutat UoCs), with individual quantities as follows: Lingcod - 57.4%; Black rockfish - 25.5%; Yellowtail rockfish - 4.5%; Silvergray rockfish - 3.5%; Yelloweye rockfish - 2.7%; Dusky rockfish - 1.4%. Lingcod and black rockfish are managed by the State of Alaska, while the other rockfish species are Federally managed. Lingcod is managed through closed seasons protecting spawning females and nest-guarding males, minimum landing sizes to ensure fish spawn at least once, daily bag limits for recreational fishermen and catch quotas for commercial fishermen. Black rockfish fisheries in Southeast Alaska are small and conservatively managed using guideline harvest limits (http://www.adfg.alaska.gov/index.cfm?adfg=blackrockfish.management). Yellowtail and silvergray rockfish were both considered to be part of the 'other rockfish' assemblage for the 2011 full assessment, when overfishing was not considered to be occurring (http://www.afsc.noaa.gov/REFM/docs/2011/GOAorock.pdf). Yelloweye rockfish is considered to be part of the demersal shelf rockfish assemblage. The 2011 assessment considered that the assemblage was not overfished or approaching an overfished condition (http://www.afsc.noaa.gov/REFM/docs/2011/GOAdsr.pdf). Dusky rockfish is not overfished nor is it considered to be approaching an overfished condition (http://www.afsc.noaa.gov/REFM/docs/2011/GOAdusky.pdf). Essentially, none of these groundfish species is considered to be particularly vulnerable (and therefore is not considered to be a 'main' bycatch species (see GCB 3.5.2, MSC 2013b), while it is estimated that the total groundfish catches in 2005 – 2010 made up an average of only 0.02% of the commercial salmon catch in Southeast Region (data from NPFMC *et al*. 2011 and http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). Therefore, the catch of non-salmonids is considered to be negligible. Inseparable or Practically Inseparable (IPI) catches must be considered under PIs 2.1.1, 2.1.2 and 2.1.3 (MSC 2013a). Only the Copper/Bering Districts catches of non-target pink and chum salmon exceeded the 2% threshold for IPI species to be considered against the full IPI requirements (CR 27.4.10 – MSC 2013a). It is

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			considered that the relatively low overall catches, minimal targeting and relatively pristine habitat in the area mean that pink and chum salmon in the Copper/Bering Districts UoC meet those requirements. The full list and justification for potentially IPI salmon in each UoC is provided in Table 6. There are no potential IPI Pacific salmon species (i.e., IPI category 'a', as defined in the introductory Section 2.4.3) in the SEAK, UCI, Kodiak or Chignik UoCs, there is one potential IPI Pacific salmon species in each of the Yakutat, PWS, Bristol Bay, Kuskokwim, Norton Sound and the Alaska Peninsula and Aluetian Islands UoCs, two potential IPI Pacific salmon species in each of the Copper/Bering Districts, LCI and Yukon River UoCs, while Kotzebue UoC has four potential IPI Pacific salmon species (only chum is a target in this UoC). With the exception of the Copper/Bering Districts UoC and sockeye salmon in the Alsek River (Yakutat UoC), the catches of these potential IPI species are all less than 2% of the harvest of the other targeted Pacific salmon species in the UoC, and therefore these are exempt from IPI requirements under CR 27.4.10.2 (MSC 2013a). In the SEAK UoC, Chinook and sockeye are target species, but a proportion of these fish originate from non-Alaskan river systems (PSC 2012c). These non-Alaskan fish are considered to be in IPI category 'b' (i.e. of the same species as a target species within a UoC, but originating from outside the UoC). For the years 2008 – 2011, the Chinook catch in SEAK averaged 0.7% of the total salmon harvest in the UoC, although an estimated 96.2% of the Chinook harvest for the years 1985-2010 was derived from non-local stocks (PSC 2012c). The maximum annual exploitation rate on any non-local Chinook salmon stock was 20.6% (Upper Strait of Georgia; PSC 2012c). For SEAK sockeye, over the period 2007-2011, fish from the Canadian Nass and Skeena runs have comprised an average of 6.5% of the total annual SEAK sockeye harvest, but 0.1% of the total salmon harvest in SEAK. Coho, pink and chum slamon are also harvested at typically low rates. The low level of catch relative to the harvest of other Pacific salmon in the SEAK UoC mean that these species qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a), and there are otherwise no main retained species. Exploitation rates of non-local chum, coho, and pink salmon in SEAK are provided in Table 6. All UoCs exceed this level of performance.
	c	**Y**	If main retained species are outside the limits there are **measures** in place that are **expected** to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.
			There are no main retained species.
	d	**N/A**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.
			N/A. All UoCs exceed this level of performance.
80	**a**	**Y**	Main retained species are **highly likely** to be within biologically based limits (if not, go to scoring issue c below).
			There are no main retained species. In the SEAK and Yakutat UoCs, a significant proportion of the Chinook taken originate from non-Alaskan river systems in British Columbia, Washington, Oregon and California. Of those fish, a tiny proportion may originate from runs that have been listed under the Endangered Species Act, and Chinook from four runs are deemed likely to appear in catches- the Snake River fall, Puget Sound, Lower Columbia River and Upper Willamette River runs.

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			The MSC has granted a variation that means these ESA fish can be considered IPI category 'b' fish (i.e. of the same species as a target species within a UoC, but originating from outside the UoC) on the basis that the SEAK and Yakutat fisheries are awarded incidental take permits for these runs, the fisheries are not considered to be the major limiting factor for populations in any of these ESUs, harvest limits implemented since 2008 have reduced the potential impact of the fishery on these runs, and fish from these runs comprise a very small percentage of the overall harvest. Alsek River sockeye is considered to be a non-local IPI harvest in the Yakutat UoC, as it comprised an average of 3.6% of the salmon harvest in the years 2008 - 2011 (Woods & Zeiser 2012). The upriver Klukshu River Weir sockeye escapement has been met in the last 3 years, such that it is considered highly likely that the run is within biologically-based limits; the fishery meets this level of performance. See Table 6 for more information. The status of the ESA-listed salmon species taken in SEAK and Yakutat means that these UoCs meet this level of performance but can score no higher than 80 for this PI. All other UoCs exceed this level of performance.
	c	**Y**	If main retained species are outside the limits there is a **partial strategy** of **demonstrably effective** management measures in place such that the fishery does not hinder recovery and rebuilding.
			There are no main retained species. As noted in SI 80a above, fishing is not the considered to be the major limiting factor for populations of the four ESA-listed runs that are deemed likely to appear in the SEAK and Yakutat fisheries. Stricter harvest limits implemented since 2008 have further reduced the potential impact of the fishery on these runs. The SEAK and Yakutat fisheries meet this level of performance, while all other UoCs exceed this level of performance.
100	**a**	**N – UoC 1 UoC 2** **Y – All other UoCs**	There is a **high degree of certainty** that retained species are within biologically based limits **and** fluctuating around their target reference points.
			With the exception of troll gears used in the Southeast, non-salmonids may not be retained and sold in the Alaska salmon fishery. Small quantities of other finfish may, though, be taken and retained for personal use (i.e. they may be retained but not sold) (SOA 2007). In the Southeast Region (SEAK and Yakutat UoCs), it is estimated that the total groundfish catches in 2005 – 2010 made up an average of only 0.02% of the commercial salmon catch (data from NPFMC *et al.* 2011 and http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery). This is considered to be essentially negligible, but nevertheless the assessment team could not conclude that there was a high degree of certainty that these species and some non-local salmon populations that are considered to be IPI are within biologically based limits and fluctuating around their target reference points. While the abundance of steelhead in Southeast Alaska has been at average or above-average levels for the last decade, some systems are below historic levels. Togetejhrm this means that SEAK and Yakutat do not meet this level of performance, but all other UoCs meet this level of performance.
	b	**N – UoC 1 UoC 2**	Target reference points are defined for retained species.
			Although harvest limits are used to manage catches of Chinook in the Southeast fishery, many non-local Chinook salmon harvested in SEAK and Yakutat, as well as steelhead, do not have TRPs. Target reference points are also not defined for all

PI 2.1.1		The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
		Y All other UoCs	retained groundfish species in the Southeast Region. As such, the SEAK and Yakutat UoCs do not meet this level of performance. As only negligible quantities of other finfish species are taken while targeting salmon in the remaining Alaska salmon fisheries, this scoring guidepost can be met without knowing the status of those species with respect to biological reference points (MSC 2013a).
References			Anderson & Nichols (2012), Augerot & SotS (2004), English *et al*. (2012), Harding & Coyle (2011), MSC (2013), NPFMC *et al*. (2011), PSC (2009), PSC (2011), PSC (2012a), PSC (2012b), SOA (2007).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 2.1.2

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **measures** in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.
			Non-salmonids may not be retained and sold in the Alaska salmon fishery (SOA 2007), other than when taken trolling in the Southeast Region. The retention of non-salmonids in the Southeast troll fishery constituted an average of just 0.02% of the salmon catch annually from 2005 – 2010 (data from NPFMC *et al*. 2011 and http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery) (see text for PI 2.1.1, SI 60a for more detail). Very small quantities of steelhead may also be retained for personal use, but the average number of these in even SEAK (the area where steelhead are most likely to be encountered) is very low (mean 2002-2011 = 108 fish per year) (Harding & Coyle 2011). The quantity of potential IPI Pacific salmon species taken in any of the UoCs is also very low, with IPI species in any UoC accounting for less than 2% of the total salmon catch in that UoC. The exceptions are the Copper/Bering Districts UoC, where pink and chum salmon have made up 2.1% of the catch in recent years, and the Yakutat UoC where non-local sockeye in the Alsek River have made up 3.6% of the harvest in that UoC from 2008 - 2011. The upriver Klukshu sockeye escapement is monitored and has consitently exceeded the escapement goal in recent years, while it is considered that the relatively low overall catches, minimal targeting and relatively pristine habitat in the area mean that pink and chum in the Copper/Bering Districts meet the IPI requirements. See Table 6. ESA-listed Pacific salmon may be taken in the SEAK and Yakutat fisheries, but these constitute a tiny percentage of the overall catch, and exploitation is controlled at levels that do not cause jeopardy through the issuance by NOAA of incidental-take permits. The MSC has allowed these ESA-listed salmon to be considered as IPI species. There are no main retained species in the Alaska salmon fishery, and all UoCs exceed this level of performance.
	b	**Y**	The measures are considered **likely** to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).
			The fishery exceeds this level of performance.
80	**a**	**Y**	There is a **partial strategy** in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.
			The fishery exceeds this level of performance, except in SEAK and Yakutat where it only meets this level for steelhead (SEAK and Yakutat) and BC chum salmon (SEAK) (see SI 100a, below).
	b	**Y**	There is some **objective basis for confidence** that the partial strategy will work, based on some information directly about the fishery and/or species involved.
			The fishery exceeds this level of performance, except in SEAK and Yakutat where it only meets this level for steelhead (SEAK and Yakutat) and BC chum salmon (SEAK) (see SI 100a, below).
	c	**Y**	There is **some evidence** that the partial strategy is being **implemented successfully.**
			The fishery exceeds this level of performance, except in SEAK and Yakutat where it only meets this level for steelhead (SEAK and Yakutat) and BC chum salmon (SEAK) (see SI 100a, below).

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
100	**a**	**N – UoC 1** **Y – All other UoCs**	There is a **strategy** in place for managing retained species. Non-salmonids may not be retained and sold in the vast majority of the Alaska salmon fishery. The exception is the Southeast Region troll fishery where specific limits exist on the amount of non-salmonid bycatch that may be retained. The total quantity of IPI species taken in any UoC has averaged less than 2% of the catch across the UoC in the last four years, except in Copper/Bering Districts, where the IPI catch of pink and chum salmon has averaged 2.1%, and in the Yakutat UoC where sockeye salmon from the Alsek made up 3.6% of the harvest from 2008 - 2011. Management of the Alsek sockey fishery is undertaken in cooperation with the Canadian authorities, and adjustments to the weekly fishing periods rely on fishery performance data- management decisions are based on CPUE data during that period, while parent-year escapement information is also considered when determining the weekly fishing periods. Management of fisheries affecting ESA-listed species is undertaken through the Pacific Salmon Treaty (PST), and is enabled through the issuance of incidental take permits. Incidental take in the Southeast Alaska region of ESA-listed Chinook salmon from the various ESUs will vary from year to year depending on the stock abundances, annual variation in migratory patterns, and fishery management measures used to set and implement fishing levels in the PST Agreement. It is considered that the ban on retained species in almost all cases, other than for personal use, the methods of fishing, close control of harvest areas, and harvest limits placed on the Southeast Region where ESA-listed salmon may be taken, constitute an operational strategy for managing retained species. However, in SEAK non-local, British Columbia chum are taken at moderately low rates (24% or less depending on stock; see Table 6;English et al. 2012) when targeting more robust chum stocks in southern SEAK. There is a partial strategy for BC chum salmon: Annex IV of the Pacific Salmon Treaty states, "*With respect to the Portland Canal chum salmon fishery, neither Party shall conduct net fisheries in Alaskan Section 1A and Canadian sub-areas 3-15 and 3-16 nor conduct directed chum fisheries in Alaskan Section 1B north and east of Akeku Point or in Canadian sub-areas 3-11 and 3-13 unless agreed otherwise by the Parties*." Also, PST regulation of BC sockeye catch in Alaska fisheries is considered a partial strategy to conserve BC chum because migration timing and ER of BC chum is similar to that of BC sockeye (English *et al*. 2012). There has been a slight decline over time in the exploitation rate of BC chum stocks in SEAK and a larger ER decline in British Columbia. 100% elimination of chum harvests in Alaska and BC would not have enabled benchmarks to be achieved in nearly all years when the lower benchmark was not met, suggesting environmental factors are the major factor for the chum decline. It is noteworthy that when addressing depleted Chinook stocks in mixed stock and terminal fisheries, the PST calls for greater conservation measures in terminal area fisheries where the depleted stock originates (NMFS 2008). The harvest of steelhead from SEAK and Yakutat has remained low since measures were introduced banning the commerical sale or barter of steelhead. Although steelhead may be retained for personal consumption, this is only considered a partial strategy to maintain the species and so SEAK and Yakutat do not meet this high level of performance. All other UoCs meet this level of performance.
	b	**N – UoC 1**	**Testing** supports **high confidence** that the strategy will work, based on information directly about the fishery and/or species involved. There is no evidence of non-salmonids being sold from the UoCs other than the Southeast Region, where retention of groundfish is permitted in the troll fishery. The

PI 2.1.2		There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
		Y – All other UoCs	very low levels of bycatch overall in the Southeast troll fishery and the reductions in exploitation rate of ESA-listed salmon in the SEAK and Yakutat fisheries provide high confidence that the strategy is working. All UoCs meet this level of performance, except SEAK and Yakutat where steelhead and depleted BC chum (SEAK only) are taken (see above).
	c	**N – UoC 1** **Y – All other UoCs**	There is **clear evidence** that the strategy is being **implemented successfully.** There is no evidence of non-salmonids being sold from the Alaska salmon fishery, other than from the Southeast Region where retention of groundfish is permitted in the troll fishery. Data from the SEAK and Yakutat troll fishery for the last 10 years show that the quantities of retained species harvested are within limits, except non-local chum in SEAK. All UoCs meet this level of performance, except SEAK (where steelhead and depeleted BC chum are taken) and Yakutat (where steelhead are taken).
	d	**N – UoC 1** **Y – All other UoCs**	There is some **evidence** that the strategy is **achieving its overall objective**. There is no evidence of non-salmonids being sold from the Alaska salmon fishery, other than from the Southeast Region where retention of groundfish is permitted in the troll fishery. Harvest rates of IPI species are typically low and harvest rates of ESA-listed Chinook runs have declined over time. Overall, there is some evidence that the strategy is achieving its overall objective, and the fishery is considered to meet this level of performance, except SEAK (steelhead and BC chum) and Yakutat (steelhead) (see above).
References			http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery), Anderson & Nichols (2012), Harding & Coyle (2011), NPFMC *et al.* (2011), SOA 2007), NMFS 2008.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 2.1.3

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Qualitative information** is available on the amount of main retained species taken by the fishery.
			There are no main retained species, and so the fishery exceeds this level of performance. See text for PI 2.1.1, SI 60a for more detail.
	b	**Y**	Information is **adequate to qualitatively** assess outcome status with respect to biologically based limits.
			There are no main retained species, and so the fishery exceeds this level of performance.
	c	**Y**	Information is adequate to support **measures** to manage **main** retained species.
			There are no main retained species, and so the fishery exceeds this level of performance.
80	**a**	**Y**	**Qualitative information** and **some quantitative information** are available on the amount of main retained species taken by the fishery.
			There are no main retained species. SEAK and Yakutat meet this level of performance, while all other UoCs exceed this level of performance (please see SI 100a, below).
	b	**Y**	Information is **sufficient to estimate** outcome status with respect to biologically based limits.
			There are no main retained species. The SEAK and Yakutat fisheries meet this level performance because the CWT and other stock-based information for Chinook, and ER estimates for BC chum are sufficient to estimate outcome status with respect to biologically based limits. All other UoCs in the fishery exceed this level of performance.
	c	**Y**	Information is adequate to support a **partial strategy** to manage **main** retained species.
			There are no main retained species. SEAK and Yakutat meet this level of performance, while all other UoCs exceed this level of performance (see SI 100c, below).
	d	**Y**	Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)
			There are no main retained species. SEAK and Yakutat meet this level of performance, while all other UoCs exceed this level of performance (see SI 100d, below).
100	**a**	**N – UoC 1 UoC 2** **Y – All other UoCs**	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
			Very limited quantities of fish may be retained for personal use, small quantities of IPI salmon are taken in a number of UoCs, and groundfish are taken by troll-fishers in the Southeast Region. There are no other retained species in the Alaska salmon fishery. Personal use and IPI fish are required to be reported on fish tickets, and accurate and verifiable information is available on the groundfish taken in the Southeast troll fishery. Nevertheless, Harding & Coyle (2011) have questioned the accuracy of reported steelhead catch in Southeast Alaska, such that the SEAK and Yakutat UoCs do not meet this high level of performance.

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	b	**N – UoC 1 UoC 2** **Y – All other UoCs**	Information is **sufficient to quantitatively** estimate outcome status with **a high degree of certainty.**
			With the exception of the limited quantities of fish that are retained for personal use, the IPI salmon species and the groundfish that are taken in the SEAK and Yakutat troll fishery, there are no retained species in the Alaska salmon fishery. Personal use fish and groundfish taken in the Southeast troll fishery are required to be reported. Catches of non-local Chinook in the SEAK and Yakutat fisheries are quantified but the estimates are largely based on CWT of hatchery stocks (e.g. PSC 2012c), and it is not possible to say that information is sufficient to quantitatively estimate outcome status with a high degree of certainty. Likewise, there is not a high degree of certainty for the catch of BC chum, pink, and coho salmon in SEAK; genetic and scale data are used to identify BC sockeye. Other UoCs meet this level of performance.
	c	**N – UoC 1 UoC 2** **Y – All other UoCs**	Information is adequate to support a **comprehensive strategy** to manage retained species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
			Groundfish taken in the SEAK and Yakutat troll fisheries, and personal use fish taken in all UoCs, are required to be reported on fish tickets. The comprehensive strategy to manage retained fish includes a ban on retaining non-salmonids other than for personal use in the Alaska salmon fishery, other than where catch limits exist on groundfish taken in the troll fishery. Management measures are used to set and implement fishing levels in the Southeast Region that will help to manage take of ESA-listed Chinook salmon, although harvest from the various ESUs will vary from year to year depending on the stock abundances, annual variation in migratory patterns, and total catch levels. Information is adequate to support this strategy, and is considered that there is a high degree of certainty that the strategy is achieving its objective. The fishery meets this level of performance, except in SEAK and Yakutat, becasue of the limited information on BC chum (SEAK) and because steelhead data from SEAK and Yakutat may not be comprehensive (i.e., Harding & Coyle 2011).
	d	**N – UoC 1 UoC 2** **Y – All other UoCs**	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
			Although there are only very limited quantities of retained fish in the Alaska salmon fishery, all retained fish are required to be reported on fish tickets. Alaska fisheries more widely are well monitored such that it is considered that the fishery meets this level of performance. However, catch of BC chum in SEAK is estimated using a number of assumptions (English *et al*. 2012), and Harding & Coyle (2011) have questioned the accuracy of reported steelhead catch in Southeast Alaska, such that the SEAK and Yakutat UoCs do not meet this high level of performance.
References			http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery), Anderson & Nichols (2012), Harding & Coyle (2011), NPFMC *et al*. (2011), PSC (2012c), SOA (2007).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**

PI 2.1.3		Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 2.2.1

PI 2.2.1		The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Main bycatch species are **likely** to be within biologically based limits (if not, go to scoring issue b below).
			Data from test fisheries and subsistence and personal use fisheries undertaken alongside commercial fisheries show that catches of non-salmonid species in the Alaska salmon fishery are very low, with no other species comprising more than 5% of the total, and total bycatch levels in almost all cases comprising less than 1% of the catch (Table 3, Table 4). Short soak or fishing periods may facilitate live release of bycatch species in some cases (see Table 3). Marine species including starry flounder, cod, sculpin and yellowfin sole are reported as bycatch in UoCs 6, 11, 12 and 14, but the quantities are considered to be very small and effectively negligible relative to marine populations of these species. The freshwater bycatch species listed include Dolly Varden (UoCs 1, 10 and 11), ciscos (UoC 8) and sheefish (UoCs 8 and 10). Dolly Varden is abundant and widely-distributed, with generally stable populations in Alaska (http://www.adfg.alaska.gov/index.cfm?adfg=dollyvarden.main). The distribution of Arctic cisco is to the north of the Alaska salmon fishery area, and the Bering cisco is generally not targeted for subsistence use, although harvested in small numbers and is apparently abundant wherever it occurs , albeit that total populations and trends are unknown (http://www.adfg.alaska.gov/static/species/speciesinfo/_aknhp/Bering_cisco.pdf). Sheefish have been separated into five major stocks (http://www.adfg.alaska.gov/static/education/wns/sheefish.pdf), but while sheefish is a valuable subsistence resource and a popular sport fish, there is no directed commercial fishery in Alaska for this species (http://www.adfg.alaska.gov/index.cfm?adfg=sheefish.uses). None of these freshwater species is considered to be particularly vulnerable, and so none is considered to be a 'main' bycatch species (see GCB 3.5.2, MSC 2013b). There are no main bycatch species in Alaska salmon fishery.	
	b	**Y**	If main bycatch species are outside biologically based limits there are mitigation **measures** in place that are **expected** to ensure that the fishery does not hinder recovery and rebuilding.
			There are no main bycatch species in Alaska salmon fishery.
	c	**Y**	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.
			There are no main bycatch species in Alaska salmon fishery.
80	**a**	**Y**	Main bycatch species are **highly likely** to be within biologically based limits (if not, go to scoring issue b below).
			There are no main bycatch species in the Alaska salmon fishery.
	b	**Y**	If main bycatch species are outside biologically based limits there is a **partial strategy** of **demonstrably effective** mitigation measures in place such that the fishery does not hinder recovery and rebuilding.
			There are no main bycatch species in Alaska salmon fishery.
100	**a**	**N**	There is a **high degree of certainty** that bycatch species are within biologically based limits.
			Data that are available show that bycatch of fish species is very low in the Alaska

PI 2.2.1		The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			salmon fishery (Table 3, Table 4). Also, the salmon fishing season is short, and habitat is relatively pristine, providing some certainty that all bycatch species are within biologically based limits. However, this cannot be confirmed with a high degree of certainty for all species in all areas, and so the fishery does not meet this level of performance.
References			Chaffee 2005.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.2.2

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **measures** in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.
			There are no main bycatch species (See PI 2.2.1).
	b	**Y**	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).
			There are no main bycatch species.
80	**a**	**Y**	There is a **partial strategy** in place, if necessary, for managing bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.
			There are no main bycatch species, and bycatch levels are typically at negligible levels in all UoCs. The fishery exceeds this level of performance.
	b	**Y**	There is **some objective basis for confidence** that the partial strategy will work, based on some information directly about the fishery and/or the species involved.
			There are no main bycatch species, and bycatch levels are typically negligible, but periodic documentation of bycatch in test fisheries and in a logbook program for the Southeast troll fishery provides an objective basis for confidence that the strategy will work.
	c	**Y**	There is **some evidence** that the partial strategy is being implemented successfully.
			There are no main bycatch species, and the test fishery data provide evidence that the bycatch in the Alaska salmon fishery is very low to the point of being negligible (Chaffee 2005). It is considered that this is sufficient evidence that the strategy is being implemented successfully for the fishery to meet this level of performance.
100	**a**	**N**	There is a **strategy** in place for managing and minimising bycatch.
			The ban on selling non-salmonids, selectivity of the gear, very limited fishing seasons and spatial restrictions on fishing activity ensure that bycatch levels in the fishery are effectively negligible. The relatively short soak times offer the potential for live releases in some fisheries. These elements come together to form a partial strategy for managing and minimizing bycatch, and so the fishery does not meet this higher level of performance.
	b	**N**	**Testing** supports **high confidence** that the strategy will work, based on information directly about the fishery and/or species involved.
			The information available from test fisheries is valuable, but bycatch of non-salmonids is not reported with sufficient frequency or detail for the fishery to meet this high level of performance.
	c	**N**	There is **clear evidence** that the strategy is being implemented successfully.
			The test fishery data provides clear evidence that the bycatch in the Alaska salmon fishery is very low to the point of being negligible. Nevertheless, it is considered that the data of non-salmonid catches from the fishery are not reported with sufficient frequency to be able to conclude that there is clear evidence that the strategy is being implemented successfully. The fishery does not meet this level of performance.
	d	**N**	There is some **evidence** that the strategy is achieving its objective.
			The ban on selling non-salmonids, selectivity of the gear, very limited fishing seasons and spatial restrictions on fishing activity constitutes a partial strategy for

PI 2.2.2		There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			managing and minimising bycatch, while data from the test fisheries provides evidence that the partial strategy is achieving its objectives. Nevertheless, as a partial strategy, the fishery cannot meet this level of performance.
References			Chaffee (2005).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC remains in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.2.3

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Qualitative information** is available on the main bycatch species affected by the fishery.
			There are no main bycatch species (see PI 2.2.1).
	b	**Y**	Information is **adequate** to **broadly understand** outcome status with respect to biologically based limits
			There are no main bycatch species.
	c	**Y**	Information is adequate to support **measures** to manage bycatch.
			There are no main bycatch species.
80	**a**	**Y**	**Qualitative information and some quantitative information** are available on the amount of main bycatch species affected by the fishery.
			Some quantitative data on bycatch are available from test fisheries conducted by ADF&G staff and from personal and subsuistence fisheries undertaken alongside commercial fisheries (Table 3 and Table 4). Bycatch is universally low or negligible, with a number of marine and freshwater species taken. None of these species are considered to be main under quantity or vulnerability criteria (see PI 2.2.1). Qualitative, supporting information on the low level of bycatch was also provided during the site visit by ADF&G staff. These data are sufficient for the fishery to meet this level of performance.
	b	**Y**	Information is **sufficient to estimate** outcome status with respect to biologically based limits.
			There are no main bycatch species, and bycatch levels overall are considered to be negligible. The fishery meets this level of performance.
	c	**Y**	Information is adequate to support a **partial strategy** to manage main bycatch species.
			Information on the observed low bycatch rate in the test fisheries, the gear selectivity and the restricted areas in which the fishery occurs is sufficient to meet the requirements of a partial strategy to manage bycatch. The fishery meets this level of performance.
	d	**Y**	Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectively of the strategy).
			Test fishery data are collected annually in order to monitor run size and escapement, and commercial fisheries are monitored in situ with varying levels of intensity. Any increase in risk to main bycatch species would likely be detected quickly. Nevertheless, bycatch levels would need to increase significantly in order for any individual fish species to be considered a main bycatch species. The fishery meets this level of performance.
100	**a**	**N**	**Accurate and verifiable information** is available on the amount of all bycatch and the consequences for the status of affected populations.
			Test fishery data are available that demonstrate that the bycatch in the fishery are essentially negligible. However, the test fishery statistics are only an indicator of low bycatch in the fishery, rather than providing a direct measure of bycatch by the entire fleet, and so the fishery does not meet this level of performance.
	b	**N**	Information is **sufficient** to quantitatively estimate outcome status with respect to biologically based limits with a **high degree of certainty**.

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Test fishery data indicate bycatch is very low and effectively negligible in the Alaska salmon fishery. However, the absence of a direct bycatch estimate for the fleet means that it cannot be said that bycatch information is sufficient to quantitatively estimate outcome status with respect to biologically-based limits with a high degree of certainty. As such, the fishery does not meet this level of performance.
	c	**N**	Information is adequate to support a **comprehensive strategy** to manage bycatch, and **evaluate** with a **high degree of certainty** whether a strategy is **achieving its objective**.
			The absence of data for all species and areas means that it is not possible to evaluate with a high degree of certainty whether the strategy is achieving its objective. The fishery does not meet this level of performance.
	d	**N**	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
			Monitoring of bycatch in the test fisheries is periodic and consistently shows low bycatch rates, but there is no systematic random sampling of the fleet to estimate bycatch rates nor is there periodic reporting of test fishery bycatch data applied to the total fishery. The fishery does not meet this level of performance.
References			Chafee (2005).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC remains in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.3.1

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Known effects of the fishery are **likely** to be within limits of national and international requirements for protection of ETP species. For the Alaska salmon fishery, ETP species are considered to include marine mammals and migratory birds, as species covered by the Marine Mammal Protection Act (MMPA) and the Migratory Birds Act (MBA), as well as by the Endangered Species Act (ESA) where those species are also listed. ESA-listed Chinook salmon that are incidentally harvested within the SEAK and Yakutat fishery are considered separately in this assessment under the retained species PIs (PIs 2.1.1 – 2.1.3). NMFS classifies commercial salmon fisheries with respect to bycatch of marine mammals (NMFS 2012). No Alaska salmon gear-area combination is listed as a Category I fishery (i.e., **frequent** incidental mortality or serious injury of marine mammals). A number are classified as Category II (i.e., **occasional** incidental mortality or serious injury of marine mammals); these are: • SEAK drift gillnet (UoC 1). • Yakutat set gillnet (UoC 2). • PWS drift gillnet (UoC 3 [including Copper/Bering Districts, UoC 4]). • Cook Inlet purse seine, drift gillnet and set gillnet (UoCs 5 and 6). • Bristol Bay drift and set gillnet (UoC 7). • Kodiak purse seine and set gillnet (UoC 12). • Peninsula/Aleutians drift and set gillnet (UoC 14). Other gear-area combinations are classified as Category III (i.e., **remote likelihood of/no known** incidental mortality or serious injury of marine mammals); these are: • SEAK purse seine (UoC 1). • PWS set gillnet and seine (UoC 3). • LCI purse seine (UoC 5). • Yukon gillnet (UoC 8). • Kuskokwim gillnet (UoC 9). • Kotzebue gillnet (UoC 10). • Norton Sound gillnet (UoC 11). • Chignik seine (UoC 13). • Peninsula/Aleutians seine (UoC 14). NMFS has estimated total annual bycatch of marine mammals in some fisheries and determined that the Potential Biological Removal (PBR) taken in Alaska salmon fisheries is relatively low (typically <5% of the PBR (NMFS 2012). More details are also provided in Table 7, in the introductory sections above. Bycatch of birds and marine mammals was the subject of a Condition of Certification during the first MSC certification in 2000. The condition required collection of bycatch data in test fisheries as a means to identify whether bycatch was a significant conservation issue. As reported by ADF&G and presented in the 2007 recertification report (Chaffee et al. 2007), no bycatch of birds or marine mammals was observed in ADF&G test fisheries in Southeast Alaska, Upper Cook Inlet, Bristol Bay, Kuskokwim, Yukon, Norton Sound, North Alaskan Peninsula, Shumagin Islands, and Kodiak during 2002, 2003, and/or 2004. Since that time, additional monitoring of bird bycatch has occurred in specific areas of Alaska. This monitoring showed that species including pelagic cormorants, red-faced cormorants, harlequin ducks, pigeon guillemots, marbled murrelets, common murres, thick-

PI 2.3.1			The fishery meets national and international requirements for the protection of ETP species The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species
			billed murres, horned puffins, tufted puffins, sooty shearwaters, Kittlitz's murrelets, Arctic loon, white-winged scoters, red-throated loon, gulls, long-tailed duck and other species may be taken in relatively small numbers across the fishery. It is noted that the "expanded" take of Kittlitz's murrelets, an ESA candidate species, was 0 in 2002 and 18.1 in 2005 (Kodiak), 0 in 2007 and 14 in 2008 (Yakutat), and 0 in LCI and UCI. Blejwas & Wright (2012) examined spatial and temporal overlap of Kittlitz's murrelets with gillnets in Prince William Sound, Cook Inlet, Kodiak, and Yakutat and concluded that most Kittlitz's murrelets were found in areas where there was no fishing. In areas of overlap, they concluded "the total number of birds exposed to gillnets in any of the overlap areas is small. Essentially, the AMMOP and test fishery data, as well as the NMFS classifications for the different gear-area combinations of the fishery, demonstrate that all UoCs exceed this level of performance.
	b	**Y**	Known direct effects of the fishery including its enhancement activities are **unlikely** to create **unacceptable impacts** to ETP species.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The effects of the fishery are known and are **highly likely** to be within limits of national and international requirements for protection of ETP species.
			Bycatch data are available from a number of UoCs, and test fishery data provide additional supporting information, such that it can be said that the effects of the fishery are known. These data and the NMFS classifications for the different fisheries demonstrate that the fishery meets this level of performance.
	b	**Y**	Direct effects of the fishery including its enhancement activities are **highly unlikely** to create **unacceptable impacts** to ETP species.
			ETP species are taken in the fishery, including cetaceans and pinnipeds that are ESA-listed. However, the take in all cases is sufficiently under the PBR that no component of the Alaska salmon fishery has been classified as a Category I fishery. As such, it is considered that the direct effects fishery and its enhancement activities are highly unlikely to create unacceptable impacts to ETP species. The fishery meets this level of performance.
	c	**Y**	Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.
			It is considered that the fishery has no permanent impact on habitats used by ETP species, and temporary avoidance of fishing areas by ETP species (birds and marine mammals) is considered unlikely to produce significant detrimental indirect effects. Escapement goals are set at levels consistent with supporting upstream communities and species depenedent on healthy salmon runs, and harvest is managed, and curtailed if needed, to ensure escapement to the greatest degree possible. Purse seines (e.g., in Chignik Lagoon), and set nets (e.g. in LCI) may drag on the bottom in use but any impacts are likely to temporary, and the assessment team is not aware of any evidence or suggestions that this would, in any case, cause detrimental indirect effects on ETP species. The fishery meets this level of performance.
100	a	**N**	There is a **high degree of certainty** that the effects of the fishery are within limits of national and international requirements for protection of ETP species.
			The limited bycatch of ETP species in the fishery, robust populations of birds and most marine mammals in Alaska, and oversight of ETP species by NMFS and FWS indicate that the fishery is within national and international requirements for protection of ETP species, but we cannot make this determination with a high degree of certainty. The fishery does not meet this level of performance.

PI 2.3.1			The fishery meets national and international requirements for the protection of ETP species The fishery and its enhancement activities do not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species
	b	N	There is a **high degree of confidence** that there are no significant **detrimental direct effects** of the fishery including its enhancement activities on ETP species.
			While AMMOPs and test-fishery data are collected, the level of observer coverage and sampling in the commercial fishery is insufficiently high to be able to confirm with a high degree of confidence that there are no significant detrimental direct effects of the fishery. As such, the fishery does not meet this level of performance.
	c	N	There is a **high degree of confidence** that there are no significant **detrimental indirect effects** of the fishery including its enhancement activities on ETP species.
			The fishery meets the SG80 level of performance, but it is not possible to say with a high degree of confidence that there are no significant detrimental indirect effects of the fishery. The fishery does not meet this level of performance.
References			Chaffee (2005), NMFS (2010), NMFS (2012), Wynne *et al*. (1992).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC remains in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.3.2

PI 2.3.2			The fishery has in place precautionary management strategies designed to: • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **measures** in place that minimise mortality due to the fishery and its enhancement activities, and are expected to be **highly likely to achieve** national and international requirements for the protection of ETP species.
			The fishery exceeds this level of performance.
	b	**Y**	The measures are **considered likely** to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar fisheries/species).
			The fishery exceeds this level of performance.
80	**a**	**Y**	There is a **strategy** in place for **managing the fishery's impact** and its enhancement activities on ETP species, including measures to minimise mortality, that is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.
			Fishery regulations prohibit the deliberate take of ETP species in Alaska salmon fisheries, while the use of "seal bombs" to scare away pinnipeds has been prohibited. Fishing is also prohibited near Stellar sea lion rookeries and haul-out areas. NOAA's marine mammal observer program has an outreach component that educates fishermen with regard to marine mammals and birds, although the outreach program does not engage every fishery each year. This strategy is consistent with the observed level of ETP bycatch, is sufficient for minimizing impacts on ETP species and is highly likely to achieve national and international requirements for the protection of ETP species. The fishery meets this level of performance.
	b	**Y**	There is an **objective basis for confidence** that the strategy will work, based on **information** directly about the fishery and/or the species involved.
			Bycatch data collected in the ADF&G test fisheries (e.g., Chaffee 2005) and periodic sampling of fisheries by the AMMOP (e.g. NOAA 2012a) provides an objective basis for confidence that the strategy will work. The fishery meets this level of performance.
	c	**Y**	There is **evidence** that the strategy is being implemented successfully.
			Test fishery statistics and the AMMOP provide evidence that the strategy is being successfully implemented. The fishery meets this level of performance.
100	**a**	**N**	There is a **comprehensive strategy** in place for managing the fishery's impact and its enhancement activities on ETP species, including measures to minimise mortality, that is designed to achieve **above** national and international requirements for the protection of ETP species.
			The MSC defines a comprehensive strategy as "*a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses*." The operational strategy that the Alaska salmon fishery maintains cannot be considered to be comprehensive because of the lack of an ongoing observer program. This prevents the fishery from meeting the monitoring requirement of a comprehensive strategy.
	b	**N**	The strategy is mainly based on information directly about the fishery and/or species involved, and a **quantitative analysis** supports **high confidence** that the strategy will work.
			Quantitative information on the bycatch of ETP species is available from the fishery, but not all area-gear combinations have been sampled, and the data are limited to one or two years only. The assessment team therefore has an objective basis for

PI 2.3.2			The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			confidence, but not high confidence, that the strategy will work. The fishery does not meet this level of performance.
	c	**N**	There is **clear evidence** that the strategy is being implemented successfully. Again, quantitative information on the bycatch of ETP species is available from the fishery, but not all area-gear combinations have been sampled, and the data are limited to one or two years only. There is therefore considered to be evidence that the strategy is being implemented successfully, but a higher level of sampling would be required for the fishery to meet the SG100 level of performance, here.
	d	**N**	There is evidence that the strategy is achieving its objective. Available AMMOP and test fishery data, together with the NMFS classifications, provide some evidence that bycatch of ETP species is relatively low and not causing adverse impacts on those species. However, not all area-gear combinations have been sampled, and the data are limited to one or two years only. The fishery does not meet this level of performance.
References			Chaffee (2005), NOAA (2012a).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC remains in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.3.3

PI 2.3.3			**Relevant information is collected to support the management of fishery impacts on ETP species including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Information is sufficient to qualitatively estimate the fishery and its enhancement activities related mortality of ETP species.
			The fishery exceeds this level of performance.
	b	**Y**	Information is **adequate** to **broadly understand** the impact of the fishery and its enhancement activities on ETP species.
			The fishery exceeds this level of performance.
	c	**Y**	Information is adequate to support **measures** to manage the impacts on ETP species.
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Sufficient data** are available to allow fishery and its enhancement activities related mortality and the impact of fishing to be **quantitatively** estimated for ETP species.
			Sufficient data are available from test fishing (e.g., Chaffee 2005), additonal observations of the fishery (Wynne *et al.* 1991, Wynne *et al.* 1992, Manly 2006, Manly 2007, Manly 2009) and the AMMOP (e.g. NOAA 2012a) to quantitatively estimate take of ETP species, although the observer program has not operated in all areas of Alaska, including Chignik. The sampling effort is consistent with the observed relatively low level of impact of the fishery on ETP species. NMFS has calculated the percentage of species PBR taken in some of the fisheries and found it to be typically low (<5%), such that no fishery is considered to cause more than occasional incidental mortality or serious injury of marine mammals (NMFS 2012). The fishery meets this level of performance.
	b	**Y**	Information is **sufficient** to determine whether the fishery may be a threat to protection and recovery of the ETP species.
			Although the AMMOP has not operated in all areas of Alaska, NMFS has calculated the percentage of species PBR taken in some of the fisheries and found it to be typically low (<5%) (NMFS 2012), while test fishery data provide additional information, such that the sampling effort is considered to be **sufficient** to determine whether the fishery may be a threat to protection and recovery of the ETP species. The fishery meets this level of performance.
	c	**Y**	Information is sufficient to measure trends and support a full **strategy** to manage impacts on ETP species.
			Information is sufficient to determine that the bycatch of ETP species is relatively low in salmon fisheries, and this is sufficient for the strategy to manage impacts on ETP species. This information includes logbook reports of ETP species take, and several years of sampling in test fisheries. The fishery meets this level of performance.
100	**a**	**N**	Information is **sufficient** to **quantitatively** estimate outcome status of ETP species with a high degree of certainty.
			Information on the bycatch of ETP species in the salmon fishery is not sufficient to quantitatively estimate the outcome status of ETP species with a high degree of certainty, but it is sufficient to determine that bycatch is low and not likely to impact the ETP species. The fishery does not meet this level of performance.
	b	**N**	**Accurate and verifiable information** is available on the **magnitude of all impacts, mortalities and injuries** from the fishery and its enhancement activities and the

PI 2.3.3			Relevant information is collected to support the management of fishery impacts on ETP species including: • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			consequences for the status of ETP species.
			The absence of ongoing, routine observer coverage across the whole fishery means that information is not available on the magnitude of **all** impacts, mortalities, and injuries from the fishery. The fishery does not meet this level of performance.
	c	**N**	Information is adequate to support a **comprehensive strategy** to manage impacts, minimise mortality and injury of ETP species from the fishery and its enhancement activities, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
			Information is adequate to measure trends and to support a full strategy, but the assessment team does not consider the information and strategy to be comprehensive. As such, the fishery does not meet this level of performance.
References			Chaffee (2005), NOAA (2012a).

UNIT OF CERTIFICATION		**OVERALL PERFORMANCE INDICATOR SCORE:**	**CONDITION NUMBER (if relevant)**
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC remains in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.4.1

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
60	**a**	**Y**	The fishery is **unlikely** to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			The fishery exceeds this level of performance.
	b	**Y**	The enhancement activities are likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows, and water temperatures).
			There is no significant enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians. Very local, *de minimus* enhancement activities (e.g., egg box placement, stream channel restoration, log and woody debris placement, etc.) may be employed but these are not considered or scored in the assessment. Hatcheries occur in SEAK, PWS, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified through permitting (e.g. construction permits and then operational permits specific to water quality and discharges), are regulated and monitored. Any impacts are considered to be negligible at the regional or bioregional scale.
80	**a**	**Y**	The fishery is **highly unlikely** to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			Salmon fishing gears (trolling gear, drift gillnets, set gillnets, purse seine, and fish wheels) in Alaska are not designed to penetrate the seabed and typically do not disrupt benthos; as such, it is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Gears other than set gillnets and fish wheels are designed to be operated at the surface without significant bottom contact, and set gillnets and fish wheels operate in discrete areas, with the main contact points being the anchors or fixing points of the gear to the seabed, rather than the gear itself. Purse seines may touch bottom in soft-bottom areas but impacts are likely to be very localised where this occurs. In some management areas, gillnets may be lost but this will again affect only localised areas of habitat. All commercial fishing gear is required to be attended (Alaska Administrative Codes 5AAC 39.280 [fish wheels and set nets] and 5AAC 24.334 [drift gillnets]), and incentives exist to retrieve gillnets (i.e., the gear is expensive and is required to be marked, so it can be traced back to owner). Troll gear is operated while vessels are moving and is therefore always attended- the gear is also designed to be fished off-bottom. The assessment team concludes that there is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. All UoCs meet this level of performance.
	b	**Y**	The enhancement activities are highly likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows, and water temperatures).
			There is no significant enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians. Very local, *de minimus* enhancement activities (e.g., egg box placement, stream channel restoration, log and woody debris placement, etc.) may be employed but these are not considered or scored in the assessment. Hatcheries occur in SEAK, PWS, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
			through permitting (e.g. construction permits and then operational permits specific to water quality and discharges), are regulated and monitored. Any impacts are considered to be negligible at the regional or bioregional scale.
100	**a**	**N**	There is **evidence** that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
			While the assessment team considers that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm, little evidence was available to support that assertion. As such, the fishery does not meet this level of performance.
	b	**Y**	There is evidence that the enhancement activities are highly likely to have minimal impact on water quality, access of natural-origin fish to spawning habitat, and quality of stream habitat (such as physical features, spawning and rearing flows, and water temperatures).
			There is no significant enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians. Very local, *de minimus* enhancement activities (e.g., egg box placement, stream channel restoration, log and woody debris placement, etc.) may be employed but these are not considered or scored in the assessment. Hatcheries occur in SEAK, PWS, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified through permitting (e.g. construction permits and then operational permits specific to water quality and discharges), are regulated and monitored. Any impacts are considered to be negligible at the regional or bioregional scale.
References			Alaska Administrative Codes 5AAC 39.280 and 5AAC 24.334

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**
2	**Yakutat**	**90**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**90**	**N/A**
5	**LCI**	**90**	**N/A**
6	**UCI**	**90**	**N/A**
7	**Bristol Bay**	**90**	**N/A**
8	**Yukon**	**90**	**N/A**
9	**Kuskokwim**	**90**	**N/A**
10	**Kotzebue**	**90**	**N/A**
11	**Norton Sound**	**90**	**N/A**
12	**Kodiak**	**90**	**N/A**
13	**Chignik**	**90**	**N/A**
14	**Peninsula/Aleutians**	**90**	**N/A**

Evaluation Table: PI 2.4.2

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **measures** in place for managing the impact of the fishery and enhancement activities, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.
			The fishery exceeds this level of performance.
	b	**Y**	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).
			The fishery exceeds this level of performance.
80	**a**	**Y**	There is a **partial strategy** in place for managing the impact of the fishery and enhancement activities, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.
			Salmon fishing gear tends to have little effect on the habitat. Commercial salmon fishing is regulated to occur in nearshore marine areas and in rivers where fish are migrating, and commercial fishing on the spawning grounds is prohibited. The assessment team considers that these factors, comprising a partial strategy, are sufficient to meet the Habitat outcome of 80 or above. In areas where drift gillnets are used, the removal of derelict gear occurs on nearshore land, but there is no formalised program to remove derelict salmon fishing gear from the water if it cannot be retrieved through normal fishing operations. As such, where drift gillnet fisheries occur (i.e., SEAK, Copper/Bering Districts, UCI, Bristol Bay, Yukon, Kuskokwim, Norton Sound and Peninsula/Aleutians) there is no evidence that the loss of gear has been evaluated, and so those UoCs can only meet the SG80 level of performance.Nevertheless, the gear must be marked and has to be attended when in use, which comprises a partial strategy to achieve the SG80 level of performance. Additionally, the expense of losing gear creates an incentive to retrieve gear even if snagged. Hatcheries occur in SEAK, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified through permitting (e.g. construction permits and then operational permits specific to water quality and discharges), are regulated and monitored. Any impacts are considered to be negligible at the regional or bioregional scale.
	b	**Y**	There is some **objective basis for confidence** that the partial strategy will work, based on **information directly about the fishery and/or habitats** involved.
			Observations of salmon fishing gear interactions with various habitat types, and the prohibition of commercial fishing on the spawning grounds provides an objective basis for evidence that the strategy will work to protect habitat. In areas where hatcheries occur, the permitting and monitoring processes provide an objective basis for confidence that impacts on habitats are negligible at the regional or bioregional scale.
	c	**Y**	There is **some evidence** that the partial strategy is being implemented successfully.
			Commercial fishing does not occur on the spawning grounds and anecdotal evidence shows that habitats are not being significantly altered by salmon fishing. Any impacts are considered to be negligible at the regional or bioregional scale.
100	**a**	**N –** **UoC 1** **UoC 4** **UoC 6**	There is a **strategy** in place for managing the impact of the fishery and enhancement activities on habitat types.
			Regulation 5AAC 39.222 (Policy for the Management of sustainable salmon fisheries) requires that impacts of fishing on habitats must be considered and

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
		UoC 7 **UoC 8** **UoC 9** **UoC 11** **UoC 14** **Y- All other UoCs**	evaluated in harvest management policy. Further to comments made regarding lost gillnets in SI 80a, in UoCs where drift gillnets are not used (Yakutat, LCI, Kotzebue, Kodiak and Chignik), the use of gear at the surface and/or in discrete areas acts as an operational strategy for managing and minimizing the potential for the fishery to impact habitats at the regional or bioregional level. Hatcheries occur in SEAK, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified through permitting (e.g. construction permits and then operational permits specific to water quality and discharges), are regulated and monitored. Any impacts are considered to be negligible at the regional or bioregional scale.
	b	**N**	**Testing** supports **high confidence** that the strategy will work, based on **information directly about the fishery and/or habitats** involved. The assessment team is not aware of testing to evaluate a strategy of habitat protection. As such, the fishery cannot meet this level of performance. However, there is no evidence of impact and the assessment team does not perceive this as a weakness in the management system.
	c	**N**	There is **clear evidence** that that strategy is being implemented successfully. There is some evidence that the operational strategy is being implemented successfully, thereby meeting the SG80 level of performance for this SI, but the assessment team could not conclude that the evidence is sufficiently comprehensive to meet this higher level of performance. The fishery does not meet this level of performance.
	d	**N**	There is some evidence that the strategy is achieving its objective. There is some evidence that the operational strategy is achieving its objective, for example in terms of the fishery occurring in permitted locations and seasons. However, the limited detailed information on the habitats present in the fished areas means that the assessment team could not conclude that the evidence is sufficiently comprehensive to meet this level of performance. The fishery does not meet this level of performance.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**85**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**85**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**85**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**85**	**N/A**

PI 2.4.2		There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
13	**Chignik**	**85**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 2.4.3

PI 2.4.3		Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There is **basic understanding** of the types and distribution of main habitats in the area of the fishery.
			The fishery exceeds this level of performance.
	b	**Y**	Information is adequate to broadly understand the nature of the main impacts of gear use and enhancement activities on the main habitats, including spatial overlap of habitat with fishing gear.
			The fishery exceeds this level of performance. Lake fertilization and removal of non-native pike are considered to be enhancement activities within the MSC terminology, but when used for the management of Alaska salmon fisheries these approaches are considered to be restoration activities and are beneficial.
80	**a**	**Y**	The nature, distribution and **vulnerability** of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.
			The fishery across the State in the different UoCs is typically focused in very localised areas and over short periods, and managers are aware of habitats and their vulnerability in areas of commercial fishing at a level of detail relevant to the scale and intensity of the fishery and to the extent needed to minimize impacts of the fishery on habitats. The fishery meets this level of performance.
	b	**Y**	Sufficient data are available to allow the nature of the impacts of the fishery and enhancement activities on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.
			Sufficient observations are available to characterize the nature of impacts of salmon fishing gear on habitats. Most salmon gears typically have little or no contact with the substrate. Set gillnets and fishwheels are anchored in place, but impacts are very localised and limited to short seasons. The assessment team concludes that these observations are sufficient to meet the intent of this indicator. Enhancement occurs in SEAK, Copper/Bering, LCI, UCI and Kodiak. Data on the nature of the impacts of enhancement activities on habitat types are identified through permitting (e.g. construction permits and then operational permits specific to water quality and discharges). There is negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians.
	c	**Y**	Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).
			Data on the effects of salmon fishing gear on habitat is not systematically collected, but the assessment team considers that routine management, monitoring and enforcement observations of the fishery by managers are sufficient to determine any increase in the risk of gear impacts on habitat. The fishery meets this level of performance.
100	**a**	**N**	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
			The distribution of habitat types within the Alaska salmon fisheries has not been described over their range, therefore this indicator is not met.

PI 2.4.3			Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types
	b	N	The physical impacts of the gear and enhancement activities on the habitat types have been quantified fully.
			The assessment team is not aware quantitative studies that examined the effects of salmon fishing gear on habitat, therefore this indicator is not met.
	c	N	Changes in habitat distributions over time are measured.
			The assessment team is not aware of studies documenting changes in habitat in fishing areas over time, therefore this level of performance is not met.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	SEAK	80	N/A
2	Yakutat	80	N/A
3	PWS	The PWS UoC is still in assessment	
4	Copper/Bering	80	N/A
5	LCI	80	N/A
6	UCI	80	N/A
7	Bristol Bay	80	N/A
8	Yukon	80	N/A
9	Kuskokwim	80	N/A
10	Kotzebue	80	N/A
11	Norton Sound	80	N/A
12	Kodiak	80	N/A
13	Chignik	80	N/A
14	Peninsula/Aleutians	80	N/A

Evaluation Table: PI 2.5.1

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
60	**a**	**Y**	The fishery is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			The key elements underlying ecosystem structure and function are considered to be the salmon as a keystone species in marine and freshwater food webs, as well as other keystone species that compete with salmon at different life stages, and the physical habitat and dynamic conditions (i.e., currents, river flow, water temperatures) found within the management areas. The fishery is considered to exceed this level of performance.
	b	**Y**	Enhanced fish are likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.
			In this reassessment of the Alaska salmon fishery, the assessment team has addressed the impacts of hatchery salmon species on other salmon species under the Principle 1 PIs 1.3.1, 1.3.2 and 1.3.3. Impacts of hatchery salmon species on other finfish species and other aquatic populations are addressed here under the Principle 2 PIs 2.5.1, 2.5.2 and 2.5.3. Enhancement occurs in SEAK (UoC 1), Copper/Bering (UoC 4), LCI (UoC 5), UCI (UoC 6) and Kodiak (UoC 12). Lake fertilization projects occur temporarily in some UoC such as Kodiak, SEAK, and Norton Sound. Although lake enrichment alters the biological community, the assessment team considers lake fertilization efforts to have minimal advese impact on the freshwater ecosystem. Lake fertilization projects are typically accompanied by liminological and fish monitoring. In SEAK, Copper/Bering, LCI, UCI and Kodiak, there is no evidence of adverse impacts on non-salmonid finfish or other aquatic populations. These UoCs therefore exceed this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and so those UoCs also exceed this level of performance.
80	**a**	**Y**	The fishery is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			As discussed above, the Alaska salmon fisheries have relatively little bycatch of non-salmon species and fishing gear has relatively little impact on the physical habitat. Harvests of salmon reduce the availability of salmon that might be consumed by other animals such as bears, fishes, birds and insects, and salmon are a keystone species in that they are highly important to other species. However, management is focused on ensuring healthy escapements are achieved and harvests are curtailed when required. As such, although salmon harvests will have some effect on species that depend on salmon, the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. The fishery therefore meets this level of performance.
	b	**Y**	Enhanced fish are highly likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.
			Enhancement occurs in SEAK, Copper/Bering, LCI, UCI and Kodiak. In SEAK, Copper/Bering, LCI, UCI and Kodiak, there is no evidence of adverse impacts on non-salmonid finfish or other aquatic populations. These UoCs therefore meet this level of performance.

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
			There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and so those UoCs exceed this level of performance.
100	**a**	**Y**	There is **evidence** that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
			The assessment team contends that the long time period over which the Alaska salmon fishery has operated without serious or irreversible harm provides evidence to support the view that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function. The fishery meets this level of performance.
	b	**N – UoC 1 UoC 4 UoC 5 UoC 6 UoC 12** **Y – All other UoCs**	There is evidence that the enhancement activities are highly likely to have minimal negative effect on the productivity of wild salmon and other aquatic populations as a result of predation, competition for resources, and disease transmission.
			Enhancement (hatcheries) occurs in SEAK, Copper/Bering, LCI, UCI and Kodiak. In these areas, it cannot be said that there is evidence that hatchery enhancement activities are highly likely to have minimal negative effects on the productivity of non-salmonid finfish and other aquatic populations. As such, these UoCs do not meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and so those UoCs meet this level of performance.
References			M. Sturdevant (pers. comm. 2012), Pearson *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**
2	**Yakutat**	**100**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**90**	**N/A**
5	**LCI**	**90**	**N/A**
6	**UCI**	**90**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**90**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 2.5.2

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **measures** in place, if necessary.
			The fishery exceeds this level of performance.
	b	**Y**	The **measures** take into account potential impacts of the fishery on key elements of the ecosystem.
			The fishery exceeds this level of performance.
	c	**Y**	The measures are considered likely to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			The fishery exceeds this level of performance.
	e	**Y**	There is an established artificial production strategy in place, if necessary, that is expected to achieve the SG 60 outcome as a minimum performance requirement.
			Enhancement occurs in SEAK (UoC 1), Copper/Bering (UoC 4), LCI (UoC 5), UCI (UoC 6) and Kodiak (UoC 12). These UoCs with enhancement exceed this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and so these UoCs also exceed this level of performance.
80	**a**	**Y**	There is a **partial strategy** in place, if necessary.
			The partial strategy involves the development of the escapement goals in the different UoCs that aim to maintain healthy wild salmon populations, and provide for other species such as bears, birds and fish that depend on Alaska salmon. All UoCs meet this level of performance.
	b	**Y**	The partial strategy takes into account **available information and is expected to restrain impacts** of the fishery on the ecosystem so as to **achieve** the Ecosystem Outcome 80 level of performance.
			The achievement of escapement goals effectively restrains the impacts of the fishery on the ecosystem such that the outcome of 80 is achieved.
	c	**Y**	The partial strategy is considered likely to work, based on **plausible argument** (e.g., general experience, theory or comparison with similar fisheries/ecosystems).
			The fishery exceeds this level of performance.
	d	**Y**	There is **some evidence** that the measures comprising the partial strategy are being **implemented successfully.**
			The fishery exceeds this level of performance.
	e	**N – UoC 1 UoC 12** **Y All other UoCs**	There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
			Policies in Alaska provide for protection of the ecosystem function using a precautionary approach, however this scoring indicator refers to the implementation and testing of a strategy to ensure that enhancement (e.g., hatcheries) are not impacting ecosystem function. The strategy also includes enhancement plans in each region. ADF&G recently implemented a review of all hatchery operations in Alaska; reports have been completed for Kodiak and Cook Inlet. In SEAK and Kodiak, conditions were introduced for PI 1.3.1 and 1.3.3 because the assessment team does not consider that monitoring of hatchery fish within mixed stock fisheries is sufficient to meet the SG80 level of performance. Therefore, these

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			two UoCs do not meet the SG80 level of performance for this Scoring Issue either. The conditions placed on SEAK (Condition 3) and Kodiak (Condition 5) are therefore linked to this PI also. For Condition 3, the assessment team is especially concerned that the effect of remote releases is accounted for in the assessments because remote-released salmon likely have a higher rate of straying. For chum salmon, we that note that this is likely to be facilitated by the near 100% thermal marking of hatchery chum in SEAK, and anticipate that ADF&G's ongoing study in the region (ADF&G 2012f) may help the fishery to meet this condition. With respect to Condition 5, it is noted that hatchery stocks of all species do not comprise a major part of the harvests in the Kodiak UoC to date, and so the concern raised by the assessment team with respect to meeting the SG 80 level of performance is primarily related to straying into other systems at the current levels of release. The assessment team notes that straying monitoring is facilitated by the near 100% otolith marking of hatchery fish or coded wire tag programs in other regions of the State. A tagging program, including sampling of systems with high risks of straying and commercial landings from areas where mixed wild and hatchery fish are likely, is therefore recommended, at least for pink and chum releases. For Chinook and coho releases, a risk assessment may suffice, but, if future hatchery programs result in significant expansion of releases, these analyses should be sufficiently robust to determine risks to wild stock productivity with the proposed expansions. A complete marking program, implemented as a standard part of the hatchery's operations, would provide greater certainty given future expansion plans. If such a program illustrates minimal risk to wild stocks, it can be terminated unless major expansions in releases occur. The KRAA and ADF&G can address this issue using other means but should have external peer reviewed analysis conducted in support of using existing data to support findings to remove this condition. In other regions of Alaska with hatchery production (i.e., Copper/Bering, LCI and UCI), it is considered that there is sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome. These UoCs therefore meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and so these UoCs exceed this level of performance.
100	**a**	**N**	There is a **strategy** that consists of a **plan**, in place.
			Although there is a partial strategy comprised of elements of different policies, it is not clear that these combine to form a plan. As such, the fishery does not meet this level of performance.
	b	**N**	The **strategy**, which consists of a **plan**, contains measures to **address all main impacts of the fishery** on the ecosystem, and at least some of these measures are in place. The plan and measures are **based on well-understood** functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for **development of a full strategy that restrains impacts** on the ecosystem to ensure the fishery does not cause serious or irreversible harm.
			Although there is a partial strategy comprised of elements of different policies, it is not clear that these combine to form a plan to address all the main impacts of the fishery on the ecosystem. As such, the fishery does not meet this level of performance.

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
	c	**Y**	The measures are considered likely to work based on **prior experience**, plausible argument or **information** directly from the fishery/ecosystems involved. Maintaining escapement goals provides a plausible argument that the measures will continue to work, such that species and communities that depend on Alaska salmon will be maintained. The fishery meets this level of performance.
	d	**Y**	There is evidence that the measures are being **implemented successfully**. The escapement goal report (Munro & Volk 2012) provides evidence that spawning objectives are typically being met, suggesting that the needs of species depending on Alaska salmon are met. The fishery meets this level of performance.
	e	**N – UoC 1 UoC 4 UoC 5 UoC 6 UoC 12** **Y – All other UoCs**	There is a comprehensive and fully evaluated artificial production strategy, if necessary, to verify with high confidence that the SG 100 outcomes are being achieved. The artificial production strategy has received some evaluation but it has not been fully and comprehensively evaluated (see SG80). As such, UoCs with enhancement (SEAK, Copper/Bering, LCI, UCI and Kodiak) do not meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik and Peninsula/Aleutians, and so these UoCs meet this level of performance.
References		Munro & Volk (2012).	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**75**	**3 (Linked to SEAK PI 1.3.3)**
2	**Yakutat**	**90**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**85**	**N/A**
5	**LCI**	**85**	**N/A**
6	**UCI**	**85**	**N/A**
7	**Bristol Bay**	**90**	**N/A**
8	**Yukon**	**90**	**N/A**
9	**Kuskokwim**	**90**	**N/A**
10	**Kotzebue**	**90**	**N/A**
11	**Norton Sound**	**90**	**N/A**
12	**Kodiak**	**75**	**5 (Linked to Kodiak PI 1.3.1 and 1.3.3)**
13	**Chignik**	**90**	**N/A**
14	**Peninsula/Aleutians**	**90**	**N/A**

Evaluation Table: PI 2.5.3

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Information is adequate to **identify** the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity).
			The key elements underlying ecosystem structure and function are considered to be the salmon as a keystone species in marine and freshwater food webs, as well as other keystone species that compete with salmon at different life stages, and the physical habitat and dynamic conditions (i.e., currents, river flow, water temperatures) found within the management areas. The fishery exceeds this level of performance.
	b	**Y**	Main impacts of the fishery and its enhancement activities on these key ecosystem elements can be inferred from existing information, and **have not been investigated in detail**.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Information is adequate to **broadly understand** the key elements of the ecosystem.
			In general, the ecosystem that includes salmon and the salmon fisheries has been investigated for many years (e.g., Munro & Volk 2012). Although much remains to be discovered about these ecosystems, the assessment team believes the available information is sufficient to meet 80a.
	b	**Y**	Main impacts of the fishery and its enhancement activities on these key ecosystem elements can be inferred from existing information and **some have been investigated in detail**.
			Harvests of salmon are well documented, information is available on bycatch of ETP species and other species, and impacts on habitats are typically small such that the main consequences for the ecosystem can be inferred. Some impacts have been investigated, including the effects of increased production of hatchery salmon on ocean ecosystems. The fishery meets this level of performance.
	c	**Y**	The main functions of the Components (i.e., Target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are **known**.
			The fishery exceeds this level of performance.
	d	**Y**	Sufficient information is available on the impacts of the fishery and its enhancement activities on these Components to allow some of the main consequences for the ecosystem to be inferred.
			Enhancement occurs in SEAK (UoC 1), Copper/Bering (UoC 4), LCI (UoC 5), UCI (UoC 6) and Kodiak (UoC 12). Enhancement activities are considered to have minimal impacts on physical habitats and dynamic conditions at the regional level, although questions remain about the cumulative impact of enhancement on oceanic systems. It is considered that these UoCs meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and it is considered that these UoCs exceed this level of performance.
	e	**Y**	Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).
			Bycatch of ETP species continues to be monitored by NMFS.
100	**b**	**N**	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and **have been investigated**.

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Main interactions between the fishery and ecosystem elements (salmon removals, bycatch, ETP species, habitat) have been investigated to some extent but work is ongoing and the assessment team considered that the fishery does not meet this level of performance.
	c	**N – UoC 1 UoC 4 UoC 5 UoC 6 UoC 12** **Y – All other UoCs**	The impacts of the fishery and its enhancement activities on Target, Bycatch and ETP species are **identified** and the main functions of these Components in the ecosystem are **understood**.
			Enhancement occurs in SEAK, Copper/Bering, LCI, UCI and Kodiak. There is ongoing work to understand the effects of increased production in oceanic systems, and it cannot yet be said that the main functions of the ecosystem components are understood. As such, these UoCs do not meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and it is considered that impacts of the fishery in these areas on target, bycatch and ETP species are generally identified and the main functions of these components in the ecosystem are generally understood. As such, these UoCs meet this level of performance.
	d	**N – UoC 1 UoC 4 UoC 5 UoC 6 UoC 12** **Y – All other UoCs**	Sufficient information is available on the impacts of the fishery and its enhancement activities on the Components **and elements** to allow the main consequences for the ecosystem to be inferred.
			Enhancement occurs in SEAK, Copper/Bering, LCI, UCI and Kodiak. There is ongoing work to understand the effects of increased production in oceanic systems, and it cannot yet be said that sufficient information is available on the impacts of enhancement activities on the components and elements to allow the main consequences for the ecosystem to be inferred. As such, these UoCs do not meet this level of performance. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians. Harvests of salmon are well documented, information is available on bycatch of ETP species and other species, and impacts on habitat are typically small such that the main consequences for the ecosystem can be inferred. The fishery in these UoCs meets this level of performance.
	e	**N**	Information is sufficient to support the development of strategies to manage ecosystem impacts.
			Although information is collected, this information is not sufficient in all aspects to develop strategies to manage ecosystem impacts.
References			M. Sturdevant (pers. comm. 2012), Munro & Volk (2012), Pearson *et al*. (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**90**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
7	**Bristol Bay**	**90**	**N/A**
8	**Yukon**	**90**	**N/A**
9	**Kuskokwim**	**90**	**N/A**
10	**Kotzebue**	**90**	**N/A**
11	**Norton Sound**	**90**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**90**	**N/A**
14	**Peninsula/Aleutians**	**90**	**N/A**

Principle 3

Evaluation Table: PI 3.1.1

PI 3.1.1			The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.
			The management system of the Alaska salmon fishery is consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2. The State of Alaska has adopted numerous laws and regulations designed to protect and sustain salmon fisheries for the benefit of subsistence, commercial and sport fishermen (see Clark 2006 for review). In 2000, the Policy for the Management of Sustainable Salmon Fisheries was adopted into State regulation (5 AAC 39.222). The regulation states that *"while, in the aggregate, Alaska's salmon fisheries are healthy and sustainable largely because of abundant pristine habitat and the application of sound, precautionary, conservation management practices, there is a need for a comprehensive policy for the regulation and management of sustainable salmon fisheries."* The goal of the policy is to *"ensure conservation of salmon and salmon's required marine and aquatic habitats, protection of customary and traditional uses and other uses, and the sustained economic health of Alaska's fishing communities."* The fishery is managed on a daily basis by ADF&G staff and fishery regulations are largely established by the Alaska BOF. Alaska participates in the Pacific Salmon Treaty with Canada and the Pacific Northwest for the management of transboundary salmon stocks.
	b	**Y**	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.
			The fishery exceeds this level of performance.
	c	**Y**	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability of the fishery.
			The fishery exceeds this level of performance.
	d	**Y**	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
			The fishery exceeds this level of performance.
80	**b**	**Y**	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the fishery.
			The fishery exceeds this level of performance.
	c	**Y**	The management system or fishery is attempting to comply in a timely fashion within binding judicial decisions arising from any legal challenges.

PI 3.1.1			The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			The fishery exceeds this level of performance.
	d	**Y**	The management system has a mechanism to **observe**_the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
			The fishery exceeds this level of performance.
100	**b**	**Y**	The management system incorporates or subject by law to a **transparent** mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been **tested and proven to be effective**.
			The BOF is established under Alaska Statute 16.05.221 for the purposes of the conservation and development of the fisheries resources of the state. The BOF has the authority to adopt regulations described in Alaska Statute 16.05.251 including: establishing open and closed seasons and areas for taking fish; setting quotas, bag limits, harvest levels and limitations for taking fish; and establishing the methods and means for the taking of fish. The regulations the BOF has authority over are 5 AAC Chapters 1- 77. http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main. The BOF process is transparent in that the Board receives and reviews proposals and testimony from the public. The Board evaluates fishery allocation issues. Findings are available on the ADF&G webpage. The BOF has been established for many years and it has been shown to be effective. The fishery meets this level of performance.
	c	**Y**	The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.
			The BOF process is used to resolve disputes that may arise, such as the allocation of surplus salmon between gear types and between adjacent management areas. Local Advisory Committees (82 in the state) are used to identify and discuss issues that may be brought to the attention of the BOF and ADF&G. The regulations governing the advisory committee are found here: http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[Group+!27Title5Chap96!2C+a!2E+1!27!3A]/doc/{@1}/hits_only?firsthit. Meetings are always open to the public and are generally attended by department staff and members of the public who can offer background information on agenda topics. Alaska participates in the Pacific Salmon Treaty as a means to resolve allocation issues of the salmon resources that migrate through Alaska's marine and fresh waters, e.g., transboundary rivers. ADF&G participates in the North Pacific Anadromous Fish Commission as a means to communicate with management agencies of other countries given that salmon from all Pacific Rim countries share the ocean.
	d	**Y**	The management system has a mechanism to **formally commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

PI 3.1.1			The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			A formal and well-defined process exists to consider the views, customs, and interests of indigenous peoples who depend on fishing for their food or livelihood – this involves the Alaska BOF, a Federal Subsistence Board, and a series of Regional Advisory Councils. The BOF process provides a formal and well-defined process to consider the impact of the fishery on coastal communities that are closely tied to the fishery. This process regularly seeks and considers input from stakeholders in an effort to understand and address socioeconomic issues related to the fishery. The Federal Subsistence Management Program is a multi-agency effort to provide the opportunity for a subsistence way of life by rural Alaskans on federal public lands and waters while maintaining healthy populations of fish and wildlife (http://alaska.fws.gov/asm/about.cfml). The Alaska National Interest Lands Conservation Act (ANILCA), passed by Congress in 1980, mandates that rural residents of Alaska be given a priority for subsistence uses of fish and wildlife. In 1989, the Alaska Supreme Court ruled that ANILCA's rural priority violated the Alaska Constitution. As a result, the Federal government manages subsistence uses on Federal public lands and waters in Alaska- covering about 230 million acres or 60 percent of the land within the state. To help carry out the responsibility for subsistence management, the Secretaries of the Interior and Agriculture established the Federal Subsistence Management Program. The program provides for public participation through the Federal Subsistence Board and 10 Regional Advisory Councils. Regulations implementing the Federal Subsistence Management Program on Federal public lands within the State of Alaska can be found in the Code of Federal Regulations, Part 100, Section 1-23, available here: http://alaska.fws.gov/asm/pdf/50cfr100.pdf The fishery meets this level of performance.
References			In links above.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**100**	**N/A**
2	**Yakutat**	**100**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 3.1.2

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood.**
			The fishery exceeds this level of performance.
	b	**Y**	The management system includes consultation processes that obtain **relevant information** from the main affected parties, including local knowledge, to inform the management system.
			The fishery exceeds this level of performance.
80	**a**	**Y**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.
			The fishery exceeds this level of performance.
	b	**Y**	The management system includes consultation processes that **regularly seek and accept relevant** information, including local knowledge. The management system demonstrates consideration of the information obtained.
			The fishery exceeds this level of performance.
	c	**Y**	The consultation process **provides opportunity** for all interested and affected parties to be involved.
			The fishery exceeds this level of performance.
100	**a**	**Y**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.
			Organisations and individuals involved in the management process are clearly identified. At the international level or Federal level, these include the North Pacific Anadromous Fish Commission, the Pacific Salmon Commission, North Pacific Fisheries Management Council, Secretary of the Interior and the USFWS Office of Subsistence Management. At the State level, the BOF, Local Advisory Committees, native associations and ADF&G are involved in the management process. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. The fishery meets this level of performance.
	b	**Y**	The management system includes consultation processes that **regularly seek and accept relevant** information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
			The Secretary of the Interior and the USFWS Office of Subsistence Management actively engage members of the public in commercial fisheries issues that affect subsistence harvest, Advisory Boards to the North Pacific Fisheries Management Council, the BOF, Local Advisory Committees, native associations and ADF&G regularly seek and accept relevant information, meetings are open to the public, and it can be demonstrated that the processes consider available information on a regular basis. The fishery meets this level of performance.
	c	**Y**	The consultation process **provides opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.

PI 3.1.2			The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			There is extensive evidence that consultation processes provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement. Meeting minutes, notes and agendas are available on the websites of the bodies listed in SI 100a, above. For example: • North Pacific Anadromous Fish Commission: www.npafc.org/ • The Pacific Salmon Commission: www.psc.org/ • The North Pacific Fisheries Management Council: http://alaskafisheries.noaa.gov/npfmc/ • USFWS Office of Subsistence Management: http://alaska.fws.gov/asm/osm.cfml • BOF: http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main • Alaska Department of Fish and Game: http://www.adfg.alaska.gov/index.cfm?adfg=home.main The fishery meets this level of performance.
References			In links above.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**100**	**N/A**
2	**Yakutat**	**100**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making for wild stock components and the use of enhancement programs that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
60	**a**	**Y**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are **implicit** within management policy
			The fishery exceeds this level of performance.
80	**a**	**Y**	**Clear** long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are **explicit** within management policy.
			The fishery exceeds this level of performance.
100	**a**	**Y**	**Clear** long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are **explicit** within **and required by** management policy.
			Alaska State policies clearly allow the fishery to meet this level of performance. Article 2, 5AAC 39.220, Policy for the management of mixed stock salmon fisheries, requires that "a) ... *conservation of wild salmon stocks consistent with sustained yield shall be accorded the highest priority*" (http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section220.htm). 5AAC 39.222, Policy for the management of sustainable salmon fisheries, also describes a number of key requirements with respect to wild fisheries, these include: "2) *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*, 3c1) *wild salmon stocks and the salmon's habitats should be maintained at levels of resource productivity that assure sustained yields as follows: A) salmon spawning, rearing, and migrate three 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; iv) all essential salmon habitat in marine, estuarine, and freshwater ecosystems and access of salmon to these habitats should be protected; B) salmon stocks should be protected within spawning, incubating, rearing and migratory habitats*". With respect to enhanced fisheries, these include: "D) *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*, G) *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. A range of other management considerations are detailed in 5AAC 39.222, available here: http://www.housemajority.org/coms/jcis/pdfs/Sustainable_Salmon_Fisheries_Policy.pdf. All UoCs meet this level of performance.

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making for wild stock components and the use of enhancement programs that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
References		In links above	

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**100**	**N/A**
2	**Yakutat**	**100**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**100**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 3.1.4

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing	
SG	**Issue**	**Met? (Y/P/N)**	**Justification/Rationale**
60	**a**	**Y**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.
			The fishery exceeds this level of performance.
80	**a**	**Y**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure **that perverse incentives** do not arise.
			The management system includes a range of features that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. These include the setting of biologically appropriate escapement goals (Munro & Volk 2012), limitations on gear type and effort levels, time and area closures, and because the fisheries are limited entry and are fully allocated. The fishery meets this level of performance.
100	**a**	**N**	The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and **explicitly considers** incentives in a **regular review** of management policy or procedures to ensure they not contribute to unsustainable fishing practices.
			The management system does not explicitly consider incentives in a regular review of management policy or procedures to ensure they not contribute to unsustainable fishing practices. As such, the fishery does not meet this level of performance.
References			Munro & Volk (2012).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**80**	**N/A**
2	**Yakutat**	**80**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**80**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**80**	**N/A**
7	**Bristol Bay**	**80**	**N/A**
8	**Yukon**	**80**	**N/A**
9	**Kuskokwim**	**80**	**N/A**
10	**Kotzebue**	**80**	**N/A**
11	**Norton Sound**	**80**	**N/A**
12	**Kodiak**	**80**	**N/A**
13	**Chignik**	**80**	**N/A**
14	**Peninsula/Aleutians**	**80**	**N/A**

Evaluation Table: PI 3.2.1

PI 3.2.1		The fishery and its enhancement activities have clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2	
SG	**Issue**	**Met? (Y/PN)**	**Justification/Rationale**
60	**a**	**Y**	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery's management system and its enhancement activities. The fishery and its enhancement activities exceed this level of performance.
80	**a**	**Y**	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and its enhancement activities. There is no or negligible enhancement in Yakutat, Bristol Bay, Yukon, Kuskokwim, Kotzebue, Norton Sound, Chignik, Peninsula/Aleutians, and these UoCs exceed this level of performance. For those UoCs where enhancement activities occur (SEAK, Copper/Bering, LCI, UCI and Kodiak), Phase 1, 2 and 3 Comprehensive Salmon Enhancement plans include short and long-term objectives and guidelines for hatchery development that are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2 (http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesPlanning.enhance). For example, the Comprehensive Phase III plan for PWS states: *"the proportion of hatchery salmon straying into wild stock streams must remain below 2% of the wild-stock escapement over the long-term; the growth rates of juvenile salmon during the early marine period must be density independent over the long term; and wildstock escapement goals must be achieved over the long-term."* As described above, the Sustainable Fisheries Policy explicitly recognizes the precautionary approach when taking actions to maintain wild salmon, including wild salmon in regions with enhancement. Therefore, planning and policy objectives of enhancement activities are consistent with MSC principles and meet this level of performance. As described in the scoring of a number of PIs in Principle 1 and 2, however, it is noted that these enhancement objectives are not always met (e.g., SEAK chum enhancement). Overall, the UoCs without enhancement exceed this level of performance, while the UoCs with enhancement meet this level of performance.
100	**a**	**N – UoC 1 UoC 4 UoC 5 UoC 6 UoC 12** **Y – All other UoCs**	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system and its enhancement activities. For the fisheries component of this PI, Article VIII of the Alaska Constitution is relevant as being dedicated to natural resources. Sections of the Alaska Constitution that are pertinent to the management of salmon include Section 3 (*Wherever occurring in the natural state, fish, wildlife and waters are reserved to the people for common use*) and Section 4 (*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*). These are carried into the management of salmon fisheries through the use of escapement goals, which are well defined and measurable. The enhancement activities undertaken in SEAK, Copper/Bering, LCI, UCI and Kodiak do not meet this level of performance because they are not demonstrably consistent with outcomes expressed by MSC's Principles 1 and 2.
References			In links above.

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	SEAK	80	N/A
2	Yakutat	100	N/A
3	PWS	The PWS UoC is still in assessment	
4	Copper/Bering	80	N/A
5	LCI	80	N/A
6	UCI	80	N/A
7	Bristol Bay	100	N/A
8	Yukon	100	N/A
9	Kuskokwim	100	N/A
10	Kotzebue	100	N/A
11	Norton Sound	100	N/A
12	Kodiak	80	N/A
13	Chignik	100	N/A
14	Peninsula/Aleutians	100	N/A

Evaluation Table: PI 3.2.2

PI 3.2.2		The fishery-specific and hatchery management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific and enhancement objectives.
			5AAC 39.222, Policy for the management of sustainable salmon fisheries, states that *"wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts"*, and *"plans and proposals for development or expansion of salmon fisheries and enhancement programs should effectively document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks"* The policy also advocates for a precautionary approach when there are uncertainties in the effects on sustainable fisheries and populations. The fishery and its enhancement activities exceed this level of performance.
	b	**Y**	Decision-making processes respond to **serious issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take **some** account of the wider implications of decisions.
			The assessment team is content that the fishery and its enhancement activities exceed this level of performance.
80	**a**	**Y**	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives.
			ADF&G and the BOF represent an established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. Regional Planning Teams provide for an established decision-making processes with regard to enhancement activities. There are regulations governing actions of RPT's requiring actions to prevent negative impacts of hatchery operatons on wild stocks. For example, in SEAK, the RPT has voted not to allow greater production of hatchery chum salmon in response to concerns over high straying in some areas. The fishery meets this level of performance.
	b	**Y**	Decision-making processes respond to **serious and other important issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
			Decision-making processes respond to serious and other important issues, e.g., Action Plans are developed in a timely manner when a SOC is identified by ADF&G and the BOF. The management system may also respond to important issues before stocks become a stock of concern. Monitoring of stream in SEAK demonstrated high levels of stray hatchery chum in some streams, leading ADF&G staff to evaluate escapement goals after excluding hatchery fish. The SEAK RPT voted not to allow greater production of hatchery chum salmon in response to concerns over high straying in some areas. The fishery meets this level of performance.
	c	**Y**	Decision-making processes use the precautionary approach and are based on best available information.
			Decision-making processes use best available information and typically balance the socio-economic needs with the precautionary approach to maintain sustainable fisheries. Evidence for this is shown from achievement of escapement goals in nearly all watershed. The fishery meets this level of performance.
	d	**Y**	**Explanations** are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.

PI 3.2.2		The fishery-specific and hatchery management system includes effective decision-making processes that result in measures and strategies to achieve the objectives	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			Explanations for actions are typically provided in management reports, Board of Fishery reports, advisory meetings, or other public meeting for actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. The fishery meets this level of performance.
100	**b**	**N**	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
			The assessment team does not have full evidence that decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. Therefore, this high performance standard is not met.
	d	**Y**	**Formal reporting** to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
			ADF&G prepares annual management reports, escapement goal reviews, and hatchery production trends, and these reports typically respond to emerging issues. Therefore, this performance standard is met.
References			

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**90**	**N/A**
2	**Yakutat**	**90**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**90**	**N/A**
5	**LCI**	**90**	**N/A**
6	**UCI**	**90**	**N/A**
7	**Bristol Bay**	**90**	**N/A**
8	**Yukon**	**90**	**N/A**
9	**Kuskokwim**	**90**	**N/A**
10	**Kotzebue**	**90**	**N/A**
11	**Norton Sound**	**90**	**N/A**
12	**Kodiak**	**90**	**N/A**
13	**Chignik**	**90**	**N/A**
14	**Peninsula/Aleutians**	**90**	**N/A**

Evaluation Table: PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery and hatchery management measures are enforced and complied with	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	Monitoring, control and surveillance mechanisms exist are implemented in the fishery and its enhancement activities under assessment and there is a reasonable expectation that they are effective.
			The fishery and enhancement activities exceed this performance level.
	b	**Y**	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.
			The fishery and enhancement activities exceed this performance level.
	c	**Y**	Fishers and hatchery operators are **generally thought** to comply with the management system for the fishery and its enhancement activities under assessment, including, when required, providing information of importance to the effective management of the fishery.
			The fishery and enhancement activities exceed this performance level.
80	**a**	**Y**	A monitoring, control and surveillance **system** has been implemented in the fishery and its enhancement activities under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.
			The fishery and enhancement activities exceed this performance level.
	b	**Y**	Sanctions to deal with non-compliance exist, **are consistently applied** and thought to provide effective deterrence.
			The fishery and enhancement activities exceed this performance level.
	c	**Y**	**Some evidence exists** to demonstrate fishers and hatchery operators comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.
			The fishery and enhancement efforts exceed this performance level.
	d	**Y**	There is no evidence of systematic non-compliance.
			The Alaska fishery is monitored for compliance by ADF&G staff and State Troopers. Commercial harvests, including retained non-salmonids, must be documented on fish tickets. Fishermen may occasionally fail to abide by regulations but there are strong incentives that prevent this behaviour from becoming systematic or wide-spread.
100	**a**	**N – UoC 5** **Y – all other UoCs**	A **comprehensive** monitoring, control and surveillance system has been implemented in the fishery and its enhancement activities under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
			Fish tickets provide the means to monitor fishery and hatchery harvests, and sampling by biologist of the harvests for length, age, gender and genetics (sometimes) provided for a relatively comprehensive monitoring program. Fish tickets must be completed and submitted to the nearest ADF&G office within 7 days of the landing and/or first purchase of the fishery resource (http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.fishtickets). State troopers and management biologists (assist troopers) patrol the areas to ensure that fishing is not occurring beyond the appropriate time and area (http://www.adfg.alaska.gov/index.cfm?adfg=enforcement.main). Additionally, fishermen continually watch activities on the water and would likely report illegal fishing activity given that this would impact their livelihood. Hatchery operations are generally monitored by ADF&G. The fishery meets this

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery and hatchery management measures are enforced and complied with	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
			performance standard for all areas except LCI. Recent reviews of the LCI and UCI hatcheries indicated that the Port Graham hatchery (now closed) had been deficient in their operations before it ceased operations (Stopha 2011). This hatchery provided enhancement for LCI fisheries. Because the non-compliance issues were identified some time after the hatchery was closed, rather during its operations, the LCI fishery did not meet this objective because of delayed enforcement.
	b	**N – UoC 5** **Y – all other UoCs**	Sanctions to deal with non-compliance exist, are consistently applied and **demonstrably** provide effective deterrence.
			Non-compliance with fishery and hatchery management measures is rare in Alaska salmon fisheries. Compliance with fishery regulations is rigorously monitored by armed enforcement officials. The risk of being fined, losing a fishing permit, and being identified for illegal activity by other fishermen provides strong incentive for fishermen to be compliant with rules and regulations. Compliance with hatchery policies and regulations is monitored by reviews by ADF&G (e.g., Lewis *et al.* 2009). Recent reviews of the LCI and UCI hatcheries indicated that the Port Graham hatchery (now closed) had been deficient in their operations before it ceased operations (Stopha 2011). This hatchery provided enhancement for LCI fisheries. Because the non-compliance issues were identified some time after the hatchery was closed, rather during its operations, the LCI fishery did not meet this objective because of delayed enforcement.
	c	**N – UoC 5** **Y – all other UoCs**	There is a **high degree of confidence** that fishers and hatchery operators comply with the management system under assessment, including, providing information of importance to the effective management of the fishery and its enhancement activities.
			There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery. Fish tickets are reported by the buyers and fishermen typically comply with requests by ADF&G staff to sample their catch for biological attributes. In LCI, the hatchery had ceased operations before non-compliance with ADF&G policies and regulations was documented (Stopha 2011).
References			Lewis *et al* (2009), Stopha (2011).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	**SEAK**	**100**	**N/A**
2	**Yakutat**	**100**	**N/A**
3	**PWS**	**The PWS UoC is still in assessment**	
4	**Copper/Bering**	**100**	**N/A**
5	**LCI**	**80**	**N/A**
6	**UCI**	**100**	**N/A**
7	**Bristol Bay**	**100**	**N/A**
8	**Yukon**	**100**	**N/A**
9	**Kuskokwim**	**100**	**N/A**

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
10	**Kotzebue**	**100**	**N/A**
11	**Norton Sound**	**100**	**N/A**
12	**Kodiak**	**100**	**N/A**
13	**Chignik**	**100**	**N/A**
14	**Peninsula/Aleutians**	**100**	**N/A**

Evaluation Table: PI 3.2.4

PI 3.2.4		The fishery and its related enhancement activities have a research plan that addresses the information needs of management	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	**Research** is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.
			The fishery and enhancement efforts exceed this performance level.
	b	**Y**	Research results are **available** to interested parties.
			The fishery and enhancement efforts exceed this performance level.
80	**a**	**Y**	A **research plan** provides the management system with a strategic approach to research and **reliable and timely information** sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
			The fishery and enhancement efforts exceed this performance level.
	b	**Y**	Research results are **disseminated** to all interested parties in a **timely** fashion.
			The fishery and enhancement efforts exceed this performance level.
100	**a**	**Y**	A **comprehensive research plan** provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and **reliable and timely information** sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
			Alaska does not have a state-wide comprehensive research plan, but there are comprehensive plans developed for regions (e.g., the AYK [http://www.aykssi.org/]). Applied research funding can be obtained from the Alaska Sustainable Salmon Fund (http://akssf.org/akssf_org/home.cfm) for applied salmon throughout the state. Marine related salmon research is funded by the North Pacific Research Board (http://www.nprb.org/). When critical issues arise, Alaska may develop a research plan and funding. For example, the decline of Chinook salmon throughout much of the state was met with a symposium, a research plan and funding of specific instate entities (http://www.adfg.alaska.gov/index.cfm?adfg=chinook_efforts_symposium.research_plan). The Western Alaska Salmon Stock Identification Program (WASSIP) is an example of an extensive research program conducted by the ADF&G to address key stock composition management issues in western Alaska. Also, given the concern about high levels of straying in some areas, ADF&G (and others) is conducting a multi-year study of staying and fitness (~$5 million budget for first several years; http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research). The fitness study plan calls for investigation of chum fitness through 2023 but funding for the entire period has not been obtained. The University of Washington has a long-term salmon research program in Alaska, and the University of Alaska and Prince William Sound Science Center have been active in salmon research in recent decades. Federal agencies also conduct salmon research in Alaska. Information provided by these various programs is reliable and timely and the cumulative influence of these programs meets the intent of this performance indicator.
	b	**Y**	Research **plan** and results are **disseminated** to all interested parties in a **timely** fashion and are **widely and publicly available**.
			Research results are disseminated to interested parties in a timely fashion and are widely and publicly available via the ADF&G online library (http://www.adfg.alaska.gov/index.cfm?adfg=library.main) and other web pages. Rapid communication is facilitated by numerous scientific conferences throughout the state.

References	In links above.		
UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	SEAK	100	N/A
2	Yakutat	100	N/A
3	PWS	The PWS UoC is still in assessment	
4	Copper/Bering	100	N/A
5	LCI	100	N/A
6	UCI	100	N/A
7	Bristol Bay	100	N/A
8	Yukon	100	N/A
9	Kuskokwim	100	N/A
10	Kotzebue	100	N/A
11	Norton Sound	100	N/A
12	Kodiak	100	N/A
13	Chignik	100	N/A
14	Peninsula/Aleutians	100	N/A

Evaluation Table: PI 3.2.5

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery and hatchery management system against its objectives There is effective and timely review of the fishery and hatchery management system	
SG	**Issue**	**Met? (Y/N)**	**Justification/Rationale**
60	**a**	**Y**	The fishery and its enhancement program have in place mechanisms to evaluate **some** parts of the management system.
			The fishery and enhancement activities exceed this performance level.
	b	**Y**	The fishery and its enhancement program management system are subject to **occasional internal** review.
			The fishery and enhancement activities exceed this performance level.
80	**a**	**Y**	The fishery and its enhancement program have in place mechanisms to evaluate **key** parts of the management system
			The fishery and enhancement activities exceed this performance level.
	b	**Y**	The fishery and its enhancement program management system are subject to **regular internal** and **occasional external** review.
			The fishery and enhancement efforts exceed this performance level.
100	**a**	**Y**	The fishery and its enhancement program have in place mechanisms to evaluate **all** parts of the management system.
			Annual management reports are produced for each management area and provide a record of harvests and spawning escapements in relation to escapement goals. Escapement goals are reviewed by ADF&G and the BOF every three years. Failure to meet expected harvest or escapement levels can lead to a SOC declaration by the BOF, which then triggers an action plan to fix the problem. The public has input into the management system via advisory committees and testimony and Board of Fishery meetings. The Alaska salmon fishery meets this performance level. The enhancement program is currently undergoing an internal review that essentially considers all parts of the management system. A new region is reviewed each year. To date, hatchery programs in Kodiak and Cook Inlet have been reviewed and are available on the web (e.g., http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2013.02.pdf).
	b	**N – UoC 1 UoC 4 UoC 5 UoC 12** **Y – All other UoCs Y**	The fishery and its enhancement program management system are subject to **regular internal and external review.**
			ADF&G technical reports are reviewed internally by other biologists, and more controversial reports may be reviewed by the Chief salmon Scientist. Some reports, such as the WASSIP reports, are reviewed by external experts, especially if they are controversial. For example, the lowering of the Chinook escapement goal in the Kuskokwim River, a highly controversial issue, was reviewed by Federal and University scientists. The enhancement program is currently undergoing an internal review. A new region is reviewed each year. To date, hatchery programs in Kodiak and Cook Inlet have been reviewed and are available on the web (e.g., http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2013.02.pdf). However, the enahancement programs, which are large and often controversial, do not have **regular** reviews by external scientists and managers, therefore areas with large enhancement programs (Kodiak, SEAK, Copper/Bering, Lower Cook Inlet) do not meet this high standard. Some external reviews have been conducted but not on a regular basis.
References			MML (2011b).

UNIT OF CERTIFICATION		OVERALL PERFORMANCE INDICATOR SCORE:	CONDITION NUMBER (if relevant)
1	SEAK	90	N/A
2	Yakutat	100	N/A
3	PWS	The PWS UoC is still in assessment	
4	Copper/Bering	90	N/A
5	LCI	90	N/A
6	UCI	100	N/A
7	Bristol Bay	100	N/A
8	Yukon	100	N/A
9	Kuskokwim	100	N/A
10	Kotzebue	100	N/A
11	Norton Sound	100	N/A
12	Kodiak	90	N/A
13	Chignik	100	N/A
14	Peninsula/Aleutians	100	N/A

Appendix 2: Confirmation of the modified default assessment tree

Alaska Salmon Fishery

(Five species: sockeye salmon, chum salmon, Chinook salmon, pink salmon, coho salmon)

Marine Stewardship Council (MSC) Fishery Certification

Certification Body: Intertek Moody Marine

Confirmation of Performance Indicators and Scoring Guideposts

Intertek Moody Marine's (IMM's) recent consultation on the proposed assessment tree for the upcoming Alaska salmon reassessment closed on August 30th 2012. A total of two responses were received, one from State of the Salmon and one from a group comprising Wild Fish Conservancy, Raincoast Conservation Foundation, SkeenaWild Conservation Trust, Watershed Watch Salmon Society and David Suzuki Foundation. The IMM team appreciates the time and effort put in to providing both responses.

For brevity, the two responses shall be referred to here as the SotS response and the Group response respectively. The SotS response ran to 6 pages and the Group response ran to 8 pages. These are included on the MSC's Alaska salmon reassessment webpage to provide stakeholders with maximum clarity. However, the issues identified have also been summarised below so that an IMM assessment team response can be provided. The 'SotS' or 'Group' in brackets after each issue below indicates from which response the issue arose.

It should also be noted that the Group response included the comment "*We trust that you still have a copy of the January 6, 2012 comments submitted by Watershed Watch and Pacific Salmon Foundation on the draft assessment tree that was release for comment under the previous client. Please note that several issues raised in those comments were not addressed in this latest draft assessment tree. Please consider those outstanding comments in addition to the comments offered below.*" The 'several issues' were not specified, but it is the assessment team's belief that only two issues were outstanding after addressing comments raised in the Group response. These are identified by the addition of the 'WW-PSF' in brackets after the issue, and are listed as points 21 and 22, below.

1) The IMM proposal is to blend elements of the Northeast Sakhalin Island and Aniva Bay (NSIAB) assessment tree and the new SamFAM tree, as well as use the newly proposed Sam FAM guidance 'where appropriate'. It is unclear what this means (SotS).

IMM response: This issue runs through a number of the points made by SotS, and a general response may be helpful prior to addressing specific points made against different Performance Indicators (PIs). The NSIAB tree has been used successfully in the assessment of the NSIAB salmon fishery, but the SamFAM is clearly the way that the MSC wants to develop the standardised assessment of

salmon fisheries. However, while the SamFAM tree and guidance is essentially new for all stakeholders, it is also essentially new for the IMM assessment team. As such, our own experience and analysis of the SamFAM and its guidance is in its early stages. While waiting for the final approach to be confirmed, though, the IMM team is proposing to use what we consider to be the most appropriate elements of both the SamFAM and NSIAB assessment trees in reassessing the Alaska salmon fishery.

However, and as identified, the MSC consultation on the SamFAM has not yet closed and no one is in any case completely clear on how the new PIs will work in practice. So, while the IMM team may use it for some PIs (in particular those PIs which have been adopted from the SamFAM), we may have to adapt the guidance or revert to existing guidance as used for the NSIAB tree where the SamFAM guidance changes as a result of the MSC's consultation or where it is found simply not to work.

2) The importance of a focus on Chinook harvest in Southeast Alaska (Group).

IMM response: The IMM Team is aware of the issues associated with the Chinook harvest in Southeast Alaska and will be paying particular attention to them in scoring the relevant Unit of Certification.

3) PI 1.1.1- Guidance should clarify that 'fluctuating around its target reference point' should mean that the stock is meeting its target in ≥ 50% of the 10 most recent years. (SotS)

IMM response: This is a reasonable suggestion that will be incorporated into the assessment team's approach to the reassessment. In the addressing this issue, the assessment team will also consider whether a decline below the target reference point (TRP) is related to the fishery or environmental conditions, and the degree to which the stock falls below the TRP.

4) PI 1.1.1- the definition of 'stock' is inadequate. (Group).

IMM response: The assessment team considers the first sentence in the stock definition to be key, *"A group of one or more component stocks for which fishery management goals have been established by the management agency and for which fisheries are regulated to achieve these goals."* The assessment team also recognizes that stocks, as used for management, may consist of multiple genetically unique populations.

5) PIs 1.1.1 and 1.2.3- the approach proposed for dealing with very low exploitation rates of non-local stocks could lead to depressed stocks suffering 'death by a thousand cuts'. (Group).

IMM response: The IMM team accepts that a concern may be reasonable where many fisheries may take small quantities of fish from a stock that in total result in a significant negative impact. However, as described in the accompanying justification, the intention is not to avoid scoring down fisheries that take small quantities of a depressed stock but more to reasonably apportion impact where such issues exist. Indeed, the newly proposed SG80d scoring issue for PI 1.2.3 is '*Information is sufficient to estimate the significance of fishery harvests on stock components*', and in combination with the changes proposed for PI 1.1.1, this is intended to allow fisheries responsible for truly negligible quantities of catch to meet the MSC standard while not allowing others (or at least

identifying them, if those other fisheries are not seeking MSC certification). This, we believe, although contrary to statements made in the Group response, is entirely consistent with the MSC's intent for fishery assessments.

A further comment may be made- the 'death by a thousand cuts' issue may have been a greater concern were the Alaska salmon reassessment to be have been undertaken across a very large number of Units of Certification (UoCs)- for example if each salmon species and gear type combination in each Management Area was a separate UoC, at which point the Alaska salmon fishery may have exceeded 100 UoCs, each of which would have been scored separately. However, the total of just 14 proposed UoCs for the upcoming Alaska salmon assessment means that each UoC is large, and that British Columbia-specific concerns will in fact be focused on just a small number of UoCs (and mainly just Southeast Alaska). As such, the identified Chinook issues will need to be considered on a large scale in any case.

6) PI 1.1.2- SamFAM guidance is inappropriate because it defines what proportions of populations/subcomponents are required to be above the reference points. The IMM team should therefore use the approach as used for the NSIAB assessment. (SotS).

IMM response: At this time, the IMM Team intends to follow the NSIAB approach for this PI.

7) PI 1.1.3- Removing the Scoring Issue 'The rebuilding strategy should prohibit the targeting of depleted stocks' is inappropriate and it should be reinstated (with 'or stock components' added. (SotS).

IMM response: The team's intention here is to allow for rebuilding strategies to be designed around the characteristics of the stocks in question, with the clear objectives of rebuilding being foremost in mind. We agree that this should include prohibiting the targeting of a depleted stock, but we do not feel it is appropriate to be prescriptive where reasonable justification to do otherwise may be provided by managers under specific situations. The team also rejects the SotS text proposed for the PI (*...rebuilding will be complete within the shortest practicable timeframe which does not exceed one generation for the depleted stock*) as being unworkable, as even with zero catches a stock may not recover within one generation.

8) PI 1.1.3- 'Wild' should be added to the title at 'there is evidence of *wild* stock rebuilding'. (Group).

IMM response: The intention is clearly that the wild stock is rebuilt where depleted. However, it is proposed that limited, temporary enhancement may be permitted at the SG60 and SG80 levels of performance, and so it is not appropriate to change the title where enhancement may be used to support the preservation and restoration of a stock.

9) PI 1.2.3- The team appears to be using the NSIAB PI here- but will it then be using the SamFAM guidance? (SoTS).

IMM response: We agree with the SotS analysis of the situation concerning stock components, and at this time we intend to follow the NSIAB approach.

10) PIs 1.3.1, 1.3.2 and 1.3.3- The team has adopted the SamFAM PIs, so will it also be using the SamFAM guidance? (SotS).

IMM response: At this time the team does intend to follow the SamFAM guidance for these PIs.

11) PI 1.3.1- pHOS standards for the maximum proportions of hatchery-origin spawners that should be allowed on spawning beds should be adopted. (Group).

IMM response: PI 1.3.1 as proposed is taken from the new SamFAM. The SamFAM guidance for this PI specifically identifies the pHOS guidelines for hatchery-origin spawners on wild beds. The IMM team intends to utilise the SamFAM guidance for these PIs, but it should be recognized that these draft guidelines have yet to be formally adopted.

12) Mark selective fisheries- external marking should be adopted for all enhanced stock fisheries to enable monitoring and selective harvesting.

IMM response: Management of enhanced fisheries is addressed through PI 1.3.2, which is again taken directly from the MSC's proposed new SamFAM. The guidance for that includes a range of measures that will need to be considered when scoring enhanced fisheries, including that, for example, '*Marking hatchery fish releases so that the distribution and composition of hatchery and wild fish can be monitored in fisheries, spawning grounds and in hatchery broodstock*', while the guidance also notes that '*Uncertainty related to the lack of information in large enhancement programs or evidence of the effectiveness of management strategies to limit impacts should be considered as having a low likelihood of meeting performance requirements*'. The IMM team believes that this indicates that these issues will be addressed appropriately and as required during the reassessment.

13) PI 2.1.1- SG60a. The use of the phrase 'If not' at the SG 60 level and how a fishery can be certified if it does not meet the SG60 level. (Group).

IMM response: This phrasing of this PI is part of the standard MSC assessment tree and guidance on such issues may be found in the MSC Certification Requirements.

14) PI 2.3.2- The alternate assessment table is better suited to the Alaska salmon reassessment. (Group).

IMM response: The MSC provides the alternate PI 2.3.2 table for situations where there are no requirements for protection and rebuilding provided through national ETP legislation or international agreements. As this is not the case with the Alaska salmon fishery, it is required that the standard table is used.

15) PI 2.4.3- risk posed by enhancement activities in freshwater and the enhancement program on marine food webs should be evaluated. (Group).

IMM response: The impacts of enhancement activities in freshwater will be assessed under PI 2.4.1 (as highlighted in the new SamFAM guidance), while the effect of enhancement programs on food chains will be assessed under ecosystem PIs, specifically PI 2.5.1.

16) PI 2.5.2 and 2.5.3- language used in the new SamFAM including 'at a local scale' should be adopted, while the language proposed that specifically focuses on the impacts of enhancement activities on the ecosystem is preferred. (Group).

IMM response: It is the team's contention that the assessment tree as proposed for the Alaska salmon reassessment already includes elements that will require the identified issues (i.e., local scale impacts and the effects of enhancement on the ecosystem) to be considered. Any such changes to the tree are therefore not required.

17) Principle 3 PIs- The new SamFAM guidance includes important interpretive guidance for scoring Principle 3 PIs, and it would be useful to confirm that the IMM team will use it. (SotS).

IMM response: At present the assessment team cannot confirm that the new SamFAM guidance will definitely be used for the Principle 3 PIs. However, the SotS comment on the value of the SamFAM guidance is noted and the team will certainly consider using it when addressing Principle 3 issues.

18) PI 3.2.2- Specific details should be provided of the parameters that need to be monitored to detect and assess the impacts of hatchery production (Group).

IMM response: The assessment team is highly knowledgeable in issues involving hatchery and wild salmon interactions. We expect them to use their knowledge and the guidance available to them to faithfully assess the Alaska salmon fishery against the MSC standard. Whilst it cannot at this stage be guaranteed that the SamFAM guidance for this PI will be used (given that the guidance may yet change following the ongoing consultation), the team is nevertheless aware of the importance of monitoring hatchery impacts and will be carefully looking at these issues during the assessment.

19) PI 3.2.3- Guidance should be adopted specifying that private as well as State-managed hatcheries should be included in the assessment (Group).

IMM response: There is no intention of excluding any hatchery components that contribute to the commercial harvest from the reassessment process for the Alaska salmon fishery. The existing PIs already reflect that fact, and there is not considered to be any reason to include additional guidance as suggested.

20) General comments- the role of salmon role as food and a nutrient supply in freshwater ecosystems should be recognised (Group).

IMM response: The role of salmon as a keystone species will be considered. One way the assessment team will do this is by evaluating whether the TRPs are being consistently met, indicating that the opportunity for species to prey on abundant salmon is being maintained.

21) The use of ambiguous and subjective language, such as 'likely', 'highly likely', high degree of certainty', etc. (WW-PSF).

IMM response: These words and phrases as listed are included by the MSC within the default assessment tree. Definitions to most of these terms are provided in the MSC Certification

Requirements (CR) at Annex AA, and interpretation of others is provided within the MSC CR within Annex CB.

22) The Units of Certification have not been announced, and it is not clear which stocks will be 'target stocks' and which, if any, will be considered to be 'inseparable or practically inseparable' [IPI] (WW-PSF).

IMM response: The Units of Certification (UoCs) to be assessed were provided to the MSC in the 'notification information' as required upon announcement that the Alaska salmon fishery was proceeding to reassessment. The UoCs for this reassessment will cover the same geographic areas (i.e. the 14 Management Areas) as for the previous reassessment process that ceased in January 2012, but some changes regarding which species will be considered to be IPI may occur when the latest information on stocks is reviewed. Confirmation of the approach being taken with respect to IPI species will be provided as soon as possible.

Summary

In the reassessment team's opinion, the responses and comments obtained reflect a keen interest and concern for the appropriate and sustainable management of fish species which play key roles in marine and freshwater ecosystems. It is also considered that the modified assessment tree as proposed for the Alaska salmon reassessment will address the concerns expressed to the extent currently required by the MSC assessment process. As such, no changes to the proposed assessment tree will be made, and the assessment tree as consulted on from July 31st to August 30th 2012 will be the one used for the upcoming Alaska salmon reassessment.

IMM and the assessment team again thank State of the Salmon and the group comprising Wild Fish Conservancy, Raincoast Conservation Foundation, SkeenaWild Conservation Trust, Watershed Watch Salmon Society and David Suzuki Foundation for the time taken in considering the issues and in responding to the consultation.

Appendix 3: Site visit notification

Alaska Salmon Fishery
(Five species: sockeye salmon, chum salmon, Chinook salmon, pink salmon, coho salmon)

Marine Stewardship Council (MSC) Fishery Certification
Certification Body: Intertek Moody Marine

Stakeholder Consultation: Site Visit Announcement

Intertek Moody Marine is making preparations for a site visit to gather information to help in the assessment of the Alaska salmon fishery against the MSC *Principles and Criteria for Sustainable Fishing*.

The site visit will be carried out by:

Lead Assessor: Dr. Rob Blyth-Skyrme
Assessment team: Dr. Greg Ruggerone, Professor Jim Seeb and Dr. Dana Schmidt.

This assessment team is intending to be available to meet with stakeholders in two locations:

1) Seattle, Washington, on **October 18th and 19th**, and
2) Anchorage, Alaska on **October 22nd and 23rd**.

Stakeholders are advised that private meetings can be arranged with the assessment team if required, and that conference calls can be arranged if travel to either of these locations is not possible. If you would like to arrange a meeting or conference call with the team, please advise us of the following information **by October 10th**:

a) your name and contact details
b) your association with the fishery
c) the issues you would like to discuss (in order for us to arrange appropriate representation)
d) where and when you would like to meet

We will then get back in touch to confirm arrangements.

If preferred, written information can be provided to the assessment team as an alternative, or in addition, to a meeting.

If you wish to provide comment at any stage of the assessment process the MSC have provided a template for stakeholders to complete and submit their comments. This can be downloaded from the following link:

http://www.msc.org/documents/get-certified/stakeholders/template_for_stakeholder_input/template_for_stakeholder_input_v1.doc/at_download/file

Should you wish to obtain further information on the Marine Stewardship Council, this is available on their web site at http://www.msc.org. As a certification body, Intertek Moody Marine has dispute resolution procedures available should these prove necessary.

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Appendix 4: Conditions

The fishery attained a score of below 80 against 11 Performance Indicators (PIs) across 13 UoCs. The assessment team has set six conditions of certification that the client is required to address. The conditions are applied to improve performance to at least the 80 level within a timescale set by the conformity assessment body (CAB) and within the valid life of the certificate (5 years). In exceptional circumstances, e.g. natural ecological functions and response times, time required for relevant research to be funded, undertaken and published, the timescale can be longer (see Condition 1).

The client has developed an 'Action Plan' for Meeting the Conditions for Continued Certification; the action plan has been approved by Intertek Moody Marine. The client provide a preface to their action plan which is included here:

Client Preface to the Client Action Plan

The actions listed listed below in the Client Action Plan sections outline the commitment of Purse Seine Vessel Owners (PSVOA) to meet the conditions set forth in the reassessment report.

Consistent with CR 27.11.3 (MSC 2013a) PSVOA will consult with and rely upon information from the ADF&G and others to achieve the conditions. PSVOA will employ personnel to assist such consultations and related reporting requirements of the conditions. The expectation is that each condition and associated SG80 scoring levels will be achieved by the end of the certification period, except for issues that require a longer period (e.g., because of needing to wait for data to be collected from adult fish returning to spawn).

The action plan addresses the six (6) conditions set forth in the reassessment report. The two prior assessments of the fishery against the MSC sustainability standard imposed a multitude of statewide and regional conditions. To a very great extent these conditions have been closed with the exception of those related to enhancement activities. Consequently, the remaining conditions set forth in the reassessment report center almost exclusively on enhancement activities conducted by hatchery operators in three regions of Alaska. Specifically, these conditions examine hatchery production levels, rearing and release strategies, straying of hatchery salmon to the spawning grounds of wild salmon, and related productivity or fitness effects. The relative lack of conditions in regions where no hatchery programs exists reflects the high quality of salmon management in those areas and the ability to implement progressive state policies that protect wild salmon populations and their habitat for future generations.

Condition 1 (UoC = SEAK)

With respect to the conditions in SEAK, these primarily relate to high levels of hatchery chum salmon straying to the spawning grounds, especially in the Northern Southeast inside (NSI) subarea. Condition 1 focuses on the ongoing study by ADF&G and others to estimate the effect of introgression on chum salmon fitness. Condition 2 focuses on the level of chum salmon straying, and management approaches to reduce straying, and Condition 3 largely focuses on the contribution of remote hatchery releases to high stray rates. These three conditions are intertwined.

UoC	1: SEAK
Performance Indicator	**PI 1.3.1: Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy**
Score	60

Rationale	**PI 1.3.1** **SG60:** a) It is likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. **SG80:** a) It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. **SG100:** a) There is a high degree of certainty that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. Investigations of chum salmon hatchery straying in the NSI subarea indicate extensive straying into wild streams (Piston & Heinl 2012a, Piston & Heinl 2012b), including from remote release sites, with averages exceeding 9% of the total escapement and with a range to > 60% in individual streams. The presence of such large straying rates suggests that enhancement activities for this species may have negative impacts on the local adaptation of wild stocks through introgression with the hatchery fish, which has a risk of decreasing the reproductive performance and diversity of wild stocks. In order to meet the SG80 level of performance, a condition of certification is introduced. This condition may be met through existing work being undertaken to look at chum straying (i.e., ADF&G 2012f). However, the assessment team noted an apparent bias in the language of the 'important questions' raised by the ADF&G (2012f) document and, given the complexities of this type of research, we therefore recommend strongly that, if the client uses this study to help address this condition, these 'important questions', and the methodology and findings for any resulting work, are subjected to external expert peer review. This would also be consistent with the approach taken for the high-profile WASSIP program. ADF&G (2012f) notes that the study will require investigation (and presumably funding) through year 2023 for chum salmon. If these studies clearly demonstrate the currently observed level of straying does not impair wild stocks, this condition under PI 1.3.1 will be removed. However, if they do demonstrate likely significant negative effects, changes will be required to the current aquaculture practices or fisheries management regime to reduce straying. The assessment team also notes that this fitness study does not address potential demographic effects of high straying. To note: CR 27.11.8 (MSC 2013a) allows for CABs to set conditions that extend beyond the period of certification under 'exceptional circumstances', where achieving the SG80 level of performance would take longer than 5 years. The Guidance for the CR provides examples of 'exceptional circumstances' that include the time taken for natural ecological functions and response times, and the time required for relevant research to be funded, undertaken and published (MSC 2013b). The timeline for this condition extends to 2023 (i.e., 10 years). In this case, the assessment team considers that the lifecycle of the salmon and the complexity of a study designed to test whether fitness of chum salmon is reduced by stray hatchery salmon provides justification for invoking exceptional circumstances.
Condition	By the **end of 2023**, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG80a) It is highly likely that the chum salmon enhancement activities in SEAK do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to

	monitor progress. It is not anticipated that meeting an interim milestone would result in a change in score – it is instead thought likely that the score will change only when the SG 80 guideposts are met and the condition is closed. **Year 1:** ▪ Provide a progress report on existing work, and commission detailed independent peer reviews (recommended three, to ensure a range of views are solicited) of the study plan, to determine its suitability for testing the fitness hypothesis.. **Year 2:** • Provide a progress report. Present recommendations of the peer reviewers to ADF&G for consideration. **Years 3-9:** • Provide a progress report. If straying is found to have a negative impact in SEAK, develop a plan to reduce straying and impacts. **Year 10:** • Provide a final report to demonstrate that: a) It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.
Client action plan	**SEAK: MSC PI 1.3.1 – Enhancement activities** ADF&G in consultation with hatchery operators, the salmon industry, and a science panel designed and is now implementing a 10-year research investigation to examine whether chum and pink salmon enhancement adversely affect the long-term fitness of wild chum and pink salmon stocks in Southeast Alaska and Prince William Sound. The study has two primary objectives: 1) Measure the percentage of first generation hatchery strays contained in the annual index of the spawning population. 2) Establish specific genetic identities of wild and hatchery salmon in the first cross-spawning (i.e., second generation fish) and resulting pedigrees to determine whether there is any change in fitness beyond the first generation. An initial $5 million to fund the study was secured through legislative appropriation and industry contributions. PSVOA believes the study will ultimately cost a minimum of $20 million and may extend beyond the stated 10-year-duration. There is industry recognition that a comprehensive and durable investigation of salmon enhancement activities and potential effects on wild salmon fitness is consistent with state policy and in the best interests of Alaska's salmon management. The investigation focuses on pink and chum salmon in Prince William Sound and chum salmon in Southeast Alaska. The study plan is available on the ADF&G web page (http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research). The plan received input from the Science Panel, as noted at the 2012 Pink and Chum Workshop (Reifenstuhl 2012) and the Prince William Sound Science Center and the Sitka Sound Science Center were selected to implement the field portions of the investigation. The assessment team understands that the original plan is in the process of being modified in response to the initial sampling in summer 2012. PSVOA believes this provides a timely opportunity to have the study plan incorporate an independent review. To meet the intent of this condition, PSVOA, in consultation with the hatchery study science panel, agrees to the following action milestones: **Year 1:** • PSVOA will commission an independent peer review of the study plan.

	Year 2: • PSVOA will provide the peer review and a report on the findings of the peer review and, where appropriate, provide a rationale for incorporation of reviewer recommendations to the study plan. **Years 3-9:** • Provide annual reports on progress of the investigation, including straying and genetic findings. • Review possible management actions for potential implementation as appropriate to ameliorate adverse effects if found. **Year 10:** • Provide a detailed technical report, including peer review of the final report by the same independent review panel members (to the extent possible), demonstrating: a) It is highly likely that chum salmon enhancement activities in SEAK do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Condition 2 (UoC = SEAK)

UoC	1: SEAK
Performance Indicator	**PI 1.3.2: Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status**
Score	70
Rationale	**SG60:** a) Practices and protocols are in place to protect wild stocks from significant detrimental impacts of enhancement. b) The practices and protocols in place are considered likely to be effective based on plausible argument. **SG80:** a) There is a partial strategy in place to protect wild stocks from significant detrimental impacts of enhancement. b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement). **SG100:** a) There is a comprehensive strategy in place to protect wild stocks from significant detrimental impacts of enhancement. b) There is clear evidence that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement. For chum salmon, the assessment team noted the high levels of hatchery chum salmon relative to wild chum, and the levels of straying that have been observed in the NSI (Piston & Heinl 2012a, Piston & Heinl 2012b). As such, the assessment team concluded that the hatchery

	management strategies were not being implemented to the extent that the fisheries would meet this level of performance, and a condition of certification is introduced. This condition is closely related to the one introduced for SI 80a in PI 1.3.1. Essentially, the assessment team sees two options that would allow the chum fishery to meet the SG80 level of performance for this SI. The first option is to reduce production levels and/or straying rates so that introgression and demographic effects are no longer a concern. The second option is to demonstrate that higher levels of straying, as previously observed, do not significantly negatively impact wild stocks (e.g., the study by ADF&G (2012f)), which is discussed in Condition 1). The MSC guidance for this PI states that "*A likelihood of minimizing the numbers and proportions of hatchery fish interbreeding with wild fish in natural spawning areas would be expected to be supported by the use and evaluation of proven artificial production and harvest management strategies. Common examples typically include: a) Ensuring release at sites and with strategies that are likely to maximize imprinting and homing, and b) Scaling hatchery release numbers to a level that is consistent with not exceeding hatchery stray benchmarks in concert with other strategies*"**.** The assessment team also notes that the efficient harvest of hatchery fish without over-harevsting the wild-component is another approach for reducing stray salmon. The preferred option is to minimize straying, especially given the long period need to conduct the fitness study.
Condition	By the end of the **fourth** year of certification, the SG 80b scoring requirements must be met for chum salmon. This will be achieved when it has been demonstrated that: a) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to monitor progress. It is not anticipated that meeting an interim milestone would result in a change in score – it is instead thought likely that the score will change only when the condition is closed. **Year 1:** • Monitor an appropriate proportion of relevant NSI streams for straying. Provide a progress report. **Year 2:** • Monitor an apporpriate proportion of relevant NSI streams for the percentage of hatchery chum on the spawning grounds. If data show that straying may exceed MSC guideline levels (i.e. SamFAM), begin development of a strategy for reducing hatchery chum straying into NSI streams. Provide a progress report. **Year 3:** • Monitor streams for the percentage of hatchery chum on the spawning grounds. If data show that straying may exceed MSC guideline levels (i.e. SamFAM), finalise strategy for reducing hatchery chum straying into NSI streams. Provide a progress report. **Year 4:** • Monitor streams for the percentage of hatchery chum on the spawning grounds and provide a final report that demonstrates that: a) There is some objective basis for confidence that the strategy in place is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
Client action plan	**SEAK: MSC PI 1.3.2 – Enhancement activities** ADF&G has recently taken action in recent years to control straying of hatchery chum

	salmon. As a means to ensure that chum salmon straying does not increase further in Southeast Alaska, ADF&G has not approved requests for increased hatchery chum salmon production beyond existing permitted capacity levels. To meet the intent of this condition, ADF&G and other entities as appropriate will continue to monitor straying of chum salmon in Northern Southeast Inside (NSI) subarea streams as part of their long term hatchery research program. They will identify possible approaches to reduce stray levels. Action milestones for addressing this condition are as follows: **Year 1:** • ADF&G and hatchery operators will continue to monitor representative streams in NSI for straying, as outlined in the recently launched hatchery straying and fitness study. (e.g., equivalent to random sampling of 18 NSI streams in 2010 (29% of total available)). PSVOA will review these efforts and provide a progress report showing hatchery/wild chum composition on the spawning grounds. **Year 2:** • PSVOA will consult with hatchery operators and ADF&G on possible stray reduction strategies in conjunction with continued monitoring of representative streams for stray proportions as part of the hatchery study plan. A progress report will be provided. **Year 3:** • PSVOA will begin preparation of a report examining methods of controlling hatchery strays. A progress report will be provided. **Year 4:** • PSVOA will present a report on controlling hatchery strays, demonstrating: a) There is some objective basis for confidence that the management strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Condition 3 (UoC = SEAK)

UoC	1: SEAK
Performance Indicator	**PI 1.3.3: Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status** **PI 2.5.2: There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function** NB: In recognition of their interlinked nature, the text of this condition was drafted to address the deficiencies identified for both PI 1.3.3 and PI 2.5.2. The MSC has agreed to this variation from CR 27.11.1.1.
Score	PI 1.3.3: 60 PI 2.5.2: 75

Rationale	**<u>PI 1.3.3</u>** **SG60:** a) Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The effect of enhancement activities on wild stock status, productivity and diversity are taken into account. **SG80:** a) Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. **SG100:** a) A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity. **<u>PI 2.5.2</u>** **SG60:** a) There are measures in place, if necessary.. b) The measures take into account potential impacts of the fishery on key elements of the ecosystem. c) The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).. e) There is an established artificial production strategy in place, if necessary, that is expected to achieve the SG 60 outcome as a minimum performance requirement. **SG80:** a) There is a partial strategy in place, if necessary. b) The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. c) The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). d) There is some evidence that the measures comprising the partial strategy are being implemented successfully. e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome. **SG100:** a) There is a strategy that consists of a plan, in place. b) The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. c) The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. d) There is evidence that the measures are being implemented successfully.

	e) There is a comprehensive and fully evaluated artificial production strategy, if necessary, to verify with high confidence that the SG 100 outcomes are being achieved. The assessment team is aware of some studies and assessments that include estimates of the impacts of enhancement activities on wild stock status of Chinook, coho and chum salmon, but it is not clear that this work has included consideration of the impact of enhancement on productivity and diversity of wild stocks. This condition therefore requires that the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity of Chinook, coho and chum salmon. For these species, the assessment team is especially concerned that the effect of remote releases is accounted for in the assessments because remote-released salmon likely have a higher rate of straying. For chum salmon, we that note that this is likely to be facilitated by the near 100% thermal marking of hatchery chum in SEAK, and anticipate that ADF&G's ongoing study in the region (ADF&G 2012f) may help the fishery to meet this condition.
Condition	By the end of the **fourth** year of certification, the SG 80 scoring requirements for PI 1.3.3, and the SG80e scoring requirements for PI 2.5.2 must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. b) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. c) (PI 2.5.2, SG80e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to monitor progress. It is not anticipated that meeting an interim milestone would result in a change in score – it is instead thought likely that the score will change only when the condition is closed. **Year 1:** • Develop approach to estimate numbers of wild and hatchery chum harvested in mixed stock fisheries, including examining the extent to which remote releases of hatchery salmon stray to spawning streams. • Prepare a risk assessment for Chinook and coho straying and design field studies to estimate straying if the proportion of hatchery fish may exceed threshold levels (same species). Provide a progress report. **Year 2:** • Implement approach as developed in Year 1. Provide a progress report. **Year 3:** • Estimate numbers of wild and hatchery salmon harvested in mixed stock fisheries, including from remote release sites. Provide a progress report. • Estimate remote released strays on the spawning grounds and test whether fish released remotely have higher straying rates. If so, develop approach to reduce straying so they do not affect wild salmon abundance, productivity and diversity or confound evaluation of wild salmon status. Provide a progress report. **Year 4:** • Continue to estimate numbers of wild and hatchery salmon harvested in mixed stock fisheries, including from remote release sites.. • If fish released remotely have higher straying rates, implement approach to reduce

	straying as developed in Year 3. Otherwise, demonstrate that: a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. c) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Client action plan	**SEAK: MSC PI 1.3.3 – Enhancement activities** The assessment team concluded that a key issue with regard to these Indicators is the effect of remote releases on increased stray rates of chum, Chinook, and coho salmon, and the potential that a reduction in remote releases (or other ways to improve homing) might be used to reduce straying. Action milestones for addressing this condition are as follows: **Year 1:** • PSVOA will review ongoing ADF&G efforts to estimate numbers of wild and hatchery chum harvested in mixed stock fisheries where the proportion of hatchery fish is demonstrated or likely to be more than minimal (facilitated by previous and ongoing studies). This includes review of data informing the extent to which remote releases of hatchery chum salmon stray to spawning streams. • PSVOA will prepare a risk assessment for Chinook and coho straying (e.g., based on CWT recoveries, release numbers, harvests of local hatchery Chinook and coho, and local wild salmon abundance), and design field studies to estimate chum straying in selected streams. A progress report will be provided. **Year 2:** • PSVOA will develop an approach to implement the risk assessment and field studies developed in Year 1. PSVOA will provide a progress report based on data provided by ADF&G. **Year 3:** • PSVOA, using available data, will estimate numbers of wild and hatchery salmon harvested in mixed stock fisheries, including fish released from remote release sites. PSVOA will provide a progress report. • PSVOA, using all available data collected by ADF&G will estimate remote release and direct-release strays on the spawning grounds, including the Northern Southeast Inside (NSI) subarea, and test whether fish released remotely have higher straying rates. PSVOA will provide a progress report to include approaches to control straying. **Year 4:** • Continue to estimate numbers of wild and hatchery salmon harvested in mixed stock fisheries, including from remote release sites. • If NSI chum stray rates are exceeding levels as set out in MSC guidelines (i.e. SamFAM), PSVOA will develop and seek implementation of approaches to reduce straying. Otherwise, demonstrate that: a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. c) There is a tested and evaluated artificial production strategy, if necessary, with

	sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Condition 4 (UoC = Copper/Bering Districts)

UoC	4: Copper/Bering Districts
Performance Indicator	**PI 1.3.1: Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy** **PI 1.3.2: Effective enhancement and fishery strategies are in place to address effects of enhancement activities on wild stock status** **PI 1.3.3: Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status** NB: In recognition of their interlinked nature, which in this case is in part because of their derivation from existing Condition 29, placed on the fishery when it was certified in 2007, the text of this condition was drafted to address the deficiencies identified for PI 1.3.1, PI 1.3.2 and PI 1.3.3. The MSC has agreed to this variation from CR 27.11.1.1.
Score	PI 1.3.1: 60 PI 1.3.2: 70 PI 1.3.3: 60
Rationale	**<u>PI 1.3.1</u>** **SG60:** a) It is likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. **SG80:** a) It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. **SG100:** a) There is a high degree of certainty that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. **<u>PI 1.3.2</u>** **SG60:** a) Practices and protocols are in place to protect wild stocks from significant detrimental impacts of enhancement. b) The practices and protocols in place are considered likely to be effective based on plausible argument. **SG80:** a) There is a partial strategy in place to protect wild stocks from significant detrimental impacts of enhancement. b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the

	minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement). **SG100:** a) There is a comprehensive strategy in place to protect wild stocks from significant detrimental impacts of enhancement. b) There is clear evidence that the strategy is successfully protecting wild stocks from significant detrimental impacts of enhancement. **<u>PI 1.3.3</u>** **SG60:** a) Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The effect of enhancement activities on wild stock status, productivity and diversity are taken into account. **SG80:** a) Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. **SG100:** a) A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock. b) The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity. This condition is related to and a supplement of the carry-over from Condition 29 on the previous Alaska salmon fishery certification from 2007. Condition 29 of that certification was to "*Conduct a review of the Gulkana sockeye hatchery program with emphasis on potential impacts to wild stocks.*" This new condition must now account for concerns raised in the observations of the Audit 4 report of the previous certification that noted "*It is difficult to determine from these hatchery evaluations whether the evaluation of the Gulkana Hatchery in 2012 will be sufficiently detailed to meet the intent of this condition.*". ADF&G staff biologists attest that '*managing wild stock sockeye salmon spawning escapement for the Copper River is complicated by large returns of enhanced fish with similar run timing . . .*" (ADF&G 2009). No comprehensive studies have been conducted on the effects of the Gulkana Hatchery program on wild stocks. ADF&G has taken a somewhat precautionary stance by not approving permit alteration requests for increased production and additional points of stocking. Yet, neither straying studies nor studies of genetic impacts have been carried out.
Condition	By the end of the **fourth** year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG80a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon, b) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement), c) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock, and d) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement

	activities on wild sockeye stock status, productivity and diversity.
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to monitor progress. If a sufficiently detailed hatchery review is presented in Year 1 and is deemed to show that the fishery meets the SG80 standard for 1.3.1, 1.3.2 and 1.3.3, then it is anticipated that the scores for these PIs will be raised to at least 80 and the condition closed. If the review shows that additional work is required under an amelioration plan, then the score will change only when the SG80 standard has been met; it is required that this would occur in Year 4. **Year 1:** • A clear and comprehensive evaluation of the Gulkana Hatchery should be provided, including an examination of concerns raised by ADF&G staff on potential impacts of hatchery sockeye salmon on wild fish (ADF&G 2009). **Year 2:** • If insufficient data are available to demonstrate that the SG80 level of performance is being met, develop a plan to demonstrate how the SG80 level of performance will be met. Provide a progress report. **Year 3:** • If an amelioration plan is required, then it must be implemented in Year 3. Provide a progress report. **Year 4** • If an amelioration plan has been implemented, demonstrate that: a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon, b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement), c) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock; and, d) The assessment includes estimates of the impacts of enhancement activities on wild sockeye stock status, productivity and diversity.
Client action plan	**Copper/Bering Districts: MSC PI 1.3.1, 1.3.2, 1.3.3 – Enhancement activities** Existing Condition 29 from the 2007 recertification formed the basis for ADF&G to conduct a review of the PWS enhancement programs, including Gulkana sockeye hatchery program with emphasis on potential impacts to wild stocks. Gulkana sockeye are currently marked and recovered through sampling of the commercial fishery to measure their contribution to the catch. Copper River sockeye escapement is complicated by large volumes of hatchery sockeye returning with the same run timing as wild stocks. Recognizing the lack of studies on straying and potential impacts on wild stocks, ADF&G has taken a precautionary stance relating to requests for increased Gulkana hatchery production and points of stocking. The Copper River/Bering District fishery will remain conditional until it is established that the Gulkana Hatchery enhancement activities do not have a significant negative impact on the productivity and diversity of wild stocks. A key outcome for this condition is to demonstrate acceptable straying of hatchery sockeye while also meeting the spawning escapement goals for the wild stock. Action milestones for addressing this condition are as follows: **Year 1:** • Using existing information available from ADF&G and PWSAC, PSVOA will prepare a review of the Gulkana Hatchery, including an examination of potential

	impacts of hatchery sockeye on wild stocks. A key metric for evaluating impact is the proportion of hatchery sockeye salmon on the spawning grounds. **Year 2:** • PSVOA will consult with ADF&G and develop a plan utilizing escapement surveys to assess impacts of Gulkana hatchery sockeye on wild stocks. **Year 3:** • PSVOA will seek to implement the plan and provide a progress report. **Year 4** • PSVOA will seek to demonstrate that the plan is implemented then demonstrate that the plan is capable of achieving an appropriately low level of hatchery fish in the spawning escapement thereby effectively minimizing detrimental impacts, and therefore: a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon, b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement), c) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock, and d) The assessment includes estimates of the impacts of enhancement activities on wild sockeye stock status, productivity and diversity.
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Condition 5 (UoC = Kodiak)

UoC	12: Kodiak
Performance Indicator	**PI 1.3.1: Enhancement activities do not negatively impact wild stocks or substitute for a stock rebuilding strategy** **PI 1.3.3: Relevant information is collected and assessments are adequate to determine the effect of enhancement activities on wild stock status** **PI 2.5.2: There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function** NB: In recognition of their interlinked nature, the text of this condition was drafted to address the deficiencies identified for PI 1.3.1, PI 1.3.3 and PI 2.5.2. The MSC has agreed to this variation from CR 27.11.1.1.
Score	PI 1.3.1: 60 PI 1.3.3: 60 PI 2.5.2: 75
Rationale	**PI 1.3.1**

SG60:

a) It is likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.

SG80:

a) It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.

SG100:

a) There is a high degree of certainty that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.

PI 1.3.3

SG60:

a) Some relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.

b) The effect of enhancement activities on wild stock status, productivity and diversity are taken into account.

SG80:

a) Sufficient relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.

b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.

SG100:

a) A comprehensive range of relevant information is available on the contribution of enhanced fish to the harvest and wild escapement of the stock.

b) The assessment is appropriate and takes into account the major features relevant to the biology of the species and the effects of any enhancement activities on the wild stock status, productivity and diversity.

PI 2.5.2

SG60:

a) There are measures in place, if necessary..

b) The measures take into account potential impacts of the fishery on key elements of the ecosystem.

c) The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems)..

e) There is an established artificial production strategy in place, if necessary, that is expected to achieve the SG 60 outcome as a minimum performance requirement.

SG80:

a) There is a partial strategy in place, if necessary.

b) The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.

c) The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems).

d) There is some evidence that the measures comprising the partial strategy are being implemented successfully.

e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.

	SG100: a) There is a strategy that consists of a plan, in place. b) The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. c) The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. d) There is evidence that the measures are being implemented successfully. e) There is a comprehensive and fully evaluated artificial production strategy, if necessary, to verify with high confidence that the SG 100 outcomes are being achieved. Hatchery stocks of all species do not comprise a major part of the harvests in the Kodiak UoC to date, and so the concern raised by the assessment team with respect to meeting the SG 80 level of performance is primarily related to straying into other systems at the current levels of release. The assessment team notes that straying monitoring is facilitated by the near 100% otolith marking of hatchery fish or coded wire tag programs in other regions of the state. A tagging program, including sampling of systems with high risks of straying and commercial landings from areas where mixed wild and hatchery fish are likely, is therefore recommended, at least for pink and chum releases. For Chinook and coho releases, a risk assessment may suffice, but, if future hatchery programs result in significant expansion of releases, these analyses should be sufficiently robust to determine risks to wild stock productivity with the proposed expansions. A complete marking program, implemented as a standard part of the hatchery's operations, would provide greater certainty given future expansion plans. If such a program illustrates minimal risk to wild stocks, it can be terminated unless major expansions in releases occur. The KRAA and ADF&G can address this issue using other means but should have external peer reviewed analysis conducted in support of using existing data to support findings to remove this condition.
Condition	By the end of the **fifth** year of certification, the SG 80 scoring requirements for PI 1.3.1 and PI 1.3.3, and the SI 80e requirements for PI 2.5.2, must be met in full. With respect to the current hatchery programs at Pillar Creek and Kitoi Bay for Chinook, coho, pink and chum salmon, this will be achieved when it has been demonstrated that: a) (PI 1.3.1, SG80a) it is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. b) (PI 1.3.3, SG80a) sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. c) (PI 1.3.3, SG80b) the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. d) (PI 2.5.2, SG80e) there is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to monitor progress. If a sufficiently detailed hatchery review is presented in Year 3 and is deemed to show that the fishery meets the SG80 standard for 1.3.1, 1.3.3 and 2.5.2, then it is anticipated that the scores for these PIs will be raised to at least 80 and the condition closed. If the review shows that additional work is required under a revised plan, then the score will change only when the SG80 standard has been met; it is anticipated that this would occur in

	Year 5. **Year 1:** • Develop a plan to demonstrate how the SG80 level of performance will be met. Provide a progress report. **Year 2:** • Provide a detailed review of approaches to Chinook and coho enhancement, to determine how the fishery meets or will meet the SG80 level of performance. Provide a progress report. **Year 3:** • Provide a progress report on implementation of the plan devised in Year 1. **Year 4:** • If concerns arise that the SG80 level of performance will not be met within the requisite time frame, develop a revised plan as necessary. Provide a progress report. **Year 5 :** • Provide a final report to demonstrate that: a) (PI 1.3.1) it is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. b) (PI 1.3.3) sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. c) (PI 1.3.3) the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. d) (PI 2.5.2) there is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Client action plan	**Kodiak: MSC PI 1.3.1 – Enhancement activities** To satisfy the intent of this condition, PSVOA will monitor and review study plans by KRAA and ADF&G to develop a chum and pink mark and recovery plan, including sampling of selected streams for rates of straying. **Year 1:** • Monitor and review plan for 100% marking of hatchery pink and chum salmon and for select sampling on spawning grounds and in fisheries. PSVOA will provide a report. **Year 2:** • For Chinook and coho salmon, PSVOA will conduct a risk assessment to evaluate whether or not releases might contribute to more than minimal proportions of hatchery fish on the spawning grounds. PSVOA will provide a report. **Year 3:** • PSVOA will seek implementation of the plan and will provide a progress report. **Year 4:** • PSVOA will provide a progress report, identifying any concerns that the SG80 level of performance will not be met and, if so, potential plan revisions necessary to meet SG80. **Year 5:** • If appropriate, PSVOA will seek implementation of plan revisions devised in Year 4, or otherwise demonstrate that:

	a) It is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks. b) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks. c) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity. d) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Condition 6 (UoC = Chignik)

UoC	13: Chignik
Performance Indicator	**PI 1.1.2: Limit and target reference points or operational equivalents are appropriate for the wild production components of the stock**
Score	PI 1.1.2: 60
Rationale	**<u>PI 1.1.2</u>** **SG60:** a) Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category. e) Where the wild stock is a management unit comprised of more than one subcomponent, it is likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent. **SG80:** a) Reference points are appropriate for the wild stock and can be estimated. b) The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. c) The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome. e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent. **SG100:** b) The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues. c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.

	e) Where the wild stock is a management unit comprised of more than one sub component, there is a high degree of certainty that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent. Coho salmon escapements to the Chignik lake system (the dominant coho stock) are monitored via weir from the beginning of the run in early August through early September, which is prior to the mid-point of the run. Nevertheless, in recent years fishing has occurred daily during this period and quantitative reference points have not been developed for Chignik coho, and so the fishery does not meet the SG80 level of performance for PI 1.1.2. It is recommended that an escapement goal or equivalent is developed, based on catch and effort information for lake coho using the early part of run that is counted by weir through August and sometimes in to early September. Techniques are available to estimate coho escapement from harvest & effort when weir data are not available.
Condition	By the end of the **fourth** year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that: a) (PI 1.1.2, SG80a) Reference points are appropriate for the wild stock and can be estimated, b) (PI 1.1.2, SG80b) The limit reference point (e.g., lower end of the Sustainable Escapement Goal or equivalent) is set above the level at which there is an appreciable risk of impairing reproductive capacity, c) (PI 1.1.2, SG80c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome and, d) (PI 1.1.2, SG80e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
Milestones	N.B. The milestones associated with the surveillance audits have been defined as a means to monitor progress. It is not anticipated that meeting an interim milestone would result in a change in score – it is instead thought likely that the score will change only when the condition is closed. **Year 1:** • Provide a report, detailing how the management of Chignik coho is undertaken to meet the SG80 level of performance. **Year 2:** • Provide an update on the Chignik management approach for the latest year, detailing how the fishery meets the SG80 level of performance. **Year 3:** • Provide an update on the Chignik management approach for the latest year, detailing how the fishery meets the SG80 level of performance. **Year 4:** • Demonstrate that: a) Reference points are appropriate for the wild stock and can be estimated, b) The limit reference point (e.g., lower end of the Sustainable Escapement Goal or equivalent) is set above the level at which there is an appreciable risk of impairing reproductive capacity, c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome and, e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of

	each stock subcomponent.
Client action plan	**Chignik: MSC PI 1.1.2 – Reference points** Chignik coho salmon typically represents a small fraction of the total Chignik catch until late August when local coho return in relatively larger numbers. The annual harvest of coho salmon may in some years not qualify under MSC standards as an IPI species and a target reference point may be needed to show that the fishery is managed to meet MSC standards. This condition will be met with the following actions: **Year 1:** • PSVOA will consult with ADF&G and prepare a memo describing the approach for managing local Chignik coho salmon to ensure that the spawning escapement is adequate. **Year 2:** • PSVOA will review and provide an initial report on existing information available from ADF&G on the harvest and escapement of local Chignik coho during the fishing period. **Year 3:** • PSVOA will provide an updated report if new information becomes available. **Year 4:** • PSVOA will provide a final report demonstrating that ADF&G management strategies achieve the SG80 scoring requirements: a) Reference points are appropriate for the wild stock and can be estimated. b) The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. c) The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome. d) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.
Consultation on condition	The ADF&G was consulted on the Client Action Plan and provided a supportive response as detailed in Appendix 5.

Appendix 5: Letter of support from the ADF&G

THE STATE of ALASKA

GOVERNOR SEAN PARNELL

Department of Fish and Game

DIVISION OF COMMERCIAL FISHERIES
Headquarters Office

PO Box 115526
1255 West 8th Street
Juneau, Alaska 99811-5526
Main: 907.465.4210
Fax: 907.465.2604

July 19, 2013

Intertek Moody Marine
Attn: Paul Knapman
1801 Hollis Street, Suite 1220
Halifax, Nova Scotia
B3J 3N4
Canada

RE: PSVOA Action Plan to Address Conditions for MSC Recertification

Dear Mr. Knapman:

The Alaska Department of Fish and Game (ADF&G) recently received a request from Purse Seine Vessel Owners Association (PSVOA) for a letter recognizing its action plan to address certain conditions set forth in the Marine Stewardship Council assessment report for certification of Alaska salmon fisheries. I am writing to inform you that we have reviewed the plan and will assist PSVOA in finding relevant information to address the conditions. While we cannot commit personnel or resources to implementation of the action plan, ADF&G is actively engaging in on-going research efforts that address specific issues identified in these conditions. Results of these projects should provide important insight on these topics in the coming years.

Please let me know if you have any further questions.

Sincerely,

Jeff Regnart
Director

Appendix 6: Harmonisation review

The four fisheries of harmonisation relevance to the Alaska salmon fishery are considered to be the Annette Islands Reserve salmon fishery, and the British Columbia sockeye, pink and chum fisheries (see Section 3.1.3). A comparison with the previous Alaska salmon certification is also appropriate.

As with the last Alaska salmon reassessment, the British Columbia fisheries used non-standard assessment trees, making it impossible to compare the individual Performance Indicators scores between those fisheries and the reassessed Alaska salmon fishery. As such, a comparison of the Principle level scores is the most direct comparison that can be achieved. The Annette Islands Reserve salmon fishery assessment was based on a similar tree, and a comparison of the Principle level scores is also appropriate there.

Table 17: Comparison of previous and new scores for the Alaska salmon fishery UoCs.

Unit of Certification	2007 P1	NEW P1	2007 P2	NEW P2	2007 P3	NEW P3
SE Drift Net	80.89	80.7	80.87	81.0	92.73	93.5
SE Purse Seine	80.89		80.87		92.73	
SE Troll	85.23		80.87		92.73	
Yakutat	85.44	97.1	82.12	83.7	92.73	96.5
Prince William Sound	80.21	-	80.25	-	92.73	-
Copper / Bering Districts	80.03	82.4	82.12	85.7	92.73	93.5
Lower Cook Inlet	86.63	91.0	82.12	86.0	92.73	91.5
Upper Cook Inlet	83.34	94.3	82.12	85.7	92.73	94.5
Bristol Bay	90.44	98.3	82.12	87.3	92.73	96.5
Yukon	91.75	91.7	82.12	87.3	92.73	96.5
Kuskokwim	82.1	91.2	82.12	87.3	92.73	96.5
Kotzebue	83.73	88.3	82.12	87.7	92.73	96.5
Norton Sound	80.56	84.2	82.12	87.3	92.73	96.5
Kodiak	82.48	82.5	82.12	85.3	92.73	93.5
Chignik	87.55	88.7	82.12	87.7	92.73	96.5
Peninsula/Aleutians	80.13	97.4	82.12	87.3	92.73	96.5
Mean	83.8	89.8	81.8	86.1	92.7	95.3

As shown in Table 17, above, the average scores for the three PIs have increased from the last certification to this current reassessment. In some cases, the scores for individual PI scores have increased substantially (e.g., P1 Yakutat, Peninsula/Aleutians). In many cases, the increases can be attributed to improvements in the performance of the fishery (reflected in the number of conditions that were closed-out during the last certification period). Also, differences can be attributed to small changes in the way the UoCs have been defined, revisions to the assessment tree, and the established precedent of awarding scores of 100 for PIs 1.3.1 – 1.3.3 for salmon fisheries where no enhancement takes place. Overall, the assessment team considers that the scores are similar or differences can be

justified on the basis of the improvements in the performance of the fishery over time, including through meeting a large number of conditions following the 2007 MSC certification.

When comparing against the other fisheries (i.e., Table 18, below), it is also apparent that the scores as awarded in the latest Alaska salmon reassessment are on average higher than those awarded to the other fisheries. For the British Columbia fisheries, however, the differences are relatively minor, except for P1 where the Alaska fishery performed particularly well, in part because the State of Alaska has a good escapement goal policy which is implemented in almost all areas, as well as annual or 3 year escapement goal reports that document actions and outcomes.

The average scores awarded to the Annette Islands Reserve salmon fishery were just above the SG80 level. For P1, the Annette Islands fishery was scored down for the enhancement PIs 1.3.1 – 1.3.3, while the Alaska UoCs typically met the MSC Standard for enhancement, or were awarded scores of 100 where no enhancement took place. The need for additional stock identification work was also highlighted. For P2, the Annette Islands Reserves scores were generally lower because information on the P2 components was considered to be lacking. For P3, these scores were lower because of a number of apparent failings across a range of issues from consultation to having long-term objectives and a research plan- all areas where Alaska scored well.

Table 18: Comparison of Principle level scores between relevant salmon fisheries.

Fishery	NEW Alaska salmon	2007 Alaska Salmon	Annette Islands Reserve	BC Sockeye	BC Pink	BC Chum
UoCs	13*	16	14	4	3	3
UoCs based on	Areas	Areas, and gear types in Southeast	Gear types and species	Rivers	Rivers	Rivers
P1 mean score*	89.8	83.8	81.8	85.8	80.3	80.7
P1 range	80.7-98.3	80.1-91.8	80.3-84.2	82.2-91.6	80.0-81.0	80.0-82.0
P2 mean score*	86.2	81.8	82.3	86.3	83.0	84.0
P2 range	81.0-87.7	80.2-82.1	All 82.3	82.3-88.9	81.0-85.0	82.0-85.0
P3 mean score*	95.3	92.7	80.8	90.8	89.3	89.7
P3 range	91.5-96.5	All 92.7	All 80.8	87.4-97.1	87.0-91.0	89.0-90.0

*Not including PWS as no scores have yet been determined.

Appendix 7: Stakeholder submissions on inital assessment steps #1

Under section 27.15.3.1 of the Certification Requirements, the MSC requires that assessment reports include any information recieved from stakeholders on a number of steps early in the assessment process (MSC 2013a). These are detailed below, together with responses as appropriate.

a) The announcement of full assessment:

- No comments received.

b) Proposed team membership:

- No comments received.

c) Proposed peer reviewers.

- Comment were received by e-mail from Christina Burridge, Canadian Pacific Sustainable Fisheries Society. The e-mail, and the reponse are detailed below.

From: Dr. Rob Blyth-Skyrme
Sent: 04 February 2013 16:30
To: 'Christina Burridge'
Cc: 'Rob Morley'; 'Dan Hoggarth'; 'Megan Atcheson'; 'Paul Knapman Intertek'
Subject: RE: Assessment- Alaska salmon: consultation on proposed peer reviewers

Dear Christina,

As you are aware, the consultation on the peer reviewers for the Alaska salmon reassessment closed recently. Yours was the only response received and so I thought it appropriate to send you a reply directly. Of course, I am very conscious of the importance of having stakeholders engage with the MSC process, and so I would like to say thank you very much for your interest in the Alaska salmon reassessment.

I will summarise your main points as being that the proposed reviewers are appropriately knowledgeable on the Alaska system, but that:

1) You believe they do not have sufficient knowledge of the MSC Standard, and
2) At least one of the peer reviewers should also have reviewed a BC salmon fishery to ensure consistency between assessments.

On this first issue, although it wasn't highlighted in their short bios, one of our proposed peer reviewers was a member of the IMM team that undertook the last 4 annual audits of the Alaska salmon fishery, while the other two have both previously undertaken at least one peer review of an MSC salmon fishery. We are content that this experience is sufficient to meet the MSC requirements.

On the second issue, I would like to highlight that one of our assessment team members was also part of the BC chum, pink and sockeye assessment teams, while another one of our assessment team undertook peer reviews of the BC chum and pink assessments. We are therefore content that the IMM assessment team is appropriately informed on the BC salmon assessments, and that the consistency to the extent possible with the BC salmon assessments will be achieved through them, rather than through the peer reviewers. In fact, I am happy to confirm to you that intra-assessment team discussions have included repeated mention of the need to ensure consistency as far as possible with the BC assessments.

In summary, we are content that all three of peer reviewers are appropriately qualified for the task, and we will in due course confirm the two who will undertake the peer reviews, together with the timeline.

Thank you again for your input- it does help to ensure the MSC process is followed as required.

With best wishes,
Rob

From: Christina Burridge
Sent: 23 January 2013 15:23
To: 'Dr. Rob Blyth-Skyrme'
Cc: 'Rob Morley'; 'Dan Hoggarth'; 'Megan Atcheson'
Subject: Assessment- Alaska salmon: consultation on proposed peer reviewers

Dear Rob,

The following message represents our comments on the peer review nominations for the Alaska salmon recertification. Please confirm receipt.

The credentials of the proposed reviewers are strong in terms of knowledge of Alaskan fisheries.

We strongly suggest, however, that with consistency between the various MSC salmon assessments an issue and with the revised version of MSC's SamFam due later this year, you need at least one peer reviewer with experience of other MSC assessments, particularly in British Columbia. I don't see familiarity with MSC processes, procedures and interpretation in your reviewers' qualifications. Of course we understand that fisheries are assessed against the MSC standard not against each other but consistency of interpretation of that standard is a serious issue as it can give a competitive advantage to one fishery over another.

So we think your choice is partial and not entirely in keeping with MSC direction on peer reviewers and thus likely to encourage tension over Sam Fam rather than consistent interpretation.

We urge you to choose at least one reviewer with experience in other certifications particularly in BC. This would be helpful both immediately and ensuring that all salmon fisheries believe they have been treated fairly by the MSC process.

C/

Christina Burridge
Canadian Pacific Sustainable Fisheries Society

d) The proposal for the use or modification of the default tree and/or use of the RBF (Annex CC).

- Comments on the proposed assessment tree were received from the State of the Salmon and a group of stakeholders comprising the Wild Fish Conservancy, Raincoast Conservation Foundation, SkeenaWild Conservation Trust, Watershed Watch Salmon Society and the David Suzuki Foundation. It is noted that these were published on the MSC website, together with the response from the CAB. In order to reduce the size of this report, links to these documents on the MSC website are provided below:

State of the Salmon comments: http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120925_Comments-State_of_the_salmon.pdf

Stakeholder group comments: http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120925_STholder_Comments.pdf

Confirmation of the assessment tree, with comments on stakeholder submissions: http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/alaska-salmon/new-client-2nd-re-assessment/20120925_Confirm_DAT_MOD.pdf.

Appendix 8:Stakeholder submission for the site visit

Skeena Wild Conservation Trust, Watershed Watch Salmon Society, Wild Fish Conservancy, Raincoast Conservation Foundation and Pacific Salmon Foundation

CONSERVATION STAKEHOLDER MEETING WITH THE ASSESSMENT TEAM FOR THE MARINE STEWARDSHIP COUNCIL RE-ASSESSMENT OF ALASKAN SALMON FISHERIES

AGENDA AND OVERVIEW

October 18, 2012

Attending Stakeholders: Nick Gayeski and Kurt Beardslee (Wild Fish Conservancy), Aaron Hill (Watershed Watch Salmon Society), Greg Taylor (Pacific Salmon Foundation), Greg Knox (Skeena Wild Conservation Trust), Misty MacDuffee (Raincoast Conservation Foundation).

1. **Broad overview of stakeholder objectives:**

- Persistence of healthy wild Pacific salmon (*Oncorhynchus spp.*) runs throughout their historic range in Alaska, BC, the Pacific Northwest and California.

- Restoration of extirpated, endangered or depressed wild salmon populations to healthy levels of abundance. (Consistent with MSC Criteria 1.2 and 2.3 *Fishery allows for the recovery of depleted target and non target salmon stocks*)

- Conservation of Pacific salmon genetic diversity and biocomplexity at the ESU or CU level (Consistent with MSC Criterion 1.3 *Fishing does not impair reproductive capacity).*

- Consideration of salmon beneficiaries in escapement and harvest objectives. (Consistent with MSC Criteria 2.1 *Maintain natural functional relationships among species,* and 2.2 *Fishery minimises impacts on endangered, threatened or protected species.*

- Assurance that harvest on healthy wild salmon runs occurs at levels that are ecologically sustainable, and with minimal impacts to the above objectives.

2. **Overview of inconsistencies between MSC certified Alaskan fisheries and MSC Principles and Criteria.** Our stakeholder concerns fall under three broad headings:

a) Impacts to the abundance and diversity of wild salmon populations resulting from hatchery operations. These include:

i. Excessive release of juveniles from hatcheries and ocean ranching facilities (e.g. Prince William Sound pink salmon) that may compete with wild fish for a finite marine food supply.

ii. Genetic interactions whereby returning adult hatchery-origin fish interbreed with wild fish, causing well-documented "domestication effects" (reduction of fitness). Straying of Alaskan hatchery chum salmon from facilities in SE Alaska into spawning grounds in Canada is an example of this problem.

iii. Harvest interactions, whereby harvest plans in mixed stock fisheries and escapement goals that are appropriate for enhanced populations do not protect co-migrating stocks at low abundance or low productivity from overharvest.

iv. Other ecological interactions, including but not limited to predation, disease, and freshwater competition.

- The Assessment Team must make every reasonable effort to consider new scientific research pertaining to the above aspects of wild-hatchery interactions when evaluating the PIs that pertain to hatchery practices.

b) Impacts to the abundance and diversity of target and non-target salmon returning to watersheds outside Alaska as a result of interceptions in Alaskan fisheries. These impacts are most egregious with chinook, but also extend to other depleted salmon populations returning to BC rivers, including chum, sockeye, and steelhead.

Chinook interceptions

- On average, between 1999 and 2010, more than 85% of the chinook caught in the Alaskan Troll fishery and over 90% of the chinook caught in all (net, troll and sport) Alaskan fisheries were from salmon populations that originate in rivers outside of Alaska. Catch and stock composition data from the Chinook Technical Committee's Dr. Rishi Sharma will be provided and discussed. It is imperative that the assessment team considers this information in determining what the "target" and "non-target" stocks are in these fisheries. We expect the Assessment Team's determination in this matter to reflect the highly mixed-stock nature of the chinook troll fisheries and to be consistent with MSC's definitions for these terms.

  - Many of the chinook intercepted in Alaska are from populations depressed relative to their historic abundance, depressed relative to the habitat capacity of their natal streams, depressed relative to their escapement targets, recognized as stocks of concern by U.S. and Canadian federal agencies, and/or listed as endangered populations under the U.S. Endangered Species Act.

  - Where NOAA oversees harvests on these populations, their standards fail to satisfy PI 1.1.2 SG 60E and 80E and PI 1.1.2 SG 60 and SG 80, among others.

  - NOAA standards are minimal in that they insure average spawner escapements just sufficient for the stocks to avoid extinction in the short-term (spanning only a few generations).

  - Where DFO oversees harvests on chinook populations, their standards fail to satisfy PI 1.1.1.4 at the 60 and potentially 80 SG, 1.1.15 and potentially others. Of the 17 Conservation Units of Fraser River chinook, the CTC recognizes only 4 stock groupings and have reliable exploitation rates from CWTs on only 2 of these groupings. Additionally, only 1 of the 4 CTC aggregates has approved target escapement goals.

  - None of the existing practices include ecosystem considerations for freshwater or marine environments. Consequently, none of the non-Alaska Chinook stocks encountered by the SE Alaska troll fishery appear to meet MSC performance indicators and scoring guidelines for protection of EPT species including PI 2.3.1, PI 2.3.2 (and Alternate) at either the level of SG60 or SG80, and performance indicators and associated scoring

guidelines for ecosystem structure and function, including PI 2.5.1, 2.5.2 at either SG 60 or SG 80.

- Perhaps the most alarming impact of Alaskan chinook interceptions affects the trans-boundary population of Southern Resident Killer Whales (SRKW), listed as *endangered* under both the US ESA and Canada's Species at Risk Act (SARA). Several lines of evidence have linked the fecundity, mortality and survival of these animals to the indices of chinook abundance locally (Fraser River Albion test fishery) and broadly (PSC chinook Total Abundance indices) (Ford et al. 2010; Hanson et al. 2010; Harding & Coyle 2011). Strong correlations suggest that reduced fishery exploitation of chinook salmon, especially on stocks from rivers draining into the Salish Sea, would increase the seasonal availability of chinook. This would also rebuild long term abundance and density of chinook and recover the age and size structures of the fish. Thus the whales' caloric intake per fish can be closer to historical levels, all of which should aid the recovery and delisting of SRKWs.

- The impacts of the SE Alaska troll fishery on BC, Puget Sound and Columbia River-origin chinook stocks appear to violate PIs 2.3.1, 2.3.2, 2.5.1, and 2.5.2 at either SG 60 or SG 80.

- Impacts to age and size: The Southeast Alaska troll fishery puts significant pressure on immature chinook. This can result in age- and size-overfishing, causing selection for earlier age-at-maturity and faster growth at young ages. This results in smaller size-at-maturity with consequent reduced fecundity and potential egg deposition. As such, impacts to the age and size of catch (PI 1.1.2.3) are not maintaining the high productivity of the target population (Criterion 1.1)

- Trends toward younger age-at-maturity and smaller body size of mature chinook will also exacerbate directional trends caused by changes in productivity of marine food webs and/or competition from the excessive releases of hatchery salmonids across the North Pacific Rim. These changes can impair the viability of chinook populations and their longer-term resilience to environmental variability.

Chum and steelhead

- SE Alaskan Purse seine and drift gill net fisheries are known to intercept significant numbers of Canadian chum and steelhead, but there is little information on the impacts of these fisheries on these stocks. Understanding what is being taken as by-catch and discarded is a fundamental component of any certification program, and a core component of MSC requirements.

Northern BC Chum Salmon

- Several northern BC chum salmon populations have been designated as stocks of conservation concern by Fisheries & Oceans Canada. Most populations in DFO management areas 3-9 (BC North & Central Coast) remain depressed despite management actions to protect and rebuild them (N&CC IFMP, 2012; Peacock & Spilsted, 2010a&b).

- There are no direct Alaskan interception estimates of BC chum stocks, although it has been estimated that Alaskan seine and gill net fisheries have intercepted up to 30% of some Northern BC chum stocks in past decades (Peacock & Spilsted, 2010a). Such estimates have been produced by DFO for depressed Nass & Skeena chum (areas 3 & 4). These are based on interception rates for sockeye, assuming similar timing and migration routes through Alaskan fisheries as Nass & Skeena sockeye. Such estimates are acknowledged by DFO to be

inaccurate, and not likely scientifically defensible. Alaskan interception rates for other depressed North & Central BC coast chum stocks have not been estimated.

- Opportunities exist to initiate mark recapture and genetic ID programs to get better interception estimates; for example, a cooperative program between DFO and ADF&G using direct estimate methods should be considered. Adequate stock ID information from the Alaskan chum catch in SEAK is essential to the management of chum bycatch and the current paucity of this information should be considered in the re-assessment process and setting of conditions for the SEAK unit of certification.

BC Steelhead

- Large numbers of steelhead are caught as by-catch in SE Alaskan Seine and Gill net fisheries (Harding & Coyle, 2011; Thomas, 2010). The sale of steelhead in commercial fisheries has been prohibited since 1994, however steelhead may be retained for personal use. Only retained steelhead are required to be recorded, and there is no information on discards (Harding & Coyle, 2011).

- While Northern BC steelhead stocks appear to be healthy, many southern BC steelhead stocks, such as East Coast Vancouver Island and Thompson River, are a serious conservation concern (SC IFMP, 2012).

- Canadian commercial fisheries are required to release and count steelhead by-catch, and DFO has taken actions to reduce impacts on these stocks (SC IFMP, 2012). There is however no information on potential impacts on Canadian steelhead stocks from Alaskan fisheries.

- Gathering basic bycatch and discard data for steelhead should be a requirement of recertification.
    - Specifically, the management agency and industry should be required to document all retained and released steelhead in SE Alaska.
    - Existing dockside-monitoring programs required for salmon should also verify steelhead landings.
    - Existing SE Alaskan observer programs should include counting steelhead retention and discards.
    - Existing scale sampling and genetic programs in these fisheries should collect and analyze data for steelhead. This information should be made available to DFO, the BC Ministry of Forest Land & Natural Resource Operations (Agency responsible for steelhead management in BC), and stakeholders on an annual basis.

Sockeye

- While some efforts are made at the stock aggregate level to prevent overharvest of Canadian bound sockeye in Alaska fisheries, in many cases Canadian sockeye populations that are below their Target or Limit Reference Points (or equivalents) are subject to considerable harvest pressure, particularly in southern SEAK purse seine and gillnet fisheries, as well as those located in or near the mouth of the Stikine River.

- Canadian exploitation rates in mixed stock sockeye fisheries (e.g. DFO management Area 4) have been reduced in recent years to alleviate pressure on depressed populations (e.g. Kitawanga sockeye). However, the Pacific Salmon Treaty does not adequately provide for reciprocity of such conservation measures by the Alaskan fleet. MSC certification, on the other hand, requires protective measures for stocks at, near, or below their LRPs.

- Some northern BC sockeye stock aggregates, such as Skeena, Nass, and Stikine, are specifically targeted in southern SEAK fisheries, and should the component populations (i.e., Conservation Units) that make up these aggregates should therefore be considered target stocks when scoring these particular fisheries.

3. **Identifying solutions, conditions and incentives for change**

- Need for Genetic Stock Identification that provides information on southern interceptions
- Reduce or eliminate impacts on southern migrating stocks through shifts from mixed-stock to terminal harvest. Failure to act will provoke calls for all-out closures.
- Need to significantly reduce ocean ranching in boundary areas of SE Alaska
- Need to ensure that outstanding conditions from previous certification are addressed within a short time frame.
- Need to ensure issues and information (e.g. hatchery straying rates) identified through recent studies and conditions of previous certification are dealt with.
- Need to design fisheries and release procedures (i.e. outplanting) to reduce straying from ocean ranching facilities.

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Thomas, J. (2010). *Steelhead Bycatch and Mortalities in the Commercial Skeena Net Fisheries of British Columbia from Observer Data: 1989 to 2009.* Prepared for the Pacific Salmon Foundation and BC Ministry of Environment, Skeena Region by J.O. Thomas and Associates Ltd. http://skeenawatershedinitiative.com/library

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Inadequate Prey and Vessel Traffic on an Endangered Killer Whale (Orcinus orca) Population. PLoS One. Vol. 7:6

Appendix 9: Site visit meeting records

Skeena Wild Conservation Trust, Watershed Watch Salmon Society, Wild Fish Conservancy and Raincoast Conservation Foundation

Assessment Team	
Lead Assessor	Dr. Rob Blyth-Skyrme
Team Member	Dr. Greg Ruggerone
Team Member	Dr. Dana Schmidt
Team Member	Prof. Jim Seeb

Meeting Location	The Silver Cloud Lake Union Hotel, Seattle, WA.
Date	18th October, 2012

Stakeholders Name	Affiliation
Greg Knox	SkeenaWild Conservation Trust
Aaron Hill	Watershed Watch Salmon Society
Nick Gayeski	Wild Fish Conservancy
Kurt Beardslee	Wild Fish Conservancy
Misty MacDuffee	Raincoast Conservation Foundation
Dan Averill	Marine Stewardship Council (observer)
Jim Humphreys	Marine Stewardship Council (observer)
Wes Toller Ph.D.	Accreditation Services International (observer)

1. Comments

A) RBS introduced the Alaska salmon assessment process, confirmed that comments would not be attributed, stated the constraints on the use of any confidential information, and noted that a brief minute of the meeting would be made
B) Throughout this minute, and in order to ensure that any comments are unattributed to individuals, the stakeholders present at the meeting are referred to as 'The Group', and the assessment team members are referred to as 'The Team'.

2. Status: What is the nature of the organisations interest in the fishery: **eNGO**

3. Stakeholder Key Issues and Information

A) The Group e-mailed a list of key concerns and a bibliography to RBS just prior to the meeting. This document was also presented in hard copy at the start of the meeting.
B) At the meeting, a CD was also provided of reports, notices and data that were considered relevant by the Group to the assessment process.
C) The Group expressed support for MSC objectives, and noted that improvements had probably occurred in the BC salmon fisheries faster than if they had not been MSC certified.
D) The Group noted that they represented the public interest in the MSC assessment of Alaska salmon, and that there were concerns about various aspects of Alaska salmon management. These concerns were stated as follows:

<u>Chinook catches in Southeast Alaska</u>

a. That non-Alaskan Chinook in the SE Alaska troll fishery made up the majority of the catches (data and a report were provided showing that 97% of the troll-caught Chinook from Southeast Alaska did not originate from Alaska).
b. That the take of immature Chinook in the troll fishery was impacting the size and age of returning fish.

c. That Chinook catches are having an impact on the ESA-Southern resident orca pod.

Ocean ranching in Southeast Alaska and Prince William Sound

a. The ability to manage straying in chum salmon, and the proportion of hatchery-origin spawners that may be found in wild runs.
b. The quantities of pink salmon being released in PWS and their predatory dominance and impact on food webs.

Condition setting

a. That the process of setting and meeting conditions should progress in a line from Score to Condition to Action Plan to Outcome- if the condition is met then the identified deficiency should be addressed clearly.
b. That existing conditions of certification on the Alaska salmon fishery are carried over to any new certification for the fishery.

Target, non-target and bycatch salmon species

a. That there is no process for managing catches of weak, Canadian bound sockeye runs in the Alaska fisheries.
b. That chum salmon in British Columbia include some units that are in trouble- some modeling of sockeye suggests that BC-bound chum bycatch in Alaska fisheries may be quite high, but data (scale and genetics sampling) are lacking.
c. That it is not clear how the interception of non-local stocks more generally will be dealt with under the MSC assessment process.
d. That quantities of steelhead are being taken in the Southeast fisheries, but that these were not required to be reported on fish tickets.

Endangered, threatened or protected (ETP) species

a. That only SARA and CITES listed species are included in the MSC's ETP species categories, rather than COSEWIC and IUCN listings which reflect solely the scientific understanding of endangerment.

Application of the precautionary principle

b. That it may take many years to attain sustainability in fisheries, and climate change impacts may confound efforts- how is the precautionary principle applied?

4. IMM Assessment Team Questions

A) The Team had no particular questions for the Group, beyond holding a discussion of the points raised by the Group.

5. Other issues

A) The timeline for the assessment was discussed. At the point at which the site visit was held, the intention was to complete the assessment by the end of April 2013, prior to the start of the next Alaska salmon fishing season.
B) Stakeholders were invited to submit more information if any additional concerns were identified, although it was also noted that new information would be difficult to incorporate in to the main assessment report beyond the end of November 2012.
C) It was noted that stakeholders would have an opportunity to comment on the draft report at the Public Comment Draft Report stage, which Intertek Moody Marine was aiming to release in early 2013.

State of the Salmon

Assessment Team	
Lead Assessor	Dr. Rob Blyth-Skyrme
Team Member	Dr. Greg Ruggerone
Team Member	Dr. Dana Schmidt
Team Member	Prof. Jim Seeb

Meeting Location	The Hotel Captain Cook, Anchorage, AK.
Date	22nd October, 2012
Stakeholders Name	Affiliation
Randy Erickssen	State of the Salmon
Rich Lincoln	State of the Salmon
Dan Averill	Marine Stewardship Council (observer)
Megan Atcheson	Marine Stewardship Council (observer)

1. Comments

A) RBS introduced the Alaska salmon assessment process, confirmed that comments would not be attributed, stated the constraints on the use of any confidential information, and noted that a brief minute of the meeting would be made

B) It was confirmed that it would be best to resubmit any information that was provided prior to the last reassessment process at the end of 2011 if it was to be taken in to account in the new reassessment process.

C) SotS commented that the inclusion of the Southeast Alaska troll fishery in a Unit of Certification with other Southeast fisheries was not appropriate as the troll fishery is managed differently. The Yakutat troll fishery could be combined with the Southeast troll fishery as a separate Unit of Certification.

2. Status: What is the nature of the organisations interest in the fishery: **eNGO**

3. Stakeholder Key Issues and Information

A) SotS presented a number of concerns regarding aspects of Alaska salmon management. These concerns were stated as follows:

<u>Chinook catches in Southeast Alaska</u>

a. That Chinook catches in the Southeast included ESA listed fish from the Pacific Northwest.

<u>Ocean ranching</u>

a. That there is a need to look not just at how much straying happens, but to look at strategies to reduce straying.
b. That's competing management objectives may not always be optimized towards reducing straying.
c. That some hatchery releases are unmarked.

<u>Hatchery planning and program review</u>

a. That a number of regions are considering starting hatchery programs, but it is not clear whether comprehensive salmon plans are being reviewed when hatchery starts

are planned, and what performance management criteria are being used to assess suitability?

b. That metrics were specified in earlier hatchery program reviews [E.G., in Southeast Alaska], and that it would be useful to re-look at these and see how the impacts are assessed against the metrics.

Condition setting

a. That existing conditions of certification on the Alaska salmon fishery are carried over to any new certification for the fishery.
b. That conditions that require the collection of information result in action being taken if the information shows that a problem is occurring.

Stocks of concern

a. That escapement goals for Southeast Alaska chum salmon were lowered recently so that the run was now meeting the escapement goal.
b. That wild productivity is being influenced by hatchery fish, and that it was not clear that hatchery fish were being accounted for.

Ocean productivity

a. That there is uncertainty and a need for precautionary management across the North Pacific, because of the cumulative impact from large-scale hatchery production in different regions.

4. IMM Assessment Team Questions

A) The Team had no particular questions for SotS, beyond holding a discussion of the points raised by SotS.

5. Other issues

A) The timeline for the assessment was discussed. the point at which the site visit was held, the intention was to complete the assessment by the end of April 2013, prior to the start of the next Alaska salmon fishing season.

B) The SotS was invited to submit more information if any additional concerns were identified, although it was also noted that new information would be difficult to incorporate in to the main assessment report beyond the end of November 2012.

C) It was noted that stakeholders would have an opportunity to comment on the draft report at the Public Comment Draft Report stage, which Intertek Moody Marine was aiming to release in early 2013.

Sustainable Fisheries Partnerships

Assessment Team	
Lead Assessor	Dr. Rob Blyth-Skyrme
Team Member	Dr. Greg Ruggerone
Team Member	Dr. Dana Schmidt
Team Member	Prof. Jim Seeb

Meeting Location	The Hotel Captain Cook, Anchorage, AK.
Date	22nd October, 2012
Stakeholders Name	Affiliation
David Martin	Sustainable Fisheries Partnerships
Dan Averill	Marine Stewardship Council (observer)
Megan Atcheson	Marine Stewardship Council (observer)

1. Comments

A) RBS introduced the Alaska salmon assessment process, and noted that a brief minute of the meeting would be made.

B) It was noted that SFP had undertaken an analysis of the assessments undertaken for the different MSC-certified salmon fisheries, to determine if the standard was consistently applied. SFP determined that the scores were similar in some ways but different in others. The draft analysis would be provided to the assessment team subsequently.

2. Status: What is the nature of the organisations interest in the fishery: **eNGO**

3. Stakeholder Key Issues and Information

A) SFP presented a number of concerns regarding aspects of Alaska salmon management. These concerns were stated as follows:

<u>Ocean ranching</u>

a. That approvals had been issued in recent years for increases in hatchery releases despite scientific objection.
b. That some hatchery releases continue to be unmarked, e.g., 170 million from the Kitoi hatchery.
c. That results from a recent study into straying (Brenner et al.) are acted upon.

<u>Hatchery management</u>

a. That a link to a 2009 review of the PWSAC no longer worked on the ADF&G website nor on the Alaska document library system- why?
b. That wild stocks are being replaced by hatchery stocks in some areas- for example Southeast sockeye.

<u>Capture of non-local stocks</u>

a. That the capture of non-local stocks is considered appropriately in the assessment, including fish from ESA-listed stocks of the Pacific Northwest.

<u>Escapement goals</u>

a. That escapement goals for a number of Alaskan stocks had been lowered over the last decade, the justification for which had been unclear.

Ocean productivity

b. That there is uncertainty and a need for precautionary management across the North Pacific because of climate change.

4. IMM Assessment Team Questions

A) The Team had no particular questions for SFP, beyond further discussion of the points raised by SFP.

5. Other issues

A) The timeline for the assessment was discussed. At the point at which the site visit was held, the intention was to complete the assessment by the end of April 2013, prior to the start of the next Alaska salmon fishing season.

B) SFP was invited to submit more information if any additional concerns were identified, although it was also noted that new information would be difficult to incorporate in to the main assessment report beyond the end of November 2012.

C) It was noted that stakeholders would have an opportunity to comment on the draft report at the Public Comment Draft Report stage, which Intertek Moody Marine was aiming to release in early 2013.

Appendix 10: Peer Review reports

Peer reviewer #1

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: The evidence presented in this report clearly demonstrates the exemplary performance of Alaska salmon fishery with respect to MSC Principles and standards. The team has appropriately concluded that 13 of the 14 Units of Certification (UoC) under review meet the MSC standards with high overall scores. Given the conflicting and inconclusive scientific evidence related to sustainability of enhancement and management practices in UoC 3-Prince William Sound (PWS), the team's conclusion to delay certification of the PWS UoC pending further analysis is well justified.		Noted, thank you

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: The conditions raised in this report focus largely on the few unclosed conditions from past assessments, and are appropriately written to achieve the SG80 outcome within the specified timeframes. For the SEAK UoC (Condition 1), the extension of the timeframe beyond the period of certification (10 years) is well justified given the recent implementation of a new 10-year study. The study plan will benefit from the required independent peer review and incorporation of reviewer recommendations.		Noted, thank you

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes**	**Conformity Assessment Body Response**
Justification: The client action plan is generally well designed and includes appropriate milestones to measure progress. The client is clearly dependent on a sufficient level of agency support to provide the information needed to accomplish the plan. A draft letter to be signed by the agency indicates that an appropriate level of support will be provided.		Noted, thank you

For reports assessing enhanced fisheries please follow the link.

General Comments on the Assessment Report (optional)

The assessment report was comprehensive and provided sufficient information on the results of the assessment. Nevertheless, there is always room for improvement. In particular, in future assessment

reports it would be useful to include data tables for key metrics used by the Assessment Team in the evaluation such as the escapement estimates reported in Munro and Volk (2012). Additional suggestions and comments are listed below (line numbers are continuous starting from page 1 of the first draft assessment report released to reviewers on 6 May 2013; line numbers may differ in the second draft, released to reviewers on 16 July 2013, as well as in the final report):

IMM comment
We agree that there is always room for improvement when drafting a report of this type, and thank the reviewer for these suggestions.

Section 3.2.1 Area and History of the Fishery
The history of the fishery presented in the assessment is an oversimplification, focusing primarily on the struggle between federal and state fishery management authority and the "*significant boos*t" to the fishery from salmon enhancement. This information is repeated in section 3.5. There is no mention of the approximately 10,000-year history of aboriginal salmon fishing that provides context for sustainable salmon fishing in this region. More useful background information for this report would be a brief but balanced history of commercial, subsistence, and recreational harvests, hatchery production, and fishery management relative to long-term trends in abundance/sustainable fishing of salmon in Alaska and the major factors (including climate regimes and socio-economic factors) influencing these trends. New information on centennial-scale fluctuations and regional complexity of the Alaska salmon resource is relevant (Rogers et al. 2013).

Rogers, L.A., D.E. Schindler, P.J. Lisi, G.W. Holtgrieve, P.R. Leavitt, L. Bunting, B.P. Finney, D.T. Selbie, G. Chen, I. Gregory-Eaves, M.J. Lisac, and P.B. Walsh. 2013. Centennial-scale fluctuations and regional complexity characterize Pacific salmon populations over the last five centuries. PNAS.

IMM comment.
The assessment team recognizes that the term 'significant boost' from enhancement is controversial and debatable; the term was changed to 'significant component of.' The assessment team also recognizes the 10,000 year history of subsistence fisheries in the region and the relative importance of commercial, subsistence, and recreational harvests. However, given the scope of the current review and the size of this document, the assessment team chose to simplify the history to focus upon significant landmarks, primarily since statehood that formed the fisheries today.

Section 3.2.2 Salmon Species: Much of the species life history information in this relatively lengthy section of the report is of little use for this assessment. For example, how is information on the appearance (color and spots) of the species or the occurrence of 3-year old pink salmon in the Great Lakes used in the assessment? In addition, the life history information provided is inconsistent among species, including some out of date and/or erroneous information, and is incomplete with respect to marine life history. More useful background information for this report would be a brief review for each species of life history characteristics that might be affected by the fishery or hatchery enhancement of the fishery (for example, size and age at maturation, run timing, sex ratio on the spawning grounds, fecundity, etc.) and management strategies to reduce fishery/hatchery effects on salmon life history diversity.

IMM comment
The assessment team agrees with the reviewer. The assessment team excerpted this information from the ADF&G website, and clearly this information included excess details that lengthened and did not add significantly to the assessment. This section was substantially shortened to eliminate unnecessary and erroneous information. A short section providing background on enhancement or hatchery activities was added for each species.

Editorial note: In several places in the report, including the Executive Summary, the species scientific names for pink and coho salmon are incorrect (reversed, i.e., pink salmon should be *O. gorbuscha* and coho salmon should be *O. kisutch*).

IMM comment
Thank you- these typographical errors have been noted and corrected.

Line 1121: "*Escapement goals of sockeye (early, late stocks), Chinook, and pink (odd, even year) salmon have been met each year, 2003-2011 (Munro & Volk 2012).*" This statement is not accurate. For example, Munro & Volk (2012) show Chinook salmon escapements during the 5 most recent years that are below the lower goal in 4 of 5 years for Blossom R., in 3 of 5 years for Situk R., Keta R., in 2 of 5 years for Chilkat R., and Klukshu R. Chinook, and in 1 of 5 years for Andrew Creek and King Salmon R. Some of the coho, pink, and sockeye stocks were also below the lower goal during the recent 5-year period.

IMM comment
Thank you-this error has been corrected and this introductory text now states that most stocks of these species met escapement goals in most years.

Line 1129, Line 1134: Some additional explanation of the "*large Chinook*" designation would be useful, i.e., provide a description of sublegal catches of Chinook salmon, mortality of sublegal catches, and how this issue is addressed.

IMM comment
The term "large Chinook" is used by ADF&G to separate them from "jack" salmon, which spend less time at sea. ADF&G allows jack Chinook salmon <21" to be sold in the purse seine fishery and fish < 28" to be sold in the drift gillnet fishery. We clarified the definition of "large Chinook" in the report.

Lines 1409-1410: What is meant by "*interrogate the mixed stock fisheries*"?

IMM comment
"Interrogate" in this use is genetics jargon which means "identify the components of." The text of this section was changed for clarity.

Section 3.4 Principle 2: Ecosystem Background
Overall, the background information on the Alaska salmon ecosystem and habitat in this section was superficial with lack of reference to much relevant and important new scientific data. There is a lot of room for improvement in future reports.

IMM comment
The assessment team is conscious of the limited detail provided in this section. But, symposia are held annually on this topic, books are written, and numerous journal articles are published, and the assessment team felt that the only realistic option to help keep the assessment report to a reasonable length was to provide a brief overview. These background sections were not intended to be comprehensive. The assessment team spent most of its effort scoring the fishery against MSC guideposts.

Lines 2329-2336: *"It is important to note that the MSC acknowledged a request to use of the new draft requirements for salmon to differentiate between non-target species of salmon within the UoC and non-local stocks of the same species targeted by the fishery. The MSC also noted that the request is consistent with the default IPI requirements in which the total combined proportion of any catches from IPI stocks do not exceed 15% of the total combined catches in the Unit of Certification (UoC). The IPI requirements of Annex CH apply in this case, for which these stocks are assessed under the retained species component of Principle 2. Those UoCs where total combined IPI catches are less than or equal to 2% of the total catch are also eligible for an exemption to the requirements."* This section is could use some further clarification and explanation. For example, who made the request? An explanation/summary of the rationale behind the "*IPI requirements of Annex CH*" and the need for revision of these requirements would be helpful.

IMM comment
The paragraph has been modified to reflect that the request to use the draft MSC requirements for salmon fisheries came from Intertek Moody Marine as the CAB. A number of small changes have also been made to the text in an effort to clarify the approach used to define IPI species in the assessment.

Lines 2458-2459: (minor editorial) "*Aydiin*" should be "Aydin", "**BSIREP**" should be " BSIERP" 2007

IMM comment
Thank you- these typographical errors have been noted and corrected.

Lines 2462-2467: "*These* [climate] *factors are likely the largest variable influencing salmon run return cycles and may ultimately lead to the demise of wild salmon and enhanced salmon runs in Alaska, depending upon the rate and severity of global climate change. Despite the importance of these weather or climatic variables on salmon runs, they are not the focus of fisheries management, other than providing some early warning as to the need to compensate for harvest management.*" This management approach seems to be in conflict with sustainable salmon fishing. More evaluation is needed on whether fishery managers adjust escapement goals downward when stocks are fluctuating at or below lower escapement goal limits so that commercial harvests can continue in the face of changes in climate and ocean conditions. Stock assessments based on historical relationships between salmon productivity and climate factors are likely to fail in the face of rapid climate change, and research on mechanisms of climate-change effects and additional monitoring of juvenile salmon abundance will be needed (Dorner et al. 2013).

Dorner, B., K.R. Holt, R.M. Peterman, C. Jordan, D.P. Larson, A.R. Olsen, and O.I. Abdul-Aziz. 2013. Evaluating alternative methods for monitoring and estimating responses of salmon productivity in the North Pacific to future climatic change and other processes: a simulation study. Fisheries Research 147:10-23.

IMM comment
Noted. However, this section is about habitat, not fish management, and the sentences as written describe accurately the current understanding of climate change, PDO, and their effects on salmon populations and species. Also, the assessment team believes that this is one area where ADF&G management performs very well. The triennial reviews of escapement goals take into account downward trends to due habitat or ecosystem change; as the reviewer states, escapement goals are adjusted as necessary when new data and analyses indicate the need to adjust goals. Lower bounds of escapement goals are conservative; they are set well above the limit reference point.

Lines 2854-2855: "*Current stock status of Chinook salmon in Alaska is better than at any time since statehood*." This statement lacks credibility given recent period of low productivity of Chinook salmon throughout Alaska and the new ADFG initiative (ADFG Chinook Salmon Research Team 2013) to address the causes of low productivity of Alaska Chinook salmon.

ADF&G Chinook Salmon Research Team. 2013. Chinook salmon stock assessment and research plan, 2013. Alaska Department of Fish and Game, Special Publication No. 13-01, Anchorage. Available at: http://www.adfg.alaska.gov/static/home/news/hottopics/pdfs/chinook_research_plan.pdf

IMM comment
Thank you for noting this statement that is inconsistent with the rest of the paragraph. It was deleted.

Lines 2917-2925: "*In North America, the scientific rhetoric most often heard associated with salmon stock status and management at the current time bemoans the condition of salmon. Rhetoric associated for instance with (1) the U.S. Endangered Species Act listing of many salmon stocks in Washington, Oregon, Idaho, and California, conditions of salmon stocks in Canada, downturns in*

stock strength of some salmon stocks in western Alaska that resulted in disaster declarations, and unending arguments within some scientific circles that claim escapement goal setting associated with salmon stocks is inadequate. A careful and thoughtful examination of the success of the Alaskan salmon management program with its' demonstrated long-term sustainability of the stocks might be a prudent effort by Canadian and southern United States management entities." This political statement detracts from the objectivity and credibility of the report.

IMM comment

This section was taken directly from *Clark, J.H., McGregor, A., Mecum, R.D., Krasnowski, P. & A.M. Carroll (2006). The commercial salmon fishery in Alaska. Alaska Fishery Research Bulletin, V. 12, No. 1, pp. 1-146.* Nevertheless, the assessment team agrees with the reviewer and the paragraph was removed.

Line 3119: "*sea-base*" - what does sea-base mean in this context?

IMM comment

The term cannot be found in MSC guidance and it is not clear where it was derived from. As such, the sentence (discussing the competence of assessment team members to undertake the assessment) has been deleted.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA		Noted, thank you.
1.1.2	Yes	Yes	Yes	Condition 6 (UoC = Chignik)	Noted, thank you.
1.1.3	Yes	Yes	NA		Noted, thank you.
1.2.1	Yes	Yes	NA		Noted, thank you.
1.2.2	Yes	Yes	NA		Noted, thank you.
1.2.3	Yes	Yes	NA		Noted, thank you.
1.2.4	Yes	Yes	NA		Noted, thank you.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	Yes	Yes	Yes	Condition 1 (UoC = SEAK) Condition 4 (UoC = Copper/Bering) Condition 5 (UoC = Kodiak)	Noted, thank you.
1.3.2	Yes	Yes	Yes	Condition 2 (UoC = SEAK) Condition 4 (UoC = Copper/Bering)	Noted, thank you.
1.3.3	Yes	Yes	Yes	Condition 3 (UoC = SEAK) Condition 4 (UoC = Copper/Bering) Condition 5 (UoC = Kodiak)	Noted, thank you.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Yes	NA		Noted, thank you.
2.1.2	Yes	Yes	NA		Noted, thank you.
2.1.3	Yes	Yes	NA		Noted, thank you.
2.2.1	Yes	Yes	NA		Noted, thank you.
2.2.2	Yes	Yes	NA		Noted, thank you.
2.2.3	Yes	Yes	NA		Noted, thank you.
2.3.1	Yes	Yes	NA		Noted, thank you.
2.3.2	Yes	Yes	NA		Noted, thank you.
2.3.3	Yes	Yes	NA		Noted, thank you.
2.4.1	Yes	Yes	NA		Noted, thank you.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.2	Yes	Yes	NA		Noted, thank you.
2.4.3	Yes	Yes	NA		Noted, thank you.
2.5.1	Yes	Yes	NA		Noted, thank you.
2.5.2	Yes	Yes	Yes	Condition 3 (UoC = SEAK) Condition 5 (UoC = Kodiak)	Noted, thank you.
2.5.3	Yes	Yes	NA		Noted, thank you.
3.1.1	Yes	Yes	NA		Noted, thank you.
3.1.2	Yes	Yes	NA		Noted, thank you.
3.1.3	Yes	Yes	NA		Noted, thank you.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.4	Yes	Yes	NA		Noted, thank you.
3.2.1	Yes	Yes	NA		Noted, thank you.
3.2.2	Yes	Yes	NA		Noted, thank you.
3.2.3	Yes	Yes	NA		Noted, thank you.
3.2.4	Yes	Yes	NA		Noted, thank you.
3.2.5	Yes	Yes	NA		Noted, thank you.

Any Other Comments

Comments	Conformity Assessment Body Response
I concur with the assessment team's conclusion that the PWS UoC should remain under assessment pending further analysis of 1) an ADF&G multi-year study relating to hatchery wild salmon stock interactions and how outcomes might influence future management practices, and 2) evidence	1) Noted, thank you. 2) The unsigned letter was provided to the peer reviewers in draft form on July 18th 2013. It was subsequently signed by Jeff Regnart, Director of the Division of Commercial Fisheries, AGF&D, and has been included in the

relating to hatchery releases on the productivity of PWS herring. Regarding Appendix 4 - Consultation on Condition, an unsigned letter that is expected to be signed by the ADFG Director or Commissioner was provided for review on 18 July 2013, and (if signed) appears to provide an acceptable level of agency support to PSVOA to address issues in the PSVOA's action plan.	assessment report.

For reports using the Risk-Based Framework:

Performance Indicator	**Does the report clearly explain how the process used to determine risk using the RBF led to the stated outcome? Yes/No**	**Are the RBF risk scores well-referenced? Yes/No**	**Justification:** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response:
1.1.1	NA	NA	MSC's risk-based framework (RBF) was not used in scoring any PI of Alaska salmon fishery	Noted, thank you
2.1.1	NA	NA		
2.2.1	NA	NA		
2.4.1	NA	NA		
2.5.1	NA	NA		

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes**	**Conformity Assessment Body Response:**
Justification: See above		Noted, thank you

Peer Reviewer #2

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: This is generally a thorough review, and I agree with the majority of the scoring. I've identified a few areas that the team might want to reconsider, discussed below.		Noted, thank you. The assessment team has provided detailed responses to the peer reviewer's comments in the sections below.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**No**	**Conformity Assessment Body Response**
Justification: In general, the conditions are justified and well-reasoned. I have some suggestions about consistency and timelines, which I elaborate below.		Noted, thank you. The assessment team has provided detailed responses to the peer reviewer's comments in the sections below.

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Maybe**	**Conformity Assessment Body Response**
Justification: In general, the client action plan is targeted at closing the conditions. Most of these conditions relate to concerns about enhancement programs. My main concern is that the client has no direct control over the operation or regulation of these programs. In consequence, the action plan is full of statements such as "PSVOA will monitor and review…", "PSVOA will seek implementation of…", "PSVOA will consult with…", emphasizing that it is the non-profit enhancement organizations and their regulator, ADF&G, who will have to implement the plan. There is no documentation provided that the enhancement organizations are committed to this plan, and the statement from ADF&G says "we cannot commit personnel or resources to implementation of the action plan".		The assessment team is also conscious of the need for the client to engage other bodies and groups, over which they do not have direct control, in addressing and meeting conditions. Nevertheless, and irrespective of the fact that the ADF&G letter stated that the organisation could not commit personnel or resources to implementation of the action plan, we were very pleased to note that the Department as the key body has committed to providing information (as has been the case in previous years with the MSC-certified Alaska salmon fishery). This commitment is similar to those provided by management bodies in relation to a number of other MSC-certified fisheries (e.g. British Columbia chum salmon {"*It is important to note that implementation of the following action plan assumes there will be no requirement for additional departmental resources.*"} In addition, we note that the client has committed to commissioning or conducting work where needed, and to carrying out advocacy of the action plan. Of course, performance and achievement of the action plan would be carefully monitored through annual audits.

For reports assessing enhanced fisheries please follow the link.

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General Comments on the Assessment Report (optional)

I also reviewed some relevant documents, including:

- ADF&G 2012 RFP - Interactions of Wild and Hatchery Pink and Chum Salmon in Prince William Sound and Southeast Alaska
- PWS Science Center 2012 proposal - Interactions of Wild and Hatchery Pink and Chum Salmon in Prince William Sound and Southeast Alaska
- Bidlack, A. and Valentine, E.M. 2009. Assessment of Gulkana hatchery sockeye straying into upper Copper River tributaries. Ecotrust http://www.crks.org/wp/wp-content/uploads/Upriver-Sockeye-Straying-Report-10-13-09.pdf

Substantive issues:

1. The decision to postpone finalizing an assessment of the Prince William Sound Unit of Certification. Because of high rates of straying of pinks and chums from PWS hatcheries to wild population, the assessment team determined it needed additional information before it could evaluate the PWS fisheries. This information would include details of the ongoing study of straying rates and fitness effects to determine whether the results and future management actions have the potential to successfully address the problems identified. This postponement and the request for additional information seems warranted.

IMM comment
Noted, thank you.

2. The six conditions and their justification.

Five of the six conditions reflect concern that there are potential effects of hatchery-produced fish on wild stocks, and in particular that there is not enough information to assess the risks.

For SE AK, Conditions 1 and 2 require devising strategies to minimize hatchery effects on wild stocks in an action plan prepared by year 1, and implementation of this plan by year 2. The rationale for these conditions implies that the study beginning this year will provide information to determine whether impacts are occurring. These timelines don't seem to match; the study will have barely begun to produce data, leaving little time for analysis of preliminary results and for strategy development. Condition 3's timelines imply implementation of stray reduction strategies would start in year 4, which is much more realistic.

IMM comment
For Conditions 1 and 2, the text of the annual milestones has now been changed. Work is expected to be undertaken in years 1 and 2 to assess straying, with the expectation that a strategy to reduce straying will be developed in years 2 and 3 if observed straying levels exceed MSC guideline levels.

For the Gulkana hatchery, Condition 4 requires an evaluation in year 1, and implementation of actions by year 3. The prescriptions here are generally more vague. I have a difficult time envisioning how significant interactions of the hatchery and wild fish are to be avoided; unlike other hatchery operations, the siting of the hatchery within the river makes it impractical to differentially harvest the hatchery fish, and might increase their propensity to stray to wild spawning locations. However, the unique culture system, the location of stocking, and a small short-term study that found no evidence of substantial straying supports waiting for a thorough evaluation.

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IMM comment
Comment noted, thank you.

For Kodiak enhancement activities, Condition 5 implies that mitigative actions should begin by year 3. The assessment team seems to feel that the potential for negative effects on wild stocks is smaller here than elsewhere because the enhancement activities are smaller and generally sited away from significant wild stocks. The major concern seems to be that hatchery fish aren't marked sufficiently to evaluate the existing impacts, and that this marking is necessary to evaluate whether or not to permit expansion of enhancement.

IMM comment
The peer reviewer is correct - we feel the potential for negative effects on wild stocks is smaller here than elsewhere because the enhancement activities are smaller and generally sited away from significant wild stocks. However, the assessment team has pointed to the need to mark the large releases of hatchery salmon.

The last condition is that an escapement goal be developed for a late-running, lightly harvested coho stock, and that this be used in managing the stock. If a reference point is based on the existing data collection program, which counts a small and likely variable fraction of the annual return, it may not be a good indicator of stock size. If it requires additional monitoring, it's not clear that the monitoring will greatly increase certainty that the stock is healthy, or that the additional expenditure would be a good use of scarce management resources. This may greatly depend on what is meant by "Show the target reference point is used in managing the lagoon fishery…"; possibly a low-cost management strategy in conjunction with an easily-obtained index of stock status would satisfy the SG80 standard at the present low level of exploitation. Possibly a management strategy geared at ensuring a sufficient ratio of escapement to catch in the exploited early component of the run would satisfy the requirement for a target, and the use of the target in management.

IMM comment
The assessment team agrees with the peer reviewer. We are essentially looking for information showing that the coho run is actively managed to conserve the stock during the early portion of the coho run when the fishery is operating. A variety of approaches could be used, including those identified by the peer reviewer.

3. <u>The satisfactory scores for all other aspects of the fisheries</u>

A score for the Kodiak fishery is downgraded because of the existence of an OEG that is lower than a BEG would be. Is this assessment consistent in its treatments of such reduced OEGs? For instance, there is one for Nushagak sockeye in Bristol Bay that allows higher harvests of Wood River sockeye when Wood River returns are strong.

IMM comment
The comment is noted, thank you. The Bristol Bay scoring element at the SG 100 level has been adjusted to reflect consistency with the scoring of the Kodiak Upper Station OEG designation.

Scoring of fisheries effects on habitat (PI 2.4) considered only the effects of the gear itself, and not of operating the vessels. It also ignored the processing infrastructure and operations. The operations of hatcheries were mentioned. It also did not adequately consider the habitat and ecosystem alterations resulting from:

A) <u>Lake fertilization</u>. In the discussion of (p. 66-67) and scoring of (p. 364, 2.4.3 60b) principle 2, lake fertilization is stated to be a restoration rather than an enhancement activity. This would only make sense if nutrients in a lake had been reduced as a result of human activity, which could include a reduction in salmon carcasses due to fishing. However, fertilization is often undertaken mainly for enhancement purposes, sometimes in lakes where salmon were

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naturally absent. In these cases, the fertilization is clearly a habitat alteration for the purposes of enhancement. The eutrophication is designed to change ecosystem components, particularly to enhance the abundance of zooplankton species and size classes favored by juvenile salmon. There are likely effects on other components of the ecosystem as well. In evaluating the principles focused on the habitat and ecosystem effects of enhancement activities, lake fertilization should be considered where it occurs.

B) Stocking, and especially introduction of salmon to barren systems (p. 66-67). Introducing salmon to formerly barren systems is a significant ecosystem alteration. The role of salmon as predators and prey, and the increased nutrient influx from salmon carcasses (not applicable where smolt emigrate over a barrier), have potentially large effects on the existing ecosystem, particularly where fish were previously absent or rare. Removing barriers to upstream migration potentially allows access to additional species and potentially alters the population structure of formerly isolated population components. The cessation of a temporally limited stocking and lake fertilization program does not restore the habitat to an unaltered state; if that were true, there would be no problem with pike in the Susitna drainage. In evaluating the principles dealing with the habitat and ecosystem effects of enhancement, salmon introductions should be considered as an ecosystem alteration rather than discounted as equivalent to natural runs.

IMM comment

The reviewers comments are well thought out but do not recognize the difficulties in determining "natural" or "artificial". Is removing a beaver dam that blocks a salmon run an enhancement or a restoration? Removing a saline layer from a meromictic lake caused by a tsunami wave an enhancement or a restoration? When barriers are removed and salmon are introduced, ecosystem changes occur similar to the above activities. By not doing some activities, ecosystems will change more than by intervention. Salmon systems in Alaska are dynamic and are continually being formed or destroyed by natural processes, such as the recession or advancement of glaciers. The equivalent in forestry is fighting forest fires.

The assessment team discussed this issue at length and decided to treat fishways and lake fertilization in Alaska as restoration activities with minimal adverse impacts as defined by the MSC. These activities are not equivalent to introducing an exotic fish like pike into the Susitna which is an irrevocable act that most likely can't be undone. Lake fertilization comes and goes with most programs limited to 5 years as part of a restoration process. Whether they are used in barren systems or natural systems, the goal and objectives of such activities is to increase productivity without major alterations of the ecosystems and extensive monitoring programs are implemented to ensure major changes do not occur. The assessment team is not aware of any fertilization programs in Alaska that are designed to remain in place in perpetuity. Fishways similarly are equivalent to beaver dam removal. The difference is that of time scales. The major difference is that the goal of these types of programs is to manage them with normal ranges of productivity of wild systems so mixed stock harvests do not result in overharvest of natural stocks and to limit their impact. Consequently they were treated similarly to habitat alterations that occur from natural occurrences and did not warrant the level of scrutiny reserved for hatchery programs where major changes in productivity and harvests have the potential for impacting wild salmon runs, both demographically and affecting fitness.

The team does acknowledge that this decision could be debated ad nauseum, as could the simple habitat alterations occurring in the marine and freshwater environment from harvesting returning salmon that would otherwise contribute to nutrients and prey in both marine and freshwater ecosystems. The lack of evidence of significant adverse impacts from nutrient supplementation and opening up barren systems to self sustaining runs contributed to the decision to not address these restoration or enhancement activities in great detail. The report text has been edited to explain this information.

The satisfactory score for PI 3.2.5 is debatable. There seems to be some movement towards monitoring and evaluating whether the enhancement programs are meeting the goals set out in permits

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and in state policies. The study just beginning in PWS and SEAK is a positive step, and the cited reviews of CI enhancement programs are likewise positive. Does this activity rise to the level of a commitment to continuous monitoring and review of enhancement programs? If other, less-visible enhancement efforts are unlikely to be required to monitor their effects and review their practices, a lower score might be more appropriate.

IMM comment

The assessment team agrees with the peer reviewer. The score was revised from 100 to 90 for those regions with large enhancement programs because they do not undergo regular review by experts external to the management system.

4. The study of interactions of wild and hatchery pink salmon. I have several positive and negative things to say about the intensive study of genetic stock structure, straying of hatchery-origin fish into wild spawning aggregations, and the assessment of any fitness reductions as a consequence. On the positive side, despite formidable logistical challenges the study should provide a good overall picture of the extent of straying of hatchery fish, and of the proportion of hatchery-origin fish in spawning populations. The genetic studies may reveal some previously-unknown fine scale population structure, and if there are severe fitness reductions resulting from large hatchery contributions to escapement, these may be revealed. The ability of this study to provide this information will allow the identification of potential impacts, identify particular locations and stocks that are most at risk, and provide guidance as to how to modify hatchery practices to most effectively reduce these impacts.

However, if genetic structure is not found and fitness reductions not demonstrated, this will not mean that neither is present, nor will it mean that hatchery-origin fish are not significantly compromising the health and integrity of the wild stocks. These studies are innovative and quite valuable from a scientific point of view. However, both logistical (see PWSSC proposal) and conceptual (see below) challenges suggest a low power for these components of the study. My worry is that decision-makers believe that these study components can prove a lack of an impact whereas false negative results are highly likely. I fear that a lack of significant results will be taken as evidence that no harm is occurring and that no remedial actions are necessary.

Our genetics tools are too crude for the intended purpose; there are numerous demonstrations of local adaptations that differ among components of a salmon stock where the stock components are indistinguishable genetically. If the study doesn't find genetic differences among the salmon populations, or between the wild salmon and the hatchery fish, it does not mean that the influx of hatchery genes is not affecting the genetic adaptation of the wild stocks to their particular environment.

Assessing reductions in fitness in wild stocks in a wild setting is challenging. The background fluctuations in survival are huge; healthy, natural populations of pink salmon routinely see fluctuations in survival rates from a fraction of a percent to as high as 10%. In this noisy background, only extremely large reductions in fitness could be distinguished. Smaller but still biologically important effects will likely not be detected.

There is a large literature that conclusively demonstrates that fish reared in a hatchery rapidly lose fitness for the natural environment, and that large numbers of these fish spawning with their wild counterparts negatively affects the wild population. There is an equally large literature demonstrating fine-scale local adaptation in salmon. One of the best-researched cases is of pink salmon in SE Alaska, where Gharrett, Smoker, and collaborators have also demonstrated fitness losses when these fish interbreed with fish from different populations. In light of this literature, the management response to the ongoing study should be to focus on identifying populations where hatchery fish make up a large component of the spawning population, and taking actions to reduce these hatchery contributions irrespective of whether the wild population has been shown to be genetically distinct or whether the hatchery influx has been shown to reduce wild fitness.

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IMM comment

The assessment team agrees with the comments in the above paragraphs regarding the logistical and conceptual challenges for the study of interaction of wild and hatchery fish. We consider the peer reviews of the study, as proposed under Condition 1, to be a key element of that Condition, and would expect annual audit teams to carefully review both the peer reviews, and the responses to them from those undertaking the study.

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Weak chum salmon returns appropriately considered. Hatchery concerns addressed in PI 1.3.	Noted, thank you
1.1.2	Y	Y	NA	Weaker chum data appropriately considered.	Noted, thank you
1.1.3	Y	Y	NA	NA is appropriate at present.	Noted, thank you
1.2.1	Y	Y	NA	Uncertainty due to large hatchery chum component appropriately addressed.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately considers the mixed stock character of the troll Chinook fishery.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately accounts for poorer chum escapement and harvest allocation data.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Y	Y	NA	Appropriate scoring of 100-level criteria.	Noted, thank you
1.3.1	Y	Y	(see general comments above) The requirement for a progress report and managemnt actions in year one doesn't allow time for much additional information to be gathered in the ongoing study. The ongoing study will provide better estimates of the hatchery contribution to escapements, and thus a better idea of what issues need to be addressed to satisfy Condition 1. I am skeptical of the power of the study of fitness effects.	Chum enhancement is scored appropriately. I would have liked some discussion of potential localized effects of chum, Chinook, and coho enhancement in the determination that these activities satisfied the the SG80 level.	Regarding the potential for localised effects of chum, Chinook and coho enhancement,, Condition 3 will address these concerns. Chum straying from remote releases will be assessed, and a risk assessment of hatchery Chinook and coho salmon will be performed. On Condtion 1, the assessment team has requested progress reports in order to ensure that future audit teams are fully appraised of the work being undertaken on the study. A peer review of the study plan must also be commissioned in Year 1, which should provide an audit team with an independent analysis of the study, and

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					recommendations if approrpiate, on improving the study.
1.3.2	Y	Y	Condition 2 explicitly calls for developing and implementing a strategy to reduce chum straying by year one. This contrasts with language elsewhere in this condition and in other conditions that includes the possibility that the condition could be met by demonstrating that high levels of straying have no detrimental effects. I am skeptical of this premise based on the extensive literature demonstrating negative effects from high levels of hatchery strays. I am skeptical of the power of studies designed to test the possibility that strays have no effects on fitness.	Chum enhancement is scored appropriately. I would have liked some discussion of potential localized effects of chum, Chinook, and coho enhancement in the determination that these activities satisfied the the SG80 level.	Please refer to the response against PI 1.3.1 and Condition 3 regarding the localized effects of chum, Chinook and coho enhancement. Condition 3 requires minimizing chum straying to acceptable levels. For Condition 2, the text of the annual milestones has now been changed. Work is expected to be undertaken in years 1 and 2 to assess straying, with the expectation that a strategy to reduce straying will be developed in years 2 and 3 if observed straying levels exceed MSC guideline levels.

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.3	Y	Y	The early parts of Condition 3 require estimating numbers of hatchery and wild salmon in both the harvest and the escapement. Reducing straying if necessary is set for year 3, which is not consistent with the timeline in condition 2. Estimating the effects on wild stock productivity is left to a later undetermined date.	The quality of data is scored appropriately.	The timeline for Conditions 2 and 3 are considered to now mirror each other.

Any Other Comments

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No** **Yes**	**Conformity Assessment Body Response:**
Justification: The concerns arising from enhancement of chum salmon at levels that dwarf wild production, inadequate monitoring, and evidence of excessive straying to some wild systems have been appropriately scored. The conditions resulting from potential effects of chum production on wild populations are appropriate. I think the potential for more localized problems from the production of other species could have been		Noted, thank you, on chum salmon. On the production of other species, please see the notes against PI 1.3.1 - 1.3.3 in the boxes, above. A condition was set to perform a risk

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considered more carefully.	assessment on the straying of coho and Chinook salmon.

Performance Indicator Review: *Yakutat (UoC 2)*

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Low Chinook escapements scored appropriately.	Noted, thank you
1.1.2	Y	Y	NA	Management reference points scored appropriately.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate given lack of depletion.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate score for robust harvest strategy.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Y	Y	NA	Appropriately high score.	Noted, thank you
1.3.1	Y	Y	NA	Not relevant to this fishery.	Noted, thank you
1.3.2	Y	Y	NA	Not relevant to this fishery.	Noted, thank you
1.3.3	Y	Y	NA	Not relevant to this fishery.	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

Performance Indicator Review: *Copper/Bering (UoC 4)*

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate scoring given Bering sockeye status.	Noted, thank you
1.1.2	Y	Y	NA	Management reference points scored appropriately.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate given lack of depletion.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate score for robust harvest strategy.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate scoring given Bering sockeye status.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.4	Y	Y	NA	Appropriately high score.	Noted, thank you
1.3.1	Y	Y	Yes. Condition 4 requires an evaluation of the impacts of the Gulkana hatchery on the wild stock, and that a plan to ameliorate any impacts be in	This low score and resultant condition are well-justified. The Gulkana hatchey has especially problematic features, in that its location does not provide the	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
			effect by year 3.	opportunity to segregate hatchery fish from wild fish for differential harvest. Potential problems have been identified in previous MSC reviews and elsewhere, and a resolution is still outstanding.	
1.3.2	Y	Y	Yes	This score is appropriate given the policies and practices governing the enhancement operation, and the deficiencies in evaluating the outcomes.	Noted, thank you
1.3.3	Y	Y	Yes	This score is appropriate given the lack of information on hatchery contributions to naturally-spawning sockeye, and the potential effects.	Noted, thank you

Any Other Comments

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No** **Yes**	**Conformity Assessment Body Response:**

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Justification: The report clearly identifies concerns with the Gulkana sockeye hatchery, and imposes an appropriate condition with a clear timeline.	Noted, thank you

Performance Indicator Review: *Lower Cook Inlet (UoC 5)*

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate scoring	Noted, thank you
1.1.2	Y	Y	NA	Scoring fairly reflects strengths and weaknesses of targets.	Noted, thank you
1.1.3	Y	Y	NA	No depleted stocks	Noted, thank you
1.2.1	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.4	Y	Y	NA	Appropriately high score.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	Y	N	NA	The text discussing the use of the Hidden Lakes stock seems more focused on whether the stock is capable of producing returns for the fishery than the intent of the principle, which is protection of wild stocks.	The Hidden Lake hatchery stocks are terminally harvested at the lake and are such a small portion of the Kenai River sockeye run, they are not within the precision of management. The text in the relevant section of the main report has been altered to reflect this.
1.3.2	Y	Y	NA	The low potential for effects because of mixed stock fisheries is brought out.	Noted, thank you
1.3.3	Y	Y	NA	The lack of information on straying, and the low likelihood of problems because of the small scale of enhancement, is approporiately treated.	Noted, thank you

Any Other Comments

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For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**No**	**Conformity Assessment Body Response:**
Justification: Lake fertilization activities need to be evaluated. The ecosystem effects of introducing salmon into formerly barren lakes needs to be evaluated.		Lake fertilization, fish passage into barren lakes, isolated habitat restoration and modification, beaver dam removals, berm removals from beaches that block runs, and related activities were considered by the assessement team to have a history of minimal adverse impacts, although the assessment team acknowledges that these activities may have caused significant changes to freshwater ecosystems. These issues were considered under PIs 2.4.1 - 2.4.3 and under PI 2.5.1.

Performance Indicator Review: *Upper Cook Inlet (UoC 6)*

Performance Indicator	**Has all the relevant information available been used to score this Indicator? (Yes/No)**	**Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)**	**Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)**	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	**Conformity Assessment Body Response**
1.1.1	Y	Y	NA	Appropriate consideration of weak stocks and some weak escapement data	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2	Y	Y	NA	Appropriate scoring given lack of goals for some lightly-harvested stocks.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate scoring given weak Chinook and some sockeye, but good evidence that fishing is not a major contributor.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate scoring given lack of goals for some lightly-harvested stocks.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high scores	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high scores	Noted, thank you
1.2.4	Y	Y	NA	Appropriate scoring given lack of goals for some lightly-harvested stocks.	Noted, thank you
1.3.1	Y	Y	NA		

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.2	Y	Y	NA	The low potential for effects because of mixed stock fisheries is brought out.	Noted, thank you
1.3.3	Y	Y	NA	The lack of information on straying, and the low likelihood of problems because of the small scale of enhancement, is approporiately treated.	Noted, thank you

Any Other Comments

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No**	**Conformity Assessment Body Response:**
Justification: Unclear to what extent lake fertilization and stocking is occurring in UCI. Lake fertilization activities may need to be evaluated. The ecosystem effects of introducing salmon into formerly barren lakes may need to be evaluated.		On lake fertilization, please refer to the comment against Lower Cook Inlet (UoC 5), above.

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Performance Indicator Review: *Bristol Bay (UoC 7)*

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate high score.	Noted, thank you
1.1.2	Y	Y	NA	Appropriate high score, contrasts information levels for different stocks.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate consideration of handling of weak Kvichak sockeye run.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate high score.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriate high score.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Y	?	NA	I personally participated in a 2005 review of the Bristol Bay escapement goals, as did a member of the assessment team. Were there reviews of more recent assessments?	The report has been revised to reflect this external peer review.
1.3.1	Y	Y	NA	No enhancement activities	Noted, thank you
1.3.2	Y	Y	NA	No enhancement activities	Noted, thank you
1.3.3	Y	Y	NA	No enhancement activities	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

Performance Indicator Review: *Yukon (UoC 8)*

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Score appropriately reflects recent weak Chinook returns.	Noted, thank you
1.1.2	Y	Y	NA	Score appropriately accounts for lack of detailed information for this broad area as well as the relatively pristine habitat.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate scoring given low but not depleted status of Chinook.	Noted, thank you
1.2.1	Y	Y	NA	Appropriately accounts for periodic inability to maintain Chinook stocks above lower range of escapement goal.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate consideration of capability and record of management.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3	Y	Y	NA	Appropriate consideration of somewhat weak information, and management's strategy for managing given what is collected.	Noted, thank you
1.2.4	Y	?	NA	Unsure whether the assessment team was aware of or considered recent management strategy evaluations w/ ADF&G participation, esp. Catalano, Jones, Volk et al. report to AYK-SSI	The assessment team is aware of this effort and incorprated it into the assessment. The score has been raised accordingly.
1.3.1	Y	?	NA	Probably appropriate to ignore Canadian enhancement activities, as their primary effects are probably on harvest rates on stocks of canadian origin. There could conceivably be a higher harvest rate on Alaskan-origin Chinook that have run timing overlapping that of the enhanced Canadian stocks, but the focus on passing Canadian-origin fish to the border, and monitoring of Alaskan escapements should minimize this possibility.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.2	Y	Y	NA	No enhancement in Alaska	Noted, thank you
1.3.3	Y	Y	NA	No enhancement in Alaska	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response
It would seem appropriate to mention interception by offshore groundfish fisheries.	Interception of AYK Chinook and chum salmon, including Yukon stocks, is an important and highly visible topic. This MSC assessment involves management of the salmon fisheries that harvest these stocks after they undergo mortality at sea, which includes interceptions in the offshore fisheries. The pollock fishery is certified by the MSC and has considered the impact of the fishery on AYK Chinook and chum salmon.

Performance Indicator Review: *Kuskokwim (UoC 9)*

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate scoring given poor Chinook returns and demographic patterns.	Noted, thank you
1.1.2	Y	Y	NA	Appropriate scoring – Chinook returns are below targets, but not depleted.	Noted, thank you
1.1.3	Y	Y	NA	Appropriate scoring.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate consideration of demographic issues and the recent changes in targets.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate consideration of demographic issues and the recent changes in targets.	Noted, thank you
1.2.3	Y	Y	NA	Appropriate consideration of the weak information for stock components.	Noted, thank you
1.2.4	Y	Y	NA	Weakness in several SG100 level	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				criteria adequately considered.	
1.3.1	Y	Y	NA	No enhancement	Noted, thank you
1.3.2	Y	Y	NA	No enhancement	Noted, thank you
1.3.3	Y	Y	NA	No enhancement	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

Performance Indicator Review: *Kotzebue (UoC 10)*

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate scoring given data gaps	Noted, thank you
1.1.2	Y	Y	NA	Appropriate treatment of assessment limitations.	Noted, thank you
1.1.3	Y	Y	NA	No depleted stocks	Noted, thank you
1.2.1	Y	Y	NA	Good and bad features of strategy and data are considered.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate scoring.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately scored given data limitations.	Noted, thank you
1.2.4	Y	Y	NA	Appropriate scoring of SG100 criteria.	Noted, thank you
1.3.1	Y	Y	NA	No significant enhancement	Noted, thank you
1.3.2	Y	Y	NA	No significant enhancement	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.3	Y	Y	NA	No significant enhancement	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

Performance Indicator Review: *Norton Sound (UoC 11)*

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate consideration of recent escapement histories.	Noted, thank you
1.1.2	Y	Y	NA	Appropriate scoring of targets.	Noted, thank you
1.1.3	Y	Y	NA	No depleted stocks.	Noted, thank you
1.2.1	Y	Y	NA	Appropriate scoring.	Noted, thank you
1.2.2	Y	Y	NA	Appropriate scoring given failure to meet goals in some years for some stocks.	Noted, thank you
1.2.3	Y	Y	NA	Assessment team identifies and appropriately scores strengths and weaknesses of data.	Noted, thank you
1.2.4	Y	Y	NA	Appropriate scoring accounting for assessment data, and the low level of commercial fishing.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	Y	Y	NA	Pilot enhancement activities and periodic fertlization of one lake are appropriately scored given their small scale but lack of evaluation.	Noted, thank you
1.3.2	Y	Y	NA	Scoring appropriate for small scale efforts with some deficiencies in evaluation.	The goal of the periodic lake fertilzation program is to enhance growth and survival of wild sockeye salmon. Reports have been prepared by the proponents (http://fisheriesreports.org/sockeye-salmon-studies-in-salmon-lake-limnology-and-fishery-investigations-relative-to-a-nutrient-addition-program-1994-2008/).
1.3.3	Y	Y	NA	Scoring appropriate for small scale efforts with some deficiencies in evaluation.	Please see comment on PI 1.3.2, above.

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Any Other Comments

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No Somewhat**	**Conformity Assessment Body Response:**
Justification: Ecosystem effects of lake fertilization activities may need to be evaluated.		Please see the response to PIS 1.3.1 - 1.3.3 in the boxes above. Note that ecosytem level effects of enahancement are addressed in Principle 2.

Performance Indicator Review: *Kodiak (UoC 12)*

Performance Indicator	**Has all the relevant information available been used to score this Indicator? (Yes/No)**	**Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)**	**Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)**	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	**Conformity Assessment Body Response**
1.1.1	Y	Y	NA	Appropriate scoring given stock statuses and management responses.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2	Y	Y	NA	Appropriate scoring given the OEG and limited detail for coho and chum. Was the OEG for Nushagak sockeye, or other OEGs in the state that are below the potential BEG, treated the same way in the assessment?	Noted, thank you. OEGs for other stocks were examined for consistency and adjustments were made as appropriate.
1.1.3	Y	Y	NA	Scoring appropriate to the management actions and status of Karluk Chinook.	Noted, thank you
1.2.1	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score given regular monitoring supplemented by extra research activities.	Noted, thank you
1.2.4	Y	Y	NA	Appropriately high score.	Noted, thank you
1.3.1	Y	Y	Yes – Condition 5 is vague on	These three principles have been	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
			particulars, but clear on goals and timelines.	scored appropriately given the risk-mitigating features in the design of enhancement programs, but the weak monitoring of their performance. A marking and tagging program would be quite valuable in assessing whether there are significant impacts on wild stocks.	
1.3.2	Y	Y	NA	These three principles have been scored appropriately given the risk-mitigating features in the design of enhancement programs, but the weak monitoring of their performance.	Noted, thank you
1.3.3	Y	Y	Yes – Condition 5 is vague on particulars, but clear on goals and timelines.	These three principles have been scored appropriately given the risk-mitigating features in the design of enhancement programs, but the weak monitoring of their performance.	Noted, thank you

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Any Other Comments

For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities?	**Yes/No** **No**	**Conformity Assessment Body Response:**
Justification: Lake fertilization activities need to be evaluated. The ecosystem effects of introducing salmon into formerly barren lakes needs to be evaluated.		Please see previous response for Lower Cook Inlet lake fertilization and stocking activities.

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriately scored given lack of coho goals.	Noted, thank you
1.1.2	Y	?	Mostly. Condition 6 gives a generous 2-year timeline for developing a target reference point. However, the requirement that management use this reference point for managing this lightly-harvested coho stock will take more thought.	The scoring at an SG60 level may not be consistent with the treatment of stocks elsewhere in the state where harvest is light and reference points are not specified. In Kotzebue, species other than chum may be present and incidentally harvested, but no goals exist. Possibly this is because of their IPI status. Some lightly harvested stocks in the Peninsula/Aleutians area are stated to have no goals.	Chignik coho has been treated differently to other stocks where harvest is light because Chignik coho make up more than 4% of the catch within the UoC. This exceeds the MSC's 2% IPI threshold for different species, thereby meaning that the coho cannot be treated as an IPI catch. All of the other species that have been treated as IPI catches were calculated as accounting for less than 2% of the catch from their respective UoCs. This justifies the different treatment of Chignik coho in comparion to other lightly-

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					harvested species elsewhere. The assessment team notes the comment regarding management of Chignik coho. As described in the Action Plan, the assessment team is looking for information demonstrating that coho harvests are managed to sustain the run.
1.1.3	Y	Y	NA	No depleted stocks	Noted, thank you
1.2.1	Y	Y	NA	Appropriate scoring given the lack of a target for coho.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.4	Y	Y	NA	Appropriate scoring of SG100 criteria.	Noted, thank you
1.3.1	Y	Y	NA	No enhancement activity.	Noted, thank you
1.3.2	Y	Y	NA	No enhancement activity.	Noted, thank you
1.3.3	Y	Y	NA	No enhancement activity.	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Y	Y	NA	Appropriate scoring given occasional escapements below lower goal bounds.	Noted, thank you
1.1.2	Y	Y	NA	Appropriate scoring.	Noted, thank you
1.1.3	Y	Y	NA	No depleted stocks yet. Swanson Lagoon sockeye appropriately considered given no directed fishing and pending BOF consideration.	Noted, thank you
1.2.1	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.2	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.3	Y	Y	NA	Appropriately high score.	Noted, thank you
1.2.4	Y	Y	NA	Appropriately high score.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.3.1	Y	Y	NA	No significant enhancement.	Noted, thank you
1.3.2	Y	Y	NA	No significant enhancement.	Noted, thank you
1.3.3	Y	Y	NA	No significant enhancement.	Noted, thank you

Any Other Comments

Comments	Conformity Assessment Body Response

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Have federal and state assessments and management plans for lingcod and black rockfish been considered?	?	NA	SG100 UoC 1 and UoC2 - It is unclear what is meant by a lack of target reference points for the species that constitute the small groundfish bycatch. Does this mean that the state and federal management agencies have no target reference points for these bycaught species, that these plans don't explicitly give targets for the bycatch in salmon troll fisheries, or that the salmon-specific management plans do not contain language regarding groundfish bycatch? If the groundfish management plans for lingcod and black rockfish show that these stocks are healthy, and support the assertion that catch in the salmon troll fishery is insignificant, that would reach the "high degree of certainty" in my opinion.	In the Southeast Region (SEAK and Yakutat UoCs), it is estimated that the total groundfish catches in 2005 – 2010 made up an average of only 0.02% of the commercial salmon catch. Although this meant that the assessment team felt justified in passing the fishery at the SG80 level where only 'main' bycatch species need to be considered, the lack of target reference points for all bycatch species (i.e. not just those for lingcod and black rockfish) meant that the fishery was not considered to meet the SG 100 level (where 'all' bycatch species must be considered.)
2.1.2	Y	Y	NA	The treatment of troll catch of ESA listed Chinook is appropriate.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.3	Y	Y	NA	Data quality scored appropriately	Noted, thank you
2.2.1	Y	Y	NA	Appropriate scoring and justification.	Noted, thank you
2.2.2	Y	Y	NA	Appropriate weight given to evidence for low bycatch, but limited monitoring.	Noted, thank you
2.2.3	Y	Y	NA	Appropriate weight given to evidence for low bycatch, but limited monitoring.	Noted, thank you
2.3.1	Y	Y	NA	Appropriate scoring given data showing low bycatch in many fisheries, but limited ongoing monitoring.	Noted, thank you
2.3.2	Y	Y	NA	Appropriate scoring given data showing low bycatch in many fisheries, but limited ongoing monitoring.	Noted, thank you
2.3.3	Y	Y	NA	Appropriate scoring given data showing low bycatch in many fisheries, but limited ongoing monitoring.	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.1	Y	revise	NA	Gear is highly unlikely to cause habitat damage. However, vessel, tender, and processor operations should also be mentioned – hydrocarbon and fish waste discharges are more likely to have an impact, but are also regulated by state and federal agencies. Fertilization and stocking is a habitat alteration that should be considered.	Comment noted, thank you. Discharges into fresh and marine waters are regulated by the Clean Water Act and associated state regulations to achieve or exceed Clean Water Act standards. However, the MSC fishery assessment process is not expected to address hydrocarbon and fish waste discharges from processors, nor to address accidents, such as oil spills from vessels. Lake fertilization and stocking of fish do influence "habitat" as stated by the peer reviewer, but these topics are addressed under ecosystem effects.
2.4.2	Y	revise	NA	See 2.4.1	Please see comments against PI 2.4.1
2.4.3	Y	revise	NA	See 2.4.1	Please see comments against PI

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					2.4.1
2.5.1	Y	Reconsider SG80bscore.	NA	For SE AK chums, and PWS pinks, hatchery production far in excess of wild production makes me question whether the SG80b might be better scored as 'N'	As noted against SI 60b, the assessment is of the five Pacific salmon species occuring in Alaska waters, and the report has therefore addressed the impacts of hatchery salmon species on other salmon species under the Principle 1 PIs 1.3.1, 1.3.2 and 1.3.3. Impacts of hatchery salmon species on other finfish species and other aquatic populations are addressed here under the Principle 2 PIs 2.5.1, 2.5.2 and 2.5.3. As such, the effects of hatchery fish on wild salmon are assessed elsewhere, and the team does not consider it necessary to adjust the score for SEAK. The PWS UoC is still in assessment.

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.2	Y	Y	Y – the monitoring requirements specified in conditions 3 and 5 are sufficient		Noted, thank you
2.5.3	Y	Y	NA	Uncertainties in ecosystem impacts adequately scored	Noted, thank you
3.1.1	Y	Y	NA	State and federal management meets criteria	Noted, thank you
3.1.2	Y	Y	NA	All parties have effective access	Noted, thank you
3.1.3	Y	Y	NA	Policies and principles accord with MSC principles	Noted, thank you
3.1.4	Y	Y	NA	Management system does not promote biologically unsustainable fishing; however, it may not be optimal for the economic health of salmon-dependent	Noted, thank you

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
				people.	
3.2.1	Y	Y	NA	Appropriately accounted for the strong aspirational goals of enhancement policy and the weakness in monitoring and implementation.	Noted, thank you
3.2.2	Y	Y	NA	Approporiate scoring	Noted, thank you
3.2.3	Y	Y	NA	N for 100 level scores because of practices at the Port Graham hatchery will presumably be raised in future reviews if a better system of monitoring compliance is put in place.	Noted, thank you
3.2.4	Y	Reconsider	NA	The track record of monitoring whether enhancement programs were meeting the goals for straying rates is poor. A study is underway for the most likely areas of non-compliance, SE AK chums and PWS pinks. Is the commitment to monitoring sufficient to meet the SG80a standard?	In SEAK, ADF&G has been monitoring straying of chum salmon to the spawning grounds, largely in response to conditions placed on the fishery during the 2007 MSC assessement. The fitness and straying study that began in 2012 by ADF&G and others will continue with

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Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
					monitoring of chum straying in key areas of SEAK. Therefore, the SEAK fishery meets the SG80a standard.
3.2.5	Y	Reconsider	NA	Is the commitment to monitoring, internal review, and external review of enhancement sufficient to meet the SG80 standard?	The SG 100 score was revised downward in primary enhancement areas because the enhancement system does not have regular external reviews. Opportunistic external reviews of specific aspects of the hatchery system in specific regions of Alaska have been performed, such that these reviews meet the intent of SG80, e.g., studies by Hilborn and Eggers, Wertheimer, Smoker, and Heard.

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Appendix 11: Stakeholder submissions for the PCDR Consultation

American Bird Conservancy

Contact Information Make sure you submit your full contact details at the first phase you participate in a specific assessment process, subsequent participation will only need your name unless these details have changed.					
Contact Name	*First* David		*Last* Wiedenfeld		
Title	Dr.				
On behalf of (organisation, company, government agency, etc.) – *if applicable*					
Organisation	*Please enter the legal or registered name of your organisation or company.* American Bird Conservancy				
Department					
Position	*Please indicate the position or function you exert within your organisation or company.* Senior Conservation Scientist				
Description	*Please provide a short description of your organization.* American Bird Conservancy (ABC) is a non-profit organization whose mission is to conserve native birds and their habitats throughout the Americas.				
Mailing Address, Country					
Tel	+ 540-253-5780	**Mob**	+ 540-260-5596	**Fax**	+ 540-253-5782
Email	**dwiedenfeld@abcbirds.org**			**Web**	www.abcbirds.org

Assessment Details	
Fishery	Alaska Salmon Fishery
Certification Body	Intertek Moody Marine

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• **SECTION 1** • Return to Page 3

Assessment Stage	Fishery	Date	Name of Commenter or Organisation
Fishery announcement and stakeholder identification[i] Opportunity to indicate that you are a stakeholder and identify other stakeholders			

Nature of Comment (select all that apply)		Additional Information/Detail Please attach additional pages if necessary.
e.g. ☒ ☐	I wish to indicate that I am a stakeholder in this fishery, please keep me informed about each stage of the assessment process	IMM comment: Noted, thank you- the ABC has been added to the list of stakeholders to be notified directly upon any developments in the fishery assessment process.
☐	I wish to suggest information or documents important for the assessment of this fishery *(you may either attach documents or provide references)*	

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☐	I wish to suggest other individuals or organizations who should be considered stakeholders in the MSC assessment of this fishery *(please name them with contact information)*	
☐	Other (please specify)	

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Assessment Stage	Fishery	Date	Name of Commenter or Organisation
Public review of the draft assessment report[ix] Opportunity to review and comment on the draft report, including the scoring of the fishery	Alaska Salmon Fishery	23 August 2013	American Bird Conservancy / David A. Wiedenfeld

☒ I wish to comment on the evaluation of the fishery against specific Performance Indicators.
A table with these indicators and the scores and rationales provided by certifiers can be found as an appendix to the report.

Nature of comment *(Please code below)*

1. I do not believe all the relevant information[x] available has been used to score this performance indicator *(please provide details and rationale)*
2. I do not think the information and/or rationale used to score this performance indicator is adequate to support the given score[xi] *(please provide details and rationale)*
3. I do not believe the condition(s) set for this performance indicator are adequate to improve the fishery's performance to the SG80 level[xii] *(please provide details and rationale)*
4. Other *(please specify)*

Performance Indicator	Nature of Comment Indicate relevant code(s) from list above.	Justification Please support your comment by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.
2.3.1	2	Due to the failure of PI 2.3.3 to achieve a score of 80 (see following comment), the information allowing PI 2.3.1 to justify a

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		score of 85 is not available. For SG 80 Issue (a), it cannot be shown that the effects of the fishery are known and are highly likely to be within limits for protection of ETP species, because the effects are not known, and available information does not allow such a level of confidence. For Issue (b) likewise, it is not known if the fishery is highly unlikely to create unacceptable impacts to ETP species, for the same reason. For Issue (c), the issue is probably met. The fishery probably does meet the two issues for SG 60. By receiving a score below 80 for PI 2.3.1, under MSC protocols this fishery must receive a condition to resolve the issue. In this case, lack of adequate information is the problem, and if the information PI 2.3.3 is resolved as described below, the score for PI 2.3.1 could also potentially be raised to meet at least SG 80. Therefore, the only condition required for PI 2.3.1 is to reevaluate the score once adequate information has been obtained, and if the reevaluation indicates a score of less than 80, to rectify the problems leading to that lower score. IMM Comment: All UoCs (excluding PWS which remains in assessment) received scores of 85 for PI 2.3.1 and 80 for PI 2.3.3. In the following text, we provide additional data that largely supports the initial finding. But after reviewing the material, we lowered the scores of PI 2.3.1 to 80 because we concluded that "there is not a **high degree of certainty** that the effects of the fishery are within limits of national and international requirements for protection of ETP species," as required to meet SI 100a. Bycatch of birds and marine mammals was the subject of a Condition of Certification during the first MSC certification in 2000. The condition require collection of bycatch data in test fisheries as a means to identify whether bycatch was a significant conservation issue. As reported by ADF&G and presented in the 2007 recertification report (Chaffee et al. 2007), no bycatch of birds or marine mammals was observed in ADF&G test fisheries in Southeast Alaska, Upper Cook Inlet, Bristol Bay, Kuskokwim, Yukon, Norton Sound, North Alaskan Peninsula, Shumagin Islands, and Kodiak during 2002, 2003, and/or 2004. Since that time, additional monitoring of bird bycatch has occurred in specific areas of Alaska. We have expanded upon the information provided in the 2013 PCDR in section 2.4.4 of the FDR.
2.3.3	2	The PI 2.3.3 criteria are not met at the SG 80 level for any of the issues. The data obtained from the test fisheries and the Alaska Marine Mammal Observer Program (AMMOP) do not adequately sample the region where the fishery operates, and

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		because only partial results are reported, those data do not represent the full impact of the fishery on seabirds. The test fisheries and AMMOP are piecemeal monitoring efforts, covering only small sections of the fishery. For example, the data cited within the Public Draft Comment Report for seabird bycatch (Manly 2007 and Manly 2009) are reports for only small areas of the Alaska salmon fishery, those in the waters of Kodiak Island and the waters of Yakutat Bay. These are only two of the 16 Units of Certification (UoC), and thus are not a fully representative sampling of the fishery area. The estimates for seabird bycatch in these reports do not cover a sufficiently large portion of the fishery to derive a robust estimate of the true extent of seabird bycatch in the fishery. Although the Draft Public Comment Report states that estimates derived from the small area sampled by observers have been "expanded to account for the entire set net salmon fishery" (page 63), those estimates have not. Instead, they have been expanded to account for the take (in this case) only of the fishery at Kodiak Island, a tiny fraction of the entire area fished. The report cited in the Draft Public Comment Report (PCDR) in the evaluation table for PI 2.3.3, Chaffee (2005) is an Annual Surveillance Report for the Alaska Salmon Fishery. Chaffee (2005) says that seabird bycatch is very low in the fishery (information in Appendix 1), and lists several test fisheries in which "no birds are taken," yet other sources contradict this. For example, Chaffee (2005) states that "[b]irds have never been captured in the Alitak test fishery." Manly (2007), however, lists seven individual birds caught in 2005 in Alitak Bay, including one Kittlitz's Murrelet. It is easy to refute many of Chaffee's (2005) other statements as well; Chaffee (2005) should not be considered a valid source of seabird bycatch information. Although the numbers cited in the PDCR, for example from Manly (2007), do seem low, it is important again to recognize that these numbers are not representative of the entire Alaska salmon fishery. Manly's (2007) data cover only the area of the Kodiak Island UoC, and there are a total of 16 UoCs in this fishery. Although it is unlikely that the take would be evenly distributed over the 16 UoCs, it is likely that the seabird bycatch is many times higher than is indicated by the information available in the PCDR. In addition, even from the information presented within the PCDR itself, the report does not recognize the significance of the seabird bycatch in the fishery. Kittlitz's Murrelet has been a candidate for listing under the US Endangered Species Act (ESA) since the 1990s, and is currently listed as Critically Endangered (CR) in the IUCN Red List, with an estimated global population of around 20,000 individuals. The murrelet is currently under review by USFWS for ESA listing. A decision is expected in September 2013, to be followed by public comment period if a proposed listing rule is published at that time. Any bycatch of this species is therefore problematic. The estimated bycatch of this species for the Kodiak Island UoC alone is of 18 individuals per year; an estimate for the entire fishery could be substantially higher. This merits close investigation, and a fishery-wide estimate of bycatch of this and other seabird species should be generated. If Kittlitz's Murrelet is listed as either Threatened or Endangered under the ESA, the fishery may be significantly affected. (see continuation of this comment, below)

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2.2.3	2	(comment continued from above) Given the above information, it is clear that this fishery does not meet SG 80 for PI 2.3.3 for any UoC. For Issue (a), the fishery does not have sufficient data available to provide quantitative estimates of take of ETP species, in this case seabirds. The information is piecemeal and does not cover the entire fishery and its impact. For Issue (b), the information does not allow determination of whether the fishery is a threat to protection and recovery, for the same reason. For Issue (c), none of the information is adequate to measure trends and support a strategy to manage the impacts on ETP species. The fishery, however, probably does meet SG 60 at the minimal level. Therefore, we recommend a PI 2.2.3 score of 60 for this fishery. This score requires a condition to be placed on the fishery to rectify the weaknesses. For this fishery, two conditions should be placed on PI 2.3.3. The first condition should be that a fishery-wide estimate of seabird bycatch and mortality be obtained. This condition should be met within two years. This would require that the piecemeal data-collection efforts now underway and the previously-existing data should be combined in a way to estimate the overall seabird interactions (including injury and mortality) by species for the ETP species. The second condition should be to respond to the results of the first condition to begin to bring ETP bycatch to sustainable levels. This condition should be met within four years. Although this comment has focused on seabird interactions and bycatch, it would also apply to marine mammals. That is, the information available is not adequate for the fishery to score at SG 80 or higher for any UoC. IMM Comment: As noted in the PCDR, the NOAA Fisheries analyses (Manly 2006, 2008, 2009) estimated total incidental take of each species of bird and marine mammal in Kodiak, Cook Inlet (lower and upper), and Yakutat fisheries during a rolling two-year survey period. Please see the previous comment response for expanded incidental take estimates. In addition to these reports, Wynne *et al.* (1991, 1992) examined bycatch in the Prince William Sound salmon fishery (two years) and the Alaska Peninsula/Aleutian Island fishery (one year). In response to the MSC bycatch condition on the Alaska salmon fishery in 2000, ADF&G monitored bycatch of birds and marine mammals in test fisheries in the following Units of Certification during 2002, 2003, and/or 2004: Southeast Alaska, Upper Cook Inlet, Kodiak, Alaska Peninsula/Aleutian Islands, Bristol Bay, Kuskokwim, Yukon, Norton Sound, and Kotzebue. Test fisheries do not represent an exhaustive coverage of bycatch but no birds or marine mammals were captured, although some marine mammals were encountered (see the 2007 recertification report). All UoCs have some level of bird bycatch monitoring except Chignik, which is a purse seine only fishery. *Eric Volk, ADF&G,* noted "*Bycatch is monitored in test fisheries conducted throughout the state, and encounters with birds and mammals are extremely rare" (personal communication).*

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		Most marine bird habitat and most marine bird populations in Alaska are relatively robust, indicating that the level of bycatch in Alaska salmon fisheries is not a significant factor in the overall fluctuations of bird population abundances. However, as noted by the ABC, the Kittlitz's murrelet is a candidate for protection under the Endangered Species Act and more information has recently become available on this species. The USFWS (dated May 2010) estimated that the world-wide (Alaska & Russia) abundance of Kittlitz's murrelet is approximately 30,900-56,800 birds, including approximately 20,000-46,000 birds in Alaska. The State of Alaska's response (dated Dec 22nd, 2010) to the November 2010 Federal Register proposed rule, stated that that the population is considered to be stable or increasing in significant portions of its range (http://www.adfg.alaska.gov/static/species/specialstatus/pdfs/kittlitzmurrelet_2010_adfg_cnor.pdf). Day (2011) concluded that while Kittlitz's murrelet populations may be declining in some areas, information is too uncertain to determine if there is an overall population decline. Of 10 experts that were interviewed by Day (2011), only one indicated bycatch in salmon fisheries as a potential factor of decline: "One respondent suggested that fishing bycatch might have an effect, albeit a small one." Most interviewed experts indicated that food limitations were the key factor. Blejwas and Wright (2012) examined spatial and temporal overlap of Kittlitz's murrelets with gillnets in Prince William Sound, Cook Inlet, Kodiak, and Yakutat and concluded that most Kittlitz's murrelets were found in areas where there was no fishing. In areas of overlap, they concluded "the total number of birds exposed to gillnets in any of the overlap areas is small." Overall, we acknowledge the limitations in the test fishery data and survey data, but believe the fishery meets the SG80 level of performance through having sufficient information or data available. Bycatch of birds does occur in salmon fisheries but the numbers do not suggest a moderate or large percentage of a bird species population is taken in the fisheries. Rather the percentage of a population taken in the fisheries appears to be quite small. This statement is further supported by Day (2011) who reviewed population status of Kittlitz's murrelets in Alaska, including interviews with experts on whether bycatch in salmon fisheries was a significant problem for the species. Bycatch data has been collected in Alaska fisheries intermittently since the early 1990s. Available reports indicate bycatch is primarily related to fishing effort and abundance of birds that interact with fishing gear, e.g., Blejwas & Wright (2012). The Alaska salmon fishery has limited entry, so fishing effort is related to salmon abundance which has remained somewhat stable over time with normal year to year fluctuations. The assessment team notes the comment on marine mammal interactions, but again defends the scores provided (noting that the scores for PI 2.3.1 have been dropped to 80). As noted in the PCDR, the risk of marine mammal interactions has been assessed in the NOAA List of Fisheries, and the reliability of the assessments are checked through, for example, the AMMOP observer program. Eric Volk, ADF&G, noted to the assessment team that "*Bycatch is monitored in test fisheries conducted throughout the state, and encounters with birds and mammals are extremely rare* (Eric Volk, ADFG, personal communication).

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David Suzuki Foundation

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August 30, 2013
Dr. Rob Blyth-Skyrme
Intertek Moody Marine
1801 Hollis Street
Suite 1220 Halifax
Nova Scotia, B3J 3N4
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Re: MSC Alaska Salmon PCDR input from the David Suzuki Foundation

Dear. Dr. Blyth-Skyrme:

Please accept this letter as input from the David Suzuki Foundation on the July 2013 Marine Stewardship Council (MSC) Public Comment Draft Report for assessment of the Alaska salmon fisheries. I will take this opportunity to express our support for this process and the opportunity to provide input to this draft assessment.

Our input will focus specifically on the designation of Inseparable and Practically Inseparable (IPI) stocks, particularly as it was applied to the Southeast Alaska (SEAK) Unit of Certification. This does not indicate that we fully support all other components of the report.

Many of our concerns relate to the process by which the IPI exemptions were made for this assessment, and how this will relate to future salmon fisheries assessments under the MSC program. We understand that these issues do not specifically relate to Intertek Moody Marine (IMM), and so we will also provide comment on those issues specifically to the MSC.

At minimum, if the certification of the SEAK UoC proceeds, given significant issues around IPI exemptions made in this assessment the fishery should be subject to the conditions laid out in the final step of the IPI stock decision flow provided in Figure GC1 of the GCM, allowing the exemption to only last for one certification period, after which it is required to: a) Achieve separability, b) Pass P1 assessment of inseparable stock, c) Seek and receive exemption, d) Certification without eco-label use.

IMM Comment:
We note this comment, thank you, and agree that the MSC requirements need to be followed during this and any subsequent assessment process.

The main problems with the current treatment of IPI exemptions, which according to the current FAM would suggest that at least some of these IPI stocks should not be able to carry the MSC eco-label, are:

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1. Setting the Unit of Certification (UoC) over a wider geographic area, and across gear types, artificially decreases the proportion of total depleted stocks to below 15%, and any one stock to below 2%, when most of the catch of these stocks occurs within one gear type (troll), in limited geographic areas, and on one species (Chinook).

IMM Comment:

A single SEAK UoC was defined very early in the assessment process, at the point at which the fishery reassessment process commenced and when the other 13 UoCs were also defined. The 14 UoCs were defined on the basis of geographic region and the Management Areas used by ADF&G. It was considered that this would simplify the assessment process in comparison to the 2007 certification. For that certification, 12 of the 16 UoCs were based solely on geographic regions but the 4 UoCs in Southeast Alaska and Yakutat were divided up on the basis of gear types.

The assessment team notes the comment on the Chinook catch occurring predominantly in the troll fishery, but also highlights that from 2008 - 2012, an average of 34.1% of the Chinook taken in the Southeast Alaska fishery were harvested using other gear types (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). The same report also highlights that while troll fishers landed 209,366 Chinook in 2012, they also landed 1.2 million coho, 168,583 pink and 476,469 chum. As such, the assessment team considers that there is sufficient cross-over between the different gear types used in the Southeast Alaska area to justify including all gears within the SEAK UoC, following the same approach used to define the other UoCs.

2. It is not clear that all potential non-target stocks, which were not assessed under P1 or P2, were included in the IPI calculations used to determine the proportion of IPI catch. A more thorough assessment of all stocks caught must be provided to ensure that the 2% and 15% IPI exemption limits are clearly met. For example, it does not appear that certain Canadian origin transboundary stocks, for which information on status and catch exists, were included.

IMM Comment:

The initial IPI calculations for SEAK and Yakutat were based on the number of fish of different species taken in the fishery in total, and so the origin of those fish is not immediately relevant in terms of determining whether or not any particular species meets the 2% or 15% IPI thresholds. For example, ADF&G data on commercial salmon catches in SEAK (http://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisherySalmon.exvesselquery) show that in 2008, 271,000 Chinook were taken from a total harvest of 28.1 million fish, and Chinook accounted for just under 0.7% of the total salmon catch 2008 - 2011, as reported in the PCDR in Table 6. Chinook are therefore eligible for an exemption from the IPI requirements (CR 27.4.10.2, MSC 2013a). Similarly, the total sockeye catch also made up just 1.7% of the total SEAK salmon catch on average over the period 2007-2011 inclusive, and individual runs will clearly have contained only a fraction of that total.

Nevertheless, the assessment team accepts that we missed detailing some significant Canadian and transboundary stocks in the PCDR, and have addressed that in the latest version of the report. These changes are also detailed in the next comment, below.

3. For those stocks potentially assigned as IPI, but not clearly identified in the calculations to determine IPI proportions (as described in point 2 above), there is a lack of assessment of the status of these stocks and the impact of the fishery to their recovery. Annex CH, section CH2.1.3 requires evidence that the fishery is not significantly affecting the recovery of any IPI stock.

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IMM Comment:

As noted in the IMM comment above, the IPI calculations for SEAK and Yakutat included all potential IPI Chinook and sockeye salmon runs as part of the overall catch calculation. Nevertheless, we provide additional information here.

PSC (2012, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. The highest harvest rate is for local Alaska Chinook salmon (avg. 35%, 1985-2010), followed by Upper Georgia Strait (19.7%), WCVI (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks is less than 10% and typically less than 5%. Harvest rates in recent years have declined relative to the base period in response to concerns to reduce overall impacts on weak Chinook stocks. ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty, and incidental take of US ESA stocks has been determined not to cause jeopardy (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). Harvest rates on ESA salmon stocks in SEAK (<7.7%, 1985-2010) was shown in the report.

Four transboundary sockeye runs are identified as potential IPI runs in SEAK. These are fish from the Nass and Skeena rivers that are taken in SEAK District 104 and District 101 fisheries (PSC 2012d), the Stikine run that is taken in Districts 106 and 108, and the Taku run that is taken in District 111 (PSC 2013b). Over the period 2007-2009 (the latest data published by the PSC are for 2009), these runs have comprised an average of 22.7% of the total annual SEAK sockeye harvest, but 0.3% of the total salmon harvest in SEAK. The last ten years of data (2002 – 2011) show that catches of Nass and Skeena fish in these fisheries have consistently been below the annual allowable harvest (PSC 2012d). While U.S. catches of Stikine and Taku fish have been around or sometimes over the TAC for the years 2007-2009 (PSC 2010, PSC 2013a, PSC 2013b), the escapement goals have been met for 8 of the last 9 years (Munro & Volk 2013). English *et al.* (2012) estimated exploitation rates (ER) in Alaska for sockeye salmon originating from key North Coast/Central Coast statistical areas for 1980-2008. Average ERs in Alaska fisheries were 24%, 9%, and 1% for sockeye originating from BC areas 3, 4, and 5, respectively, during 2006-2008.

Relatively small quantities of coho are also taken from transboundary Taku, Stikine, Nass and Skeena runs. The Pacific Salmon Treaty includes requirements for US managers to provide for upriver escapement of transboundary stocks, and escapement to the Taku is actively monitored by ADF&G; this has been met in each of the past 9 years (Munro & Volk 2013). ERs in Alaska fisheries were estimated to be 4%, 4%, 37%, 14%, 5%, 14%, 8%, 8%, 3%, and 3% for coho originating from BC areas 2E, 2W, 3, 4, 5, 6, 7, 8, 9, and 10, respectively, during 2006-2010 (English et al. 2012).

ADF&G also manages its pink salmon fisheries to achieve spawning escapement of wild pink salmon. ERs in Alaska fisheries were estimated to be 9%, 9% and 8% for pinks originating from BC areas 3, 4, and 5, respectively during 2006-2010 (English et al. 2012).

Chum salmon return to rivers in British Columbia including the Nass, Skeena and Taku rivers. Few BC chum are taken in Alaska fisheries relative to Alaska chum, and the average exploitation rate by Alaska fishers for chum salmon from British Columbia north coast statistical areas 3 (including Portland Canal), 4 and 5 for the period 2006 - 2010 was 24%, 10% and 10% respectively. Total exploitation rates of northern BC chum salmon (AK & BC) has declined in recent years in response to management actions (English et al. 2012). The 2009 Annex to the Pacific Salmon Treaty (Chapter 2) includes provisions to eliminate fisheries in some SEAK and Canadian areas and eliminate directed fisheries in other areas as a means to protect Portland Canal chum. For this evaluation, Alaska catch of other British Columbia chum stocks is considered to be negligible relative to the overall catch (English et al. 2012).

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4. Clause 27.4.9.1, indicates the requirements for defining “inseparable” and “practically inseparable.” Although limited information is provided regarding the operation of these fisheries it is not evident from the information provided that there are not simple adjustments to the fishery that could be made to avoid some of these stocks, including those listed under the U.S. Endangered Species Act. Further information on this point should be provided, particularly with respect to the possibility of shifting the fishery in space or time.

IMM Comment:
The assessment report highlights the difference between inseparable and practically inseparable species in Section 2.4.3, and goes on to define how different species were considered in the different UoCs in Table 6 (noting that information has now been provided on additional stocks, as highlighted in earlier comments to your response). On adjusting the fishery to avoid ESA and other salmon stocks, the fishery assessment aims to determine the performance of the fishery against established criteria, and not to provide management advice. Even if a fishery is not meeting an SG80 performance requirement and a condition of certification is set, it is the assessment team's responsibility to highlight that the fishery is not meeting the requisite performance requirements, not to provide advice on how the performance requirements are to be met. As such, we cannot comment or provide additional information on the suggestion.

5. There is inadequate approved MSC assessment methodology or guidance to remove the ETP requirements for IPI stocks.

IMM Comment:
We note this comment, which seems to be related to your earlier comment that "*We understand that these issues do not specifically relate to Intertek Moody Marine (IMM), and so we will also provide comment on those issues specifically to the MSC*".

Thank you for your consideration of this material. I look forward to receiving a reply to these comments and would be happy to discuss them further at your convenience.

Sincerely,

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Date: 30/08/2013

SUBJECT: MSC Review and Report on Compliance with the scheme requirements

Dear Rob Blyth-Skyrme

Please find below the results of our partial review of compliance with scheme requirements.

CAB	Intertek Moody Marine (IMM)
Lead Auditor	Rob Blyth-Skyrme
Fishery Name	Alaska salmon
Document Reviewed	Public Comment Draft Report

Ref	Type	Page	Requirement	Reference	Details	PI
3812	Guidance	16	*N/A v.n/a		Since the differences between drift gillnets and set gillnets are discussed in the P2 PIs, it would be good to clarify which UoC is which type of gillnet in Table 1.	
IMM Comment: Where just 'gillnets' were specified in Table 1 against a UoC, it was intended that this term covered drift and set gillnets. This has now been clarified in Table 1 by detailing both gear types as appropriate.						

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3813	Guidance	99	*N/A v.n/a		In Table 15, it seems that the score for 2.5.3 for UoC 14 should be 90 instead of 80, based on the scoring table on Pages 369-371.	
IMM Comment: Thank you- this has been corrected. On a related matter, the PI 2.5.3 scores in Table 15 for UoCs, 2,7,8,9,10,11 and 13 were showing correctly as 90, but in the scoring table for PI 2.5.3 they were showing incorrectly as 80. This has also been corrected.						
3814	Major	347-349, 358, 360, 362	CR-27.10.6.1 v.1.2	Rationale shall be presented to support the team's conclusion	For Principle 2: 2.2.2: The team has stated that there is only a "partial strategy" in place. Since SG100 requires that a "strategy is in place, SG100d cannot be met. 2.2.3: The rationale for SG80a does not clearly state which types of qualitative and quantitative data are available. The rationale also does not speak to each of the UoCs and gear types. 2.4.1: Troll gear is not mentioned in the rationales for this PI. The rationale also does not speak to each UoC, particularly since habitat types likely vary from one UoC location to the other. The rationale for SG80a states that "salmon fishing gear…does not penetrate the benthos"; however, set gillnets do contact the floor. 2.4.2: SG80a mentions drift gillnet gear loss, stating that there is no plan in place to collect derelict gear from water and that the effects of this gear loss have not been evaluated. Therefore, it is unclear that SG80a is met for those UoCs using drift gillnet gear. Also, it would be appropriate to discuss gear loss in the Habitats Outcome and Information PIs since it would seemingly affect the scoring of those PIs too. 2.4.3: The rationale for SG80a does not speak to each UoC, particularly since there are likely location differences for "nature, distribution and vulnerability of all main habitat types." Further, what is the evidence that supports the meeting of this scoring issue? The rationale for SG80b states "sufficient observations"? What are these observations, and how are they sufficient? The rationale does not speak to "the spatial extent of interaction, and the timing and location of use of the fishing gear". Also,	2.2.2, 2.2.3, 2.4.1, 2.4.2, 2.4.3

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					the rationale also does not speak to each UoCs and gear type. The rationale for SG80c states "data on the effects of salmon fishing gear on habitat is not systematically collected" so it is unclear how this scoring issue is met since it requires that "sufficient data continue to be collected".	

IMM Comment:

2.2.2: Thank you and noted- SI 100d has been changed to 'No' and the score revised down to 80 for all UoCs (except UoC 3, PWS, which has not been scored).

2.2.3: Quantitative test fishery data from around the State and supporting quantitative data from the subsistence and personal use fisheries that are undertaken alongside the commercial fishery in some areas, together with qualitative supporting information from ADF&G managers provided to the assessment team during the site visit, provide evidence that the fishery meets the SG80 level of performance. More information has now been included in the text of the scoring table for PI 2.2.1 - 2.2.3.

2.4.1: Consideration of troll gear has now been included to the information on this PI. It is noted that the PCDR stated that 'Salmon fishing gear ... typically does not penetrate the benthos' This has been modified to better read 'Salmon fishing gears ... are not designed to penetrate the seabed and typically do not disrupt benthos.' This comment applies in all UoCs across the Alaska salmon fishery.

2.4.2: More information has been added to highlight the partial strategy used to avoid excessive gear loss of drift gillnets (namely the requirement to mark gear and attend the gear at all times).

2.4.3: The text of the PI has been modified to better reflect that the nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. Additionally, a small change to the text of SI 80c has been made to highlight that managers routinely monitor and enforce the fishery and are well able to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures.) The fishery meets the SG80 level of performance.

3816	Guidance	370-371	*N/A v.n/a		Given the rationales and scoring for 2.5.3, the scores provided in the table below 2.5.3 should be changed from 80 to 90 for UoCs 2, 7, 8, 9, 10, 11, 13, and 14 to match scores in Tables 14 and 15 (except for the error in Table 15 for UoC 14 - see earlier comment on this). Please ensure that all scores match across PIs and summary tables.	2.5.3

IMM Comment:

Thank you. As noted in the second comment, above, this has now been corrected.

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3817	Major	337-344	CR-CB3.5.2 v.1.2	The team shall determine and justify which species are considered 'main' and which are not.	The retained species PIs do not consider the vulnerability aspect of "main" species (see GCB3.5.2 in the guidance). For example, species such as rockfish could be vulnerable in some cases. In the determination of main as a percentage, is this in relation to the Southeast Region troll fishery comprising SEAK and Yakutat, each UoC separately, a total combined catch, or some other method?	2.1.1, 2.1.2, 2.1.3

IMM Comment:
As noted in the PCDR, lingcod + the most commonly harvested 5 rockfish species together made up more than 95% of the harvest of non-salmonid species in Southeast Alaska (SEAK plus Yakutat UoCs), with individual quantities as follows: Lingcod - 57.4%; Black rockfish - 25.5%; Yellowtail rockfish - 4.5%; Silvergray rockfish - 3.5%; Yelloweye rockfish - 2.7%; Dusky rockfish - 1.4%. Lingcod and black rockfish are managed by the State of Alaska, while the other rockfish species are Federally managed. Nevertheless, these species make up less than 0.02% of the weight of fish landed in the UoCs.

'Vulnerability' of these species may also be determined. Lingcod is managed through closed seasons protecting spawning females and nest-guarding males, minimum landing sizes to ensure fish spawn at least once, daily bag limits for recreational fishermen and catch quotas for commercial fishermen. Black rockfish fisheries in Southeast Alaska are small and conservatively managed using guideline harvest limits (http://www.adfg.alaska.gov/index.cfm?adfg=blackrockfish.management). Yellowtail and silvergray rockfish were both considered to be part of the 'other rockfish' assemblage for the 2011 full assessment, when overfishing was not considered to be occurring (http://www.afsc.noaa.gov/REFM/docs/2011/GOAorock.pdf). Yelloweye rockfish is considered to be part of the demersal shelf rockfish assemblage. The 2011 assessment considered that the assemblage was not overfished or approaching an overfished condition (http://www.afsc.noaa.gov/REFM/docs/2011/GOAdsr.pdf). Dusky rockfish is not overfished nor is it considered to be approaching an overfished condition (http://www.afsc.noaa.gov/REFM/docs/2011/GOAdusky.pdf). None of these groundfish species is considered to be particularly vulnerable, and so none is considered to be a 'main' bycatch species (see GCB 3.5.2, MSC 2013b), while the quantities of any other species are tiny and are considered to be negligible. Text to this effect has been added to the report at 2.1.1 - 2.1.3.

3818	Major	345-350	CR-CB3.8.2 v.1.2	The team shall determine and justify which bycatch species are considered 'main'	The bycatch species PIs do not consider the vulnerability aspect of "main" species (see GCB3.8.2 in the guidance) The rationale should mention this aspect also.	2.2.1, 2.2.2, 2.2.3

IMM Comment:
Marine species including starry flounder, cod, sculpin and yellowfin sole are reported as bycatch in UoCs 11, 12 and 14, but the quantities are considered

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to be very small and effectively negligible relative to marine populations of these species. The freshwater bycatch species listed include Dolly Varden (UoCs 1, 10 and 11), ciscos (UoC 8) and sheefish (UoCs 8 and 10). Dolly Varden are abundant and widely-distributed, with generally stable populations in Alaska (http://www.adfg.alaska.gov/index.cfm?adfg=dollyvarden.main). The distribution of Arctic cisco is to the north of the Alaska salmon fishery area, and the Bering cisco are generally not targeted for subsistence use, although harvested in small numbers and are apparently abundant wherever it occurs , albeit that total populations and trends are unknown (http://www.adfg.alaska.gov/static/species/speciesinfo/_aknhp/Bering_cisco.pdf). Sheefish have been separated into five major stocks (http://www.adfg.alaska.gov/static/education/wns/sheefish.pdf), but while sheefish is a valuable subsistence resource and a popular sport fish, there is no directed commercial fishery in Alaska for this species (http://www.adfg.alaska.gov/index.cfm?adfg=sheefish.uses). None of these freshwater species is considered to be particularly vulnerable, and so none is considered to be a 'main' bycatch species (see GCB 3.5.2, MSC 2013b). This text has been added to the report at 2.2.1 - 2.2.3.

3834	Major		CR-27.10.6.1 v.1.2	Rationale shall be presented to support the team's conclusion	Principle 1: UoC 2, PI 1.3.2a - at the SG80 level requires rationale that a partial strategy is in place. UoC 13, PI 1.1.1 - For coho salmon at the SG80 level, no adequate rationale is given to justify that the wild stock is fluctuating around it's TRP if one is not defined. (p 30 All UoCs - 1.1.2e - How do escapements goals protect the diversity and reproductive capacity of each stock component? Are they set at the sub-component level when/if necessary? If set at the aggregate level, is there evidence that they protect the subcomponents as required by scoring issue e?	1.1.1, 1.1.2, 1.2.4

IMM Comment:

UoC 2, PI 1.3.2, SI 80a: There is no enhancement undertaken in the Yakutat UoC, and therefore there is no requirement for a partial strategy to have been developed. This is as stated in the PCDR, and the score has not been changed.

UoC 13, PI 1.1.1, SI 80b: The text of the PCDR stated: "*Coho meets this level of performance because, although no quantitative TRP has been defined, the CPUE and effort is monitored such that the stock is understood to be well above the point that recruitment would be impaired, and any potential or theoretical TRP would be met*." This was because Chignik coho return to the region late in the season and after fishing effort has declined to a relatively small fraction of what is was during June and July (see Appendix Table E1 of the area management report: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareachignik.salmon#/management). Furthermore, commercial fishing typically stops before the mid-point of the Chignik coho return. Research by the University of Washington has shown that Chignik coho are underutilized by the commercial fishery and that, in fact, the large robust coho population has a significant negative impact on sockeye productivity as a result of predation by juvenile

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coho (Ruggerone & Rogers 1992). This information provides strong evidence that coho would achieve or exceed a TRP appropriate for sustaining the coho population, if one was established.

All UoCs: The PCDR stated at PI 1.1.2, SI 80e that "*Because fisheries are curtailed to near zero harvests at the lower end of the biological or sustainable escapement goals established by ADF&G (equivalent of target reference points), weak stocks are inherently protected at levels far above what would be considered a "limit reference point". Large interannual variations in run returns are common in Pacific salmon and this "abundance" based strategy, has resulted in sustained high levels of escapements in virtually all of the wild salmon runs in Alaska. Habitat protection, in addition to lack of development of the watersheds that support most of Alaska's fisheries, have resulted in quick recovery of stocks that are depressed as a result of poor marine survival conditions. Numerous studies have been conducted of interception fisheries by ADF&G over the past 30 years, primarily driven by allocation concerns of terminal harvesters and in many of the systems, escapements of the component stocks or harvest rates of non target stocks have been determined (e.g. Dann et al. 2011, Dann et al. 2012a, Eggers et al. 2011). We are unaware of any evidence that this harvest strategy is not precautionary with respect to conservation of subcomponent stocks.*" The assessment team concluded that the escapement goal approach, the relatively pristine habitat, and actions by the ADF&G managers to reduce directed fishing as the lower escapement goal is approached is an effective and practical means to protect the diversity and productivity of subcomponent stocks. Evidence for the effectiveness of this approach can be inferred from the rapid rebound of Alaska salmon from very low runs and harvests in the early 1970s to record runs beginning in the late 1970s following the ocean regime shift. Evidence that supports this approach is also shown in some areas, such as portions of Bristol Bay, where subcomponent populations are monitoring via foot survey or aerial survey.

3835	Minor	481	CR-27.15.3 v.1.2	CABs shall include the following in a separate section or appendix: 27.15.3.1 Written submissions from stakeholders (if any) received during consultation opportunities on: 27.15.3.3. Explicit responses from the team to submissions described in 27.15.3.1 and 27.15.3.2.The CAB shall have sent these responses to the stakeholders prior to their publication in the public comment draft report.	There are no written submissions in Appendix 15. Any written submissions received from stakeholders should be included as detailed in CR v1.2 27.15.3.1 and CR 27.15.3.2. If there were no submissions please specify. It is noted that a summary of verbal submission was included in prior appendices.	

IMM Comment:
A written submission was received from the Canadian Pacific Sustainable Fisheries Society regarding the proposed peer reviewers. This, together with the IMM's response, is now provided in Appendix 7 (new numbering). State of the Salmon and, separately, a group of stakeholders comprising the Wild Fish Conservancy, Raincoast Conservation Foundation, Skeena Wild Conservation Trust, Watershed Watch Salmon Society and the David Suzuki Foundation commented on the proposed assessment tree. These submissions, together with IMM's response, were published on the MSC website, and links to those

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documents have also now been included in Appendix 7. A written submission was also received from Wild Fish Conservancy, Watershed Watch Salmon Society, Pacific Salmon Foundation, Skeena Wild Conservation Trust and Raincoast Conservation Foundation prior to a meeting during the site visit on October 18th 2012. The submission set out the group's position on a number of issues of relevance to the assessment of the Alaska salmon fishery, and is now included as Appendix 8 (new numbering). The information was useful in the assessment process, but no detailed response was provided as the information was considered during the assessment process and scoring was considered to have accounted for the points raised. We note that the requirement to have sent responses to stakeholders prior to the publication of the PCDR is no longer a requirement of the MSC Certification Requirements (MSC 2013a).						
3836	Major	372	CR-27.10.6.1 v.1.2	Rationale shall be presented to support the team's conclusion	Principle 3: Rationale provided is insufficient to justify the score for scoring issue b re: management system tested and proven to be effective.	3.1.1
IMM Comment: Under PI 3.1.1, SI 100b, the PCDR noted "*The BOF has been established for many years and it has been shown to be effective. The fishery meets this level of performance.*" The assessment team notes that the Board of Fisheries responds to issues raised by individuals and by the 82 Advisory Committees that represent local communities (http://www.adfg.alaska.gov/index.cfm?adfg=process.advisory). Meetings are always open to the public and they include comments by individuals and the Advisory Committees. Hearings often involve fishery allocation issues. BOF findings and policy decisions are transparent and they are shown on the ADF&G webpage: http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.findings. This provides evidence that the management system is tested and proven to be effective.						
3837	Major	339	CR-CB3.5.3 v.1.2	SG100 does not include the qualifier 'main' and the team shall consider all retained species in the assessment. If there are no P2 retained species in the fishery, or retention is exceptionally rare and negligible in its impact, then the fishery would meet SG100.	For SI b, SG100 - Does not include the qualifier "main" s all species must be considered at the 100 level regardless of whether or not negligible quantities are caught.	2.1.1
IMM Comment: The assessment team notes that the guidance for retained species PIs states: "*CB3.5.3: SG100 does not include the qualifier 'main' and the team shall consider all retained species in the assessment. If there are no P2 retained species in the fishery, or retention is exceptionally rare and negligible in its impact, then the fishery would meet SG100.*" (MSC 2013a).						

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It is considered that the retention of fish in all UoCs other than Seak and Yakutat is rare and negligible in its impact. As such, for PI 2.1.1, SI 100b, the PCDR noted that "*As only negligible quantities of other finfish species are taken while targeting salmon in the remaining Alaska salmon fisheries, this scoring guidepost can be met without knowing the status of those species with respect to biological reference points (MSC 2013a).*" The SEAK and Yakutat UoCs were scored at 80 for PI 2.1.1, the assessment is therefore considered to be consistent with MSC guidance, and the scores have not been changed.						
3838	Minor	95	CR-27.12.1.3 v.1.3	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products. The opportunity of substitution of certified with non-certified fish prior or at landing.	The report does not include a clear description of how tender vessels and other instances of transporting or handling fish products, would ensure segregation of non MSC products from MSC products.	
IMM Comment: Under Alaska law, a salmon vessel can only fish in one salmon region per year. Therefore, the only possibility for fish to become mixed between regions would be if a tender took delivery of a catch from one UoC but then transited to another area to take delivery of more fish. Given the distances involved, this is highly unlikely to occur, and even if it was to occur the tender would be instructed and required to segregate the catches. Tenders typically have the capacity to pack 200,000 to 800,000 pounds and have multiple fish holds. The report now has been edited to reflect these facts.						
3839	Guidance	95	CR-27.12.1.1 v.1.2	The CAB shall determine if the systems of tracking and tracing in the fishery are sufficient to make sure all fish and fish products identified and sold as certified by the fishery originate from the certified fishery. The CAB shall consider the following points and their associated risk for the integrity of certified products: The systems in use.	There is no indication or examples given of what resolution the catch is reported to other than "area of actual harvest" (paragraph 3 page 95).	
IMM Comment: Please refer to the comment above.						

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3840	Guidance	100	*N/A v.n/a		In section 5.3 the link provided reads "Error! Reference source not found.." Perhaps a link is missing?	
IMM Comment: Thank you, this has been corrected- the section was intended to link to Appendix 4, the detailed text for the Conditions.						
3841	Guidance	100	*N/A v.n/a		In section 5.3 on page 100 it states that "A variation request was accepted by MSC..." To clarify, an official variation request was not received but informal discussions took place between the CAB and MSC in which MSC confirmed that the formulation of the conditions meets CR 27.11.1.1 in that each individual PI has its own distinct condition associated with it (a,b,c...) even though the conditions are grouped together.	
IMM Comment: Noted, thank you. The text has been corrected.						

This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Megan Atcheson on +44 (0)207 246 897 more information.

Best regards,
Fisheries Oversight Director
Dan Hoggarth
Marine Stewardship Council

cc: Accreditation Services International

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Comments on Public Comment Draft Report for Marine Stewardship Council certification of Alaskan salmon fisheries

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August 30, 2013

Introduction

Raincoast Conservation Foundation and Watershed Watch Salmon Society are Canadian public-interest charities that advocate for more sustainable management of salmon fisheries. While we have been involved in numerous MSC salmon certifications over the past decade (BC sockeye, pink, and chum), this is our first time commenting on a PCDR from a fishery outside of British Columbia (BC). Our primary motivation for participating in this certification was the disparity we noticed between the MSC assessments for Alaskan vs. BC salmon fisheries in dealing with fishing mortality on at-risk salmon populations that are caught in mixed-stock fisheries through certification conditions.

While we have numerous concerns with the scoring in the PCDR, we understand that other stakeholder groups are addressing many of these. We are therefore focusing our comments on the shortcomings in the PCDR that are of most concern to us and these primarily pertain to the failure to address overfishing of at-risk populations that originate outside of Alaska.

Our groups strongly disagree with and oppose the assessment team's decision to avoid the weak-stock interception issue in this assessment by exempting key exploited populations from scoring by designating them as Inseparable and Practically Inseparable (IPI). This approach aggregates numerous fisheries with distinct gear types and target species across the large southeast Alaska (SEAK) unit of certification (UoC), lumping stock-selective, high-volume, terminal and near-terminal fisheries (with a substantial portion of the catch originating from hatchery stocks) together with fisheries of a highly mixed-stock nature which specifically target populations transiting through multi-stock migration routes. This artificially decreases the proportion of depleted stocks in the catch composition and exempts the most unselective and problematic fisheries in the State from exactly the sort of scrutiny that the MSC FAM is intended to provide.

IMM Comment:

Thank you for commenting on the report. We have provided responses to detailed comments below.

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Overfishing of depleted wild chinook populations in SEAK troll fishery

Of particular concern among the catches exempted as ISI, are those of the SEAK troll fishery for chinook, where nearly all of the fish caught originate in fisheries outside of Alaska, as confirmed on p.57 of the PCDR. Wild chinook populations are currently experiencing widespread decline or collapse across most of the southern part of BC (see appendix) and for the population aggregates that include these at-risk Conservation Units (CUs), a substantial portion of the commercial catch occurs in Alaska (mostly in the SEAK troll fishery). These populations are at levels of abundance far below MSY, thus any fishing mortality should be avoided.

IMM Comment:

The PCDR provided some information on the take of non-local Chinook salmon in the SEAK fishery, but we provide additional information here. Chinook salmon are managed to meet Pacific Salmon Treaty (PST) obligations to Canada and escapements of Chinook salmon into SEAK rivers. PST harvests levels in SEAK are based on aggregate expected abundances of Chinook salmon. Fisheries in more terminal areas (BC and the Northwest) may utilize "individual stock-based management (ISBM)" to meet escapement goals for PST escapement goal stocks PSC (2012, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. Most of the non-local Chinook are taken in the troll fishery. During 1985-2010, the highest harvest rate in SEAK was for local Alaska Chinook salmon (avg. 35%), followed by Upper Georgia Strait (19.7%), WCVI Hatchery and Wild (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks was less than 10% and typically less than 5%. Harvest rates were 7.3% for Fraser River early Chinook and 0.14% for Fraser late Chinook. Overall harvest rates in recent years have declined relative to the base period in response to concerns to reduce overall impacts on weak Chinook stocks. ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). Harvest rates on ESA salmon stocks in SEAK (<7.7%, 1985-2010) were shown in the PCDR report.

English *et al.* (2012) estimated exploitation rates (ER) in Alaska for Chinook salmon originating from key North Coast/Central Coast statistical areas, 1980-2010 (calculated by subtracting ER in Canada from total ER). Average ERs in Alaska fisheries were 2.4%, 16%, 16% and 9% for Chinook originating from BC areas 3, 4, 6, and 8, respectively, during 2006-2010.

It bears mention that in all of the MSC assessments for BC salmon fisheries, the UoCs were partitioned by species *and* region (e.g., Nass River sockeye, north and central coast pink, Fraser River chum, etc.), whereas the Alaskan UoCs were only partitioned by region, with all salmon species aggregated. If the Alaskan UoCs were partitioned in the same manner as the BC UoCs, the resulting SEAK chinook UoC could not be classified as IPI.

IMM Comment:

The different approach taken in BC is noted, but it is highlighted that the Alaska salmon fishery would comprise up to 70 UoCs (14 x 5) if UoCs were defined on the basis of management areas and individual species. However, it is also worth highlighting that the approach to scoring taken by the team was to score each PI at the level of what was considered to be the worst-performing species within the UoC, rather than taking an average of the different species or weighting the score in some way. For example, if a sockeye run in one UoC was only performing at the SG60 level for PI 1.1.1, then the UoC would only have scored 60 for that PI, even if other species were all considered to meet the SG100 level of performance. If chum was then only performing at the SG60 level for PI 1.1.2, then the whole UoC would score 60 for that PI. Combining species within one UoC therefore had the effect

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of scoring all species lower than if species had been scored separately. While this doesn't alleviate the concerns over the IPI classification, it demonstrates the team's desire to avoid obscuring issues and to reflect the overall picture of the Alaska salmon fishery, while undertaking the not insignificant task of completing the assessment of the fishery.

In addition to contributing to the threatened and endangered conservation status of individual Canadian CUs, Alaskan chinook interceptions also affect the trans-boundary population of Southern Resident Killer Whales (SRKWs). This population of whales is listed as *endangered* under both the US ESA and Canada's Species at Risk Act (SARA). Several lines of evidence have linked the fecundity, mortality and survival of these animals to the indices of chinook abundance locally (Albion Test fishery) and broadly (PSC Chinook Total Abundance indices). Strong correlations suggest that fishery reductions that affect BC, Puget sound and Columbia bound chinook, would 1) increase the seasonal availability of chinook, 2) rebuild long term abundance and density of chinook that SRKW evolved with, 3) recover the age and size structures, so that caloric intake per fish can be closer to historical levels. All of these actions would aid the recovery and delisting of these whales.

IMM Comment:

Here are key points of the recent review on this issue by the expert panel (Hilborn *et al*. 2012):

"The panel believes that the existing delisting criterion of 2.3% growth rate is unlikely to be achieved given current circumstances or by reducing Chinook salmon fisheries. But if the total abundance continues to increase, a point will be reached where a reappraisal of their status would be likely. The evidence for strong reliance on Chinook salmon in the summer is convincing, but it is also clear that SRKW will switch to alternative, more abundant chum salmon when Chinook of suitable size and quality are not readily available in the fall."

The maximum long-term increases in abundance of Chinook salmon that might theoretically be available to SRKW would be achieved by eliminating all ocean fishing (typically at least 20% increase in ocean abundance of age-4 and age-5 hatchery and wild fish due to elimination of ocean fishery interception of immature fish) and by maximizing recruitment through manipulation of freshwater exploitation rates to maximize recruitment (6-9% increase in recruitments of wild fish; no impact on hatchery fish). The best potential for increased Chinook salmon abundance is restoration of freshwater habitat, reducing downstream migration mortality and a change in ocean conditions.

The panel sees many potential reasons why not all foregone Chinook salmon catch would be available to SRKW, and is therefore skeptical that reduced Chinook salmon harvesting would have a large impact on the abundance of Chinook salmon available to SRKW. The statistical analysis by NOAA and DFO scientists are excellent, but the Panel believes considerable caution is warranted in interpreting the correlative results as confirming a linear causal relationship between Chinook salmon abundance and SRKW vital rates.

The Panel is not confident that understanding of the interaction between Chinook salmon fisheries, other predators and SRKW vital rates, is sufficient to expect the model predictions of increased SRKWs to be accurate. The Panel expects the model predictions to overestimate the impact of reductions in Chinook salmon catch on SRKW.

The Panel cautions against overreliance on the correlative studies, and notes that the level of correlation is highly dependent on the choice of Chinook salmon abundance indicators. The impact of reduced Chinook salmon harvest on future availability of Chinook salmon to SRKW is not clear."

PSC (2012) shows that the average harvest rate of Puget Sound Chinook salmon stocks during 1985-2010 was 6.4% (Stillaguamish summer/fall), 1% (Skagit summer/fall), 1.1% (Snohomish summer/fall), 0.1% (Nooksack fall), 0.25% (PS Hatchery fingerling), and 0% (Nooksack spring). These very low harvest rates suggest a reduction in harvests in SEAK would have very little beneficial effect on

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southern resident killer whales, as indicated by information provided by the expert panel text shown above.

Simply put, the SEAK chinook troll fishery as it currently exists is not a clean fishery and it should not be certified by any ecocertification scheme in the absence of conditions for improvement. While the AT's justifications for doing otherwise may serve the industry client well, they do not serve the public interest in conservation.

IPI exemption rationale fails to mention BC chum salmon

The rationale for the IPI exemptions in the SEAK UoC on p.57 of the PCDR discusses sockeye from the Nass and Skeena watersheds in BC but appears to ignore chum salmon from those same rivers, several populations of which are severely depleted (Price et al. 2013; DFO 2013). Interception of depleted BC chum stocks in the southern SEAK net fisheries was raised by stakeholders in a written submission to the AT during the site visit. It is unclear why the issue is not addressed in the PCDR. If these populations are not considered IPI, they should be evaluated under the appropriate PIs.

IMM Comment:

ADF&G manages its chum fisheries to achieve spawning escapement of wild chum salmon in SEAK and to harvest surplus hatchery chum salmon. English et al. (2012) estimated exploitation rates (ER) in Alaska for chum salmon originating from key North Coast/Central Coast statistical areas, 1980-2010. BC chum are a minor component of the Alaska chum harvest. The average annual ER for BC chum in Alaska fisheries during 2006-2010 was 24% for Area 3 stocks, 10% for Area 4 stocks, and 10% for Area 5 stocks. Non-local abundances of chum salmon are not directly considered in Alaska management decisions because locals stocks are much more abundant and harvests of BC chum are incidental. Exploitation rate estimates presented above indicate incidental harvests of non-local stocks originating from BC are typically low. In response to low abundances of chum salmon in northern BC, harvests of chum in BC fisheries have been reduced. The 2009 Annex to the Pacific Salmon Treaty (Chapter 2) has provisions to reduce harvest impacts on Portland Canal chum in both SEAK and BC.

Inadequate assessment of steelhead by-catch in SEAK net fisheries

It is unclear how the AT could dismiss steelhead bycatch (retained and discards) as insignificant when it is well known, and was explained by our groups during the site visit and in our accompanying submission, that net fishers in SEAK are not required to record or report steelhead catch numbers, and routinely retain steelhead for personal consumption without reporting. This fact is further supported by Harding and Coyle (2011) who state that "a complete analysis of the reported catch of steelhead in the commercial fisheries is difficult because of data gaps and incomplete records." In the face of catch and discard data for steelhead that are incredible, incomplete, or non-existent it is unclear how the AT can justify passing the SEAK UoC (and likely others) on the following scoring guideposts:

PI 2.1.1 SG 80a & c: *Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.*

PI 2.1.2 SG 80a: *There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding*.

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PI 2.1.3 SG 80a, b, c, d: *Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. Information is sufficient to estimate outcome status with respect to biologically based limits. Information is adequate to support a partial strategy to manage main retained species. Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy).*

For the above PIs no evidence is presented on the population structure of the steelhead bycatch, their rivers of origin, anything that would indicate what the "biologically based limits" of the populations would be, any indication of their status relative to "biologically based limits", or any exploitation rate estimates (including discard mortality rate estimates) that would indicate that "the fishery does not hinder their recovery and rebuilding". Such information would be integral to a "strategy" to "maintain the main retained species". Clearly, no such strategy exists.

It is strongly recommended that the AT re-evaluate the above PIs with respect to steelhead bycatch in SEAK and apply appropriate conditions to ensure reliable estimates are obtained for steelhead retention, discards, stock composition, and population-level exploitation rates in SEAK net fisheries.

IMM Comment:

The PCDR noted:

"*With the exception of troll gears in SEAK and Yakutat UoCs, non-salmonids may not be retained and sold in the Alaska salmon fishery. Small quantities of other finfish may, though, be taken and retained for personal use (i.e. they may be retained but not sold) (SOA 2007). These fish, including steelhead (Oncorhynchus mykiss), that are retained for personal use must be recorded on the fish tickets. Within Alaska, steelhead are most commonly found in the Southeast Alaska UoC (Augerot & SotS 2004), but the quantities taken even there are very small, with an average of 108 steelhead reported harvested annually in all commercial salmon gears from 2002 to 2011 (Harding & Coyle 2011).*"

The reported harvest of steelhead has declined significantly since the peak in the mid-late 1980s, with total Southeast Alaska commercial harvests (for personal use) of 837 fish in 1994, 453 in 1995, and 701 in 1996. In every year since then, less than 300 fish have been reported harvested, and the average for the period 2002 - 2011 is 108 fish. This decline is probably because of regulations that prohibit retention of steelhead except for personal use, and may in part be in response to environmental conditions. Monitored steelhead populations, such as Keogh River on Vancouver Island and other areas, have shown a significant decline, although Harding & Coyle (2011) reported that steelhead abundance in Southeast Alaska was generally higher than average between 2003 and 2007, while declining since 2008 to average or near-average levels.

The assessment team notes that the Raincoast Conservation Foundation and Watershed Watch Salmon Society believe that steelhead are routinely retained for personal consumption without reporting. However, we also note that ADF&G prohibits commercial sale or bartering of steelhead and that steelhead kept for personal use must be recorded on fish tickets, while highlighting that no evidence of systematic illegal practice has been presented. We also note that the TCNB (1991) report, referred to by Harding & Coyle (2011) after stating that "*a complete analysis of the reported catch of steelhead in the commercial fisheries is difficult because of data gaps and incomplete records*" states that "*Since steelhead are not consistently purchased by processors, some portion of the harvest is probably retained by fishermen for their personal use and goes unreported. There may also be some misidentification and sale of steelhead as other species*". Given that this text was written prior to the requirement to report personal use catches but immediately after a known period ofparticularly high catches, we do not believe that TCNB (1991) represents a credible critique of current practices.

Studies report that salmonids can have moderate to high survival post-release from commercial fishing gears (e.g., Welch et al. (2009) reported >1 week survival of adult steelhead of around 56% for those released from a gillnet and then tagged in good condition, Candy et al. (1996) reported a survival figure of ≈77 % for Chinook after 24 hours following purse seining, and Farell et al. (2000)

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reported a survival figure of ≈98% for coho after 24 hours following trolling), although survival will clearly depend on gear handling and sorting efficiency, amongst other factors.

In recognition of Harding & Coyle (2011) noting the difficulty of discerning a spatial or temporal trend in steelhead catches due to the paucity of data, we have lowered the score of PI 2.1.3 in SEAK and Yakutat from 95. However, the evidence of low commercial harvests from 1993 onwards (non-retention requirements were introduced in 1994), the continued very low figures for commercial personal use harvests in the last 10 years, the absence of evidence of systematic illegal practices with respect to reporting, the apparent average or higher than average abundance of steelhead in Southeast Alaska in the last decade, and the maintenance of sportfishing catches of steelhead in Southeast Alaska rivers for the period 1990 - 2010, together support scores of 80 for PI 2.1.1, 2.1.2 an 2.1.3.

Effects of Alaskan Harvest on at-risk BC Conservation Units

The figures appended to this submission demonstrate multiple instances under multiple metrics when BC salmon CUs would have met their lower or upper escapement benchmarks (similar to Limit and Target Reference Points) were it not for Alaskan harvests, primarily in SEAK. We recommend that the AT fully review and interrogate the raw data and calculations used to generate these figures and consider them under all appropriate PIs, including 2.1.1, 2.1.3, and 2.1.3. The data, calculations, and supporting documents are available from Raincoast Conservation Foundation and the authors of the figures are available to explain them further, verbally or in writing, should you have any questions (misty@raincoast.org).

IMM Comment:

Thank you for the detailed charts on BC Chinook, chum, and sockeye salmon. They capture a lot of information. Your charts are generally consistent exploitation rate information that we presented above. According to your charts, average exploitation rates in Alaskan fisheries (SEAK all gear) were typically near 10% for Chinook salmon, but approached 20% for some Chinook stocks. Exploitation rates for chum were near 20% for two stocks and 12% for the third stock. Exploitation rates for sockeye were typically near 10%. In general, the exploitation rates of BC salmon in Alaska are relatively low. Spawning escapements relative to upper and lower benchmarks varied with species and stock. In some cases, elimination of harvests in Alaska would have enabled the stock to achieve the lower benchmark. But harvests in Canada, where managers have the ability to better assess local stock abundances, could have also been reduced to achieve benchmarks. It was not clear to the assessment team whether or not the BC fisheries were being managed to achieve these specific benchmarks.

We note that the harvest of Chinook salmon in SEAK is managed based on the aggregate abundance of Chinook salmon, as described by the Pacific Salmon Treaty and PSC reports. This approach is currently designed to reduce fishery impacts relative to the 1999 base period as a means to conserve the stocks, including ESA-listed Chinook salmon. The PST has provisions to reduce harvests of Chinook salmon in Individual Stock-based Management (ISBM) terminal-area fisheries in order to meet CTC-approved escapement goals. Additional conservation of individual stocks may occur in terminal fisheries. For example, Nass and Skeena sockeye harvests in southern SEAK are managed through the PST, based on a small percentage of total allowable catch calculated as the difference between projected run and escapement targets. The Alaska harvest rates on Canadian Nass and Skeena stocks are low and within the limits identified each year in the Treaty process. Alaska chum salmon fisheries are managed to achieve escapement goals for wild AK chum while also harvesting surplus hatchery salmon. The 2009 annex to the PST has provisions to reduce impacts on Portland Canal chum. The percentage of chum harvests in southern SEAK represented by BC chum is small.

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APPENDIX: Conservation Unit Snapshots

These snapshots apply to select Conservation Units under Canada's Policy for the Conservation of Wild Pacific Salmon (WSP). All CUs selected meet the criteria for review by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or fall below Canada's Wild Salmon Policy lower benchmark (DFO unpublished data).

CU status is based on COSEWIC's short term trend criteria or the Wild Salmon Policy's current to long term trend criteria. These criteria were applied to escapement, total abundance or both.

Table 1 (next page) summarizes the snapshots and shows the Canadian red listed wild Conservation Units of Chinook, chum and sockeye salmon that are exposed to Alaskan exploitation. Consistent with Canada's Wild Salmon Policy, we have used the Conservation Unit (CU) as the designatable unit for biological assessment. Three forms of exploitation are shown. One is based on the CTC's CWT hatchery run indicator stock. The second is based on the % of the total exploitation using the Abundance Indices from the CTC Chinook model. The third uses LGL/English et al. 2011 calculations of Canadian and Alaskan Exploitation.

Importantly, with respect to MSC assessments and IPI status, Alaskan exploitation can be a significant factor in their RED listed status. In some cases a CU falls below the lower benchmark *because* of Alaskan exploitation. In the absence of Alaskan exploitation, the CU would not have fallen below the lower benchmark. Falling below the lower WSP benchmark denotes a level of abundance that could lead to a CU being considered at risk of extinction by COSEWIC.

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Table 1. Status and Exploitation of Red Listed Chinook CUs with Significant Alaskan Exploitation

Species and Region	Conservation Unit	RED list trigger	ER Data source	1999-2012 Total ER Average	1999-2012 % ALASKA ER from CWT hatchery indicator	1999-2012 % ALASKAN ER based on CTC AI Coast Wide Chinook Model
South Coast Chinook	Nootka and Kyuquot	COSEWIC	Robertson CWT	56%	**32%**	**73%**
	Southwest Vancouver Island	COSEWIC	Robertson CWT	56%	**32%**	**73%**
	East Vancouver Island-Summer	COSEWIC/ WSP	Puntledge CWT	32%	**28%**	**47%**
	Northeast Vancouver Island	COSEWIC	Quinsam CWT	41%	**53%**	**47%**
	South Coast-Southern Fjords	WSP	Big Qualicum CWT	40%	**28%**	**47%**
	South Coast-Georgia Strait	COSEWIC/ WSP	Cowichan CWT	66%	**1%**	**47%**
North Coast					**1999-2012 % ALASKA ER from LGL**	
Chum	Chum-Lower Skeena	COESWIC/ WSP	English et al. 2011	20%	46%	
Chum	Portland Canal-Observatory	COSEWIC/ WSP	English et al. 2011	32%	63%	
Chum	Portland Inlet	COSEWIC	English et al. 2011	32%	63%	
Chinook	Bella Coola-Bentinck (enhanced)	COSEWIC	English et al. 2011	49%	**19%**	68%
Chinook	Lower Skeena	COSEWIC	English et al. 2011	45%	40%	68%
Chinook	Middle Skeena-Large Lakes	COESWIC	English et al. 2011	45%	40%	68%
Sockeye	Asitika	COSEWIC	English et al. 2011	30%	26%	
Sockeye	Babine Early Wild	COSEWIC	English et al. 2011	38%	28%	
Sockeye	Babine Late Wild	COSEWIC	English et al. 2011	45%	22%	
Sockeye	Bear	COSEWIC	English et al. 2011	28%	26%	
Sockeye	Damshilgwit	COSEWIC	English et al. 2011	30%		26%
Sockeye	Mcdonell	COSEWIC	English et al. 2011	17%		20%
Sockeye	Morice	COSEWIC	English et al. 2011	26%		25%
Sockeye	Swan	COSEWIC/ WSP	English et al. 2011	25%		20%

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Ranking

Our status assessments use trends in escapement relative to two sets of criteria, COSEWIC's A2 thresholds and DFO's WSP benchmarks. Status assessments were generally completed to include data up to 2012, although some CUs are only to 2011. It is important to note that some CUs lacked sufficient data for analysis. Red listed CU's were selected based on COSEWICs and DFO's analysis.

COSEWIC

Using COSEWIC's criteria the populations were ranked Red according to the following:

Classification	COSEWIC Criteria A2	Threshold
RED	CUs that are classified as ENDANGERED (> 50% decline) or THREATENED (between 30% and 50% decline) over the last 3 generations (or 10 years)	> 30% decline in escapement and/or abundance

Wild Salmon Policy

DFO's Wild Salmon Policy uses benchmarks to identify when the status of a CU has changed significantly. According to the WSP, the lower benchmark between Yellow and Red is established at a level of abundance high enough to ensure there is a substantial buffer between it and any level of abundance that could lead to a CU being considered at risk of extinction by COSEWIC.

Using DFO's Wild Salmon Policy, the populations were ranked Red if they fell below the lower benchmark.

Classification	Wild Salmon Policy Description	Threshold
GREEN	The ratio of the current generation (geometic) mean in escapement to the long-term (geometric) mean in escapement is greater than 0.75	C: LTGME > 0.75
	UPPER BENCHMARK	
AMBER	The ratio of the current generation (geometic) mean in escapement to the long-term (geometric) mean in escapement is between 0.5 and 0.75	C: LTGME 0.5 - 0.75
	LOWER BENCHMARK	
RED	The ratio of the current generation (geometic) mean in escapement to the long-term (geometric) mean in escapement is below 0.5	C: LTGME < 0.5

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Salmon hatcheries represent a challenge to assessing salmon populations in accordance with the WSP and COSEWIC, as the first generation of these fish are not recognized as 'wild'. As such, all chinook CUs were filtered to remove the hatchery enhanced run

IN EACH SNAPSHOT THAT FOLLOWS:

The top figure shows the trend in total, Canadian and Alaskan exploitation rate since adequate record keeping began.

The middle figure shows the trend in escapement since record keeping began (grey shaded region). Canadian and Alaskan catch is added based on the hatchery Coded Wire Tag (CWT) indicator or LGL catch data (English et al. 2011). The Exploitation Rate (ER) source is listed in the top right corner. Upper and Lower benchmarks based on either the Parken, Korman or WSP method are shown (references available upon request). Square boxes above the figure identify when escapement fell below the upper (yellow) or the lower (red) benchmark. Numbers for Upper and Lower benchmark numbers are shown on the left. The figure also includes the trend in the Alaskan component of the total exploitation. ***When present, this figure also identifies times when the Alaskan exploitation drove escapement below the lower benchmark.***

The bottom figure shows the trend in escapement, CDN and Alaskan exploitation and total abundance in the most recent 3 generations, also with benchmarks.

Reference:

English, K.K.,T. Mochizuki and D. Robichaud. 2011. *Review of North Central Coast Salmon Indicator Streams and Estimating Escapement, Catch and Run Size for each Salmon Conservation Unit.* LGL Limited. Sidney, BC. 73 pps.

Additional references available upon request from misty@raincoast.org.

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[1] DFO defines a CU as a group of wild salmon sufficiently isolated from other groups that, if extirpated is very unlikely to recolonize naturally within an acceptable timeframe.[1] Essentially, CUs are biologically irreplaceable units of salmon diversity. Since 2008, the Committee on the Status of Endangered Wildlife in Canada has recognized the CU as an appropriate unit for biological assessment.

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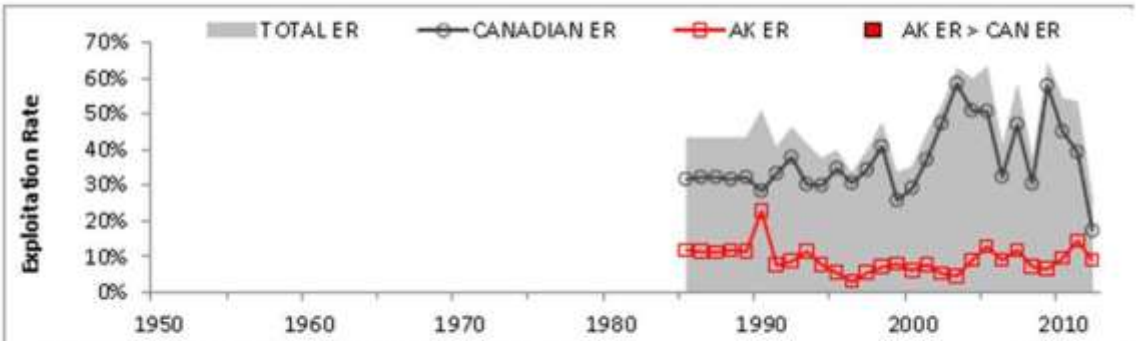
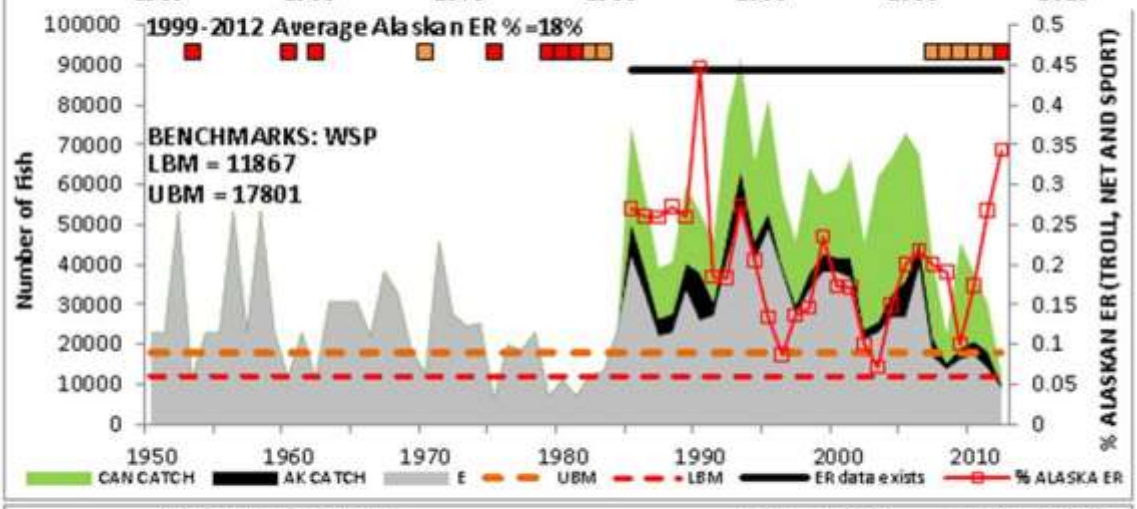
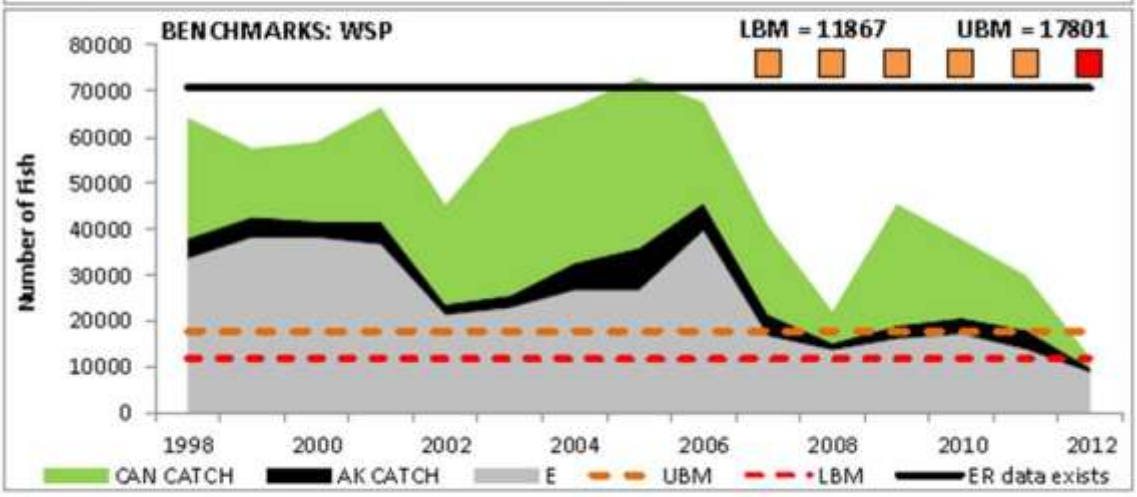
Chinook-Bella Coola-Bentinck

ENHANCED SITES INCLUDED | **ER INDICATOR: Chinook-Area 8**

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-60.7%	-45.8%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.76	0.70







- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

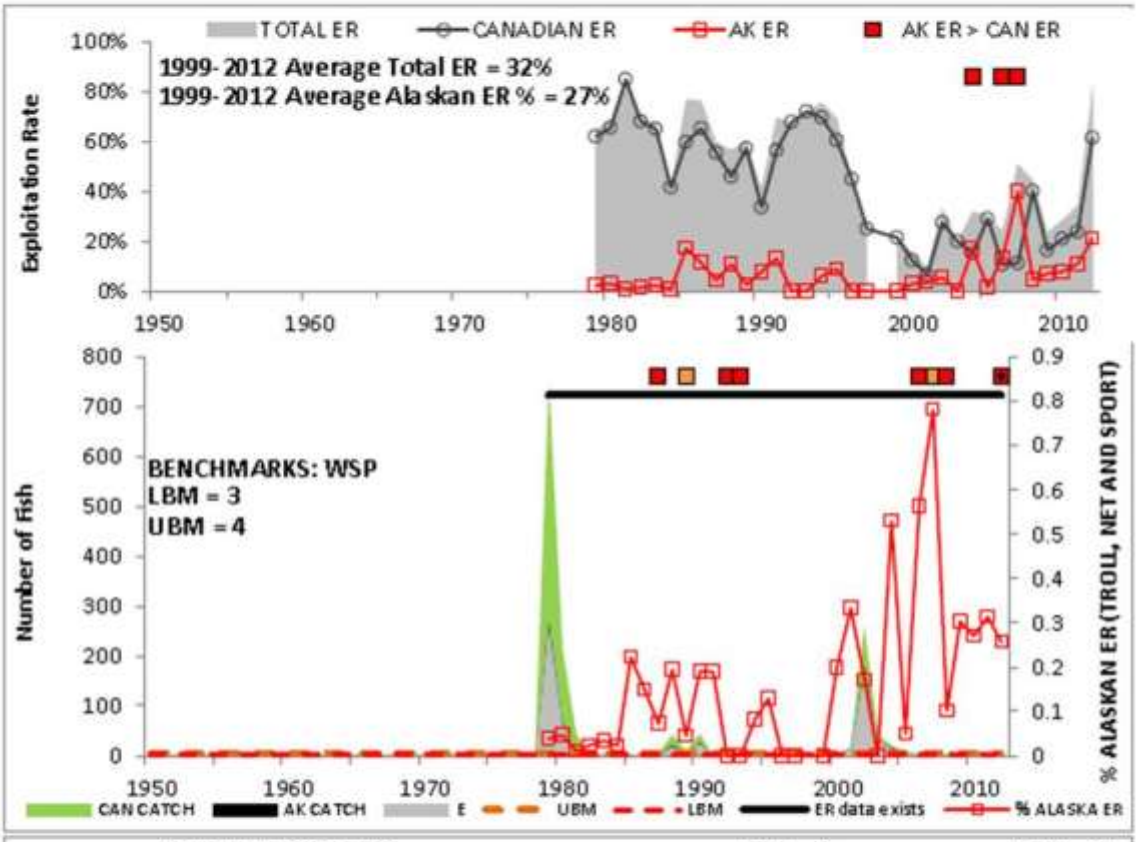
© Marine Stewardship Council, 2011

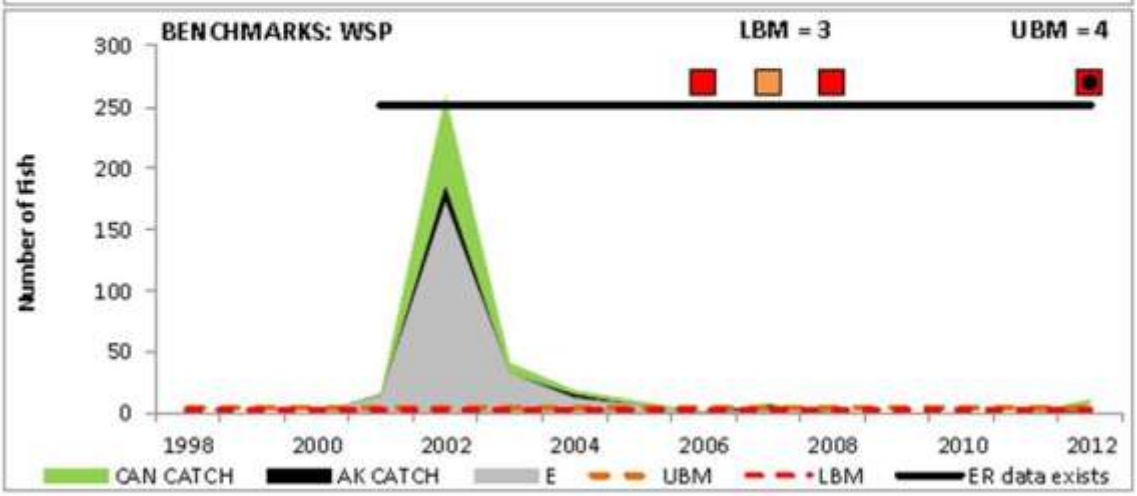
Chinook-East Vancouver Island-Nanaimo-spring timing

WILD SITES ONLY

ER INDICATOR: Chinook-Puntledge

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-99.6%	-99.3%
WSP (current generation to long term ratio)	2009-2012:1979-2012	0.28	0.21





- Escapement was below lower benchmark.
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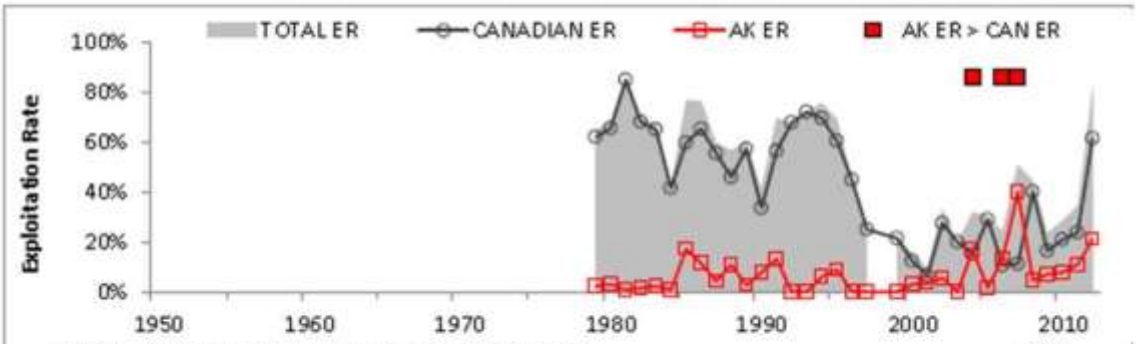
© Marine Stewardship Council, 2011

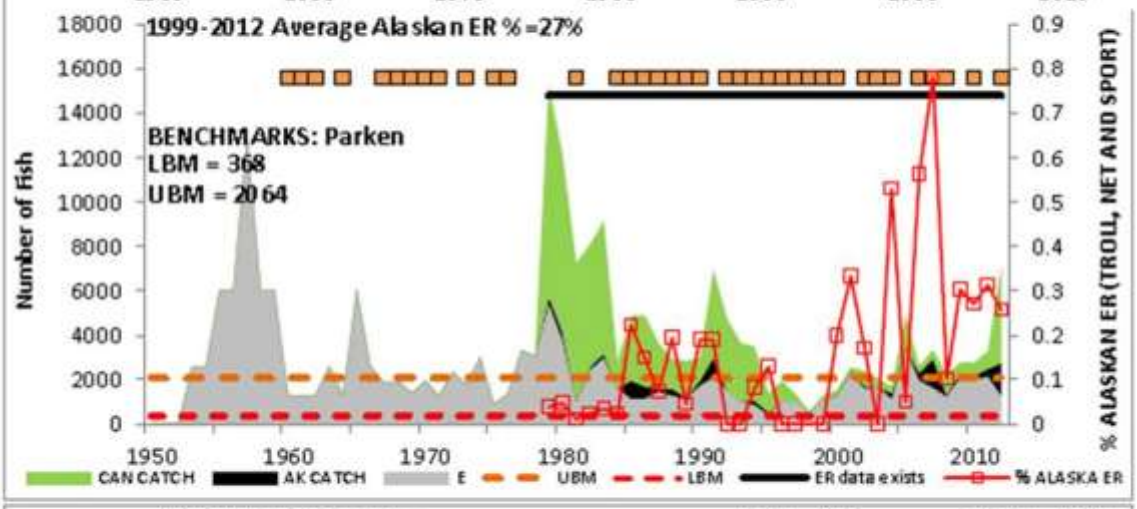
Chinook-East Vancouver Island-summer timing

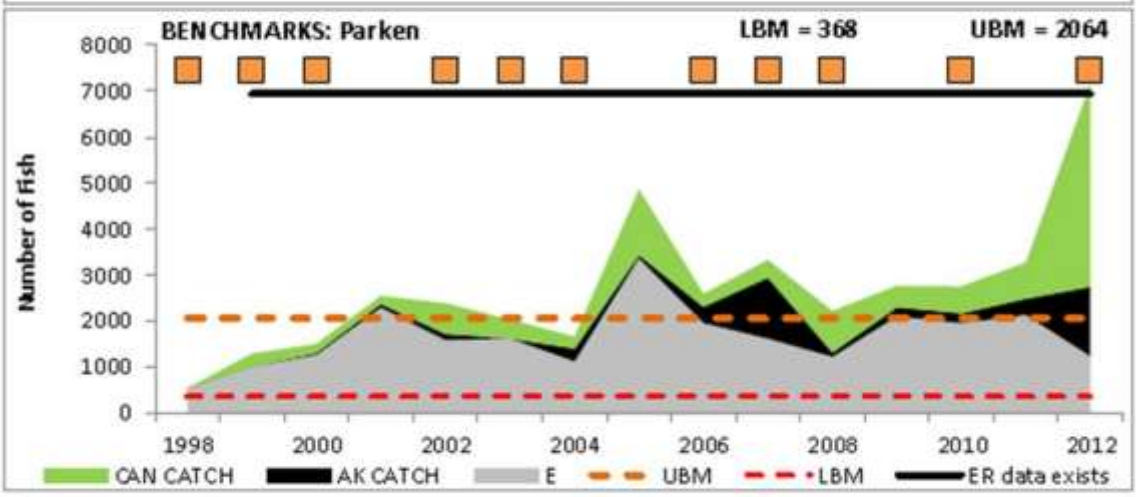
WILD SITES ONLY

ER INDICATOR: Chinook-Puntledge

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	34.8%	83.1%
WSP (current generation to long term ratio)	2009-2012:1953-2012	0.95	0.88







- Escapement was below lower benchmark.
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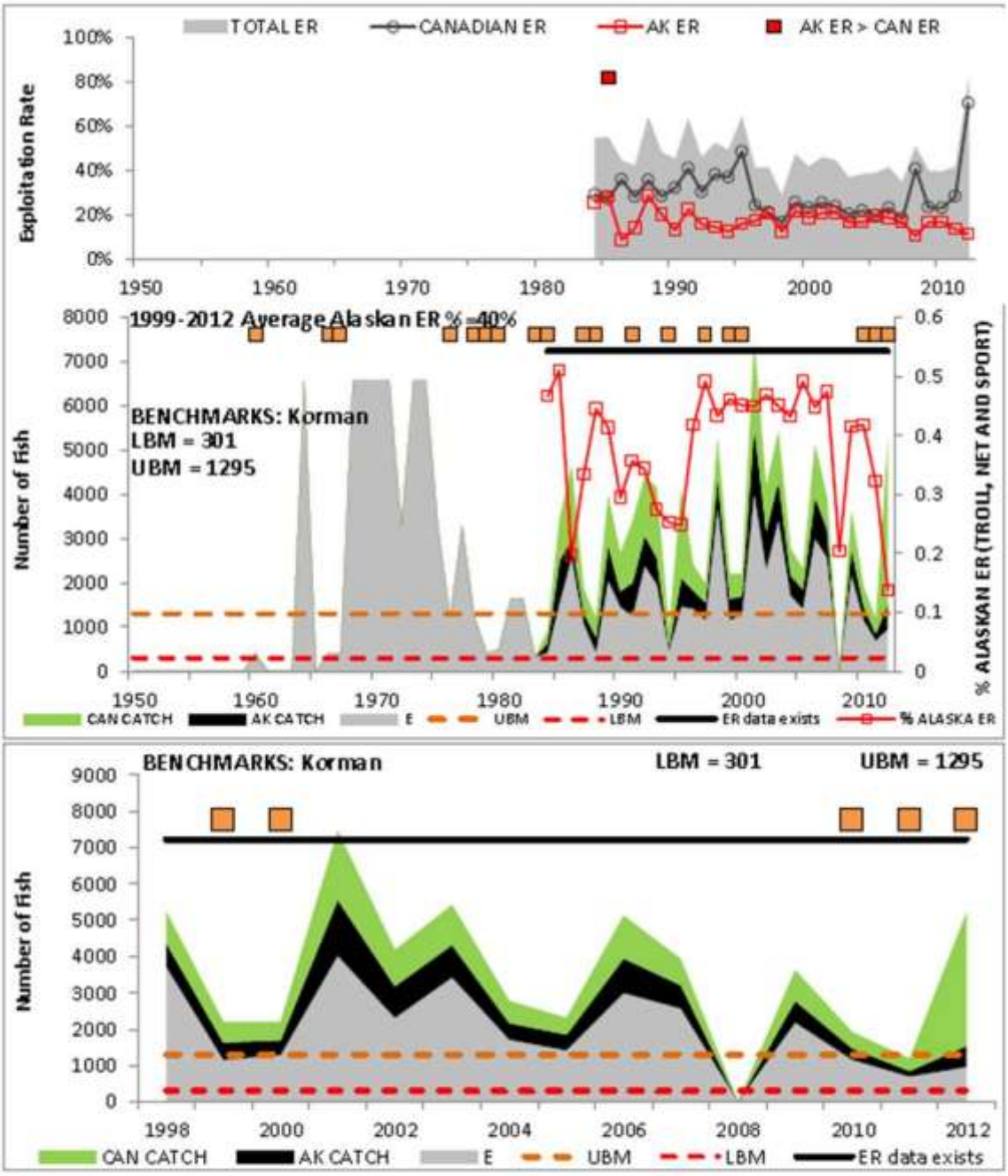
Chinook-Lower Skeena

WILD SITES ONLY

ER INDICATOR: Chinook-Skeena

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-40.9%	-37.4%
WSP (current generation to long term ratio)	2009-2012:1950-2012	0.95	0.97



Escapement was below lower benchmark.

Escapement was between upper and lower benchmarks.

Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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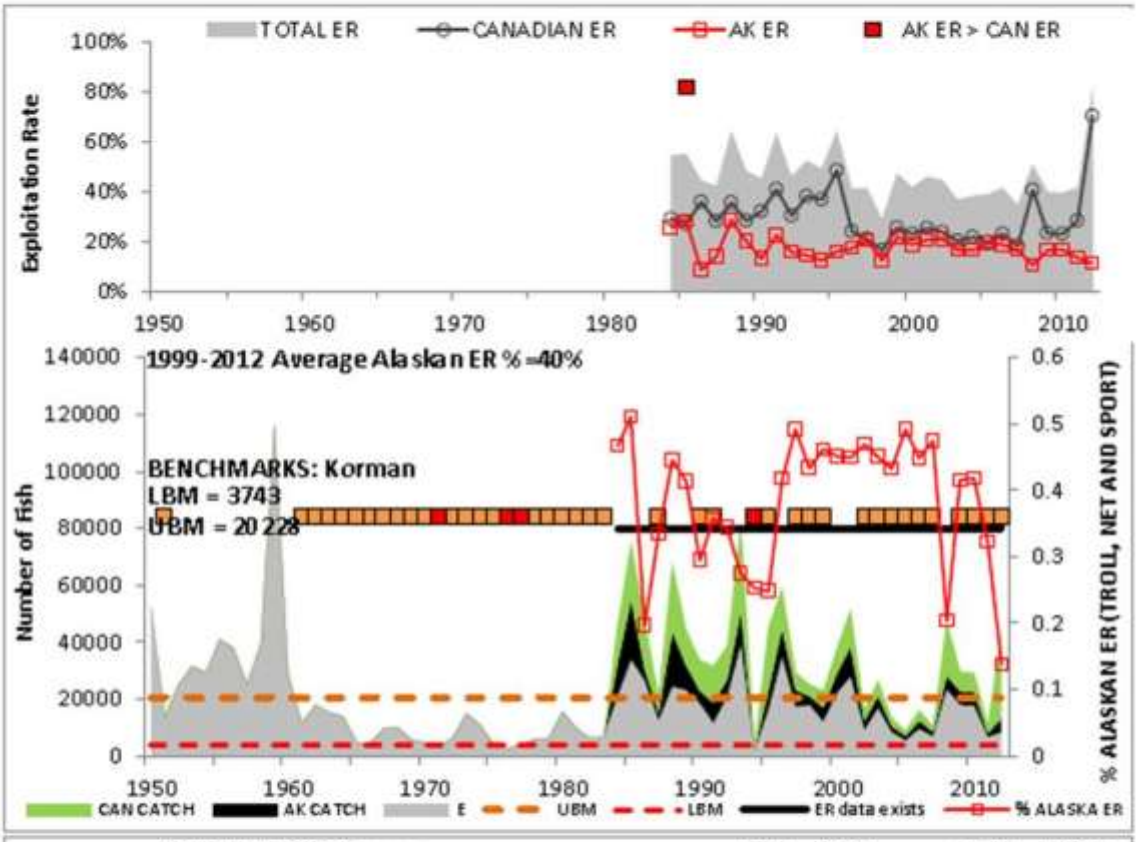
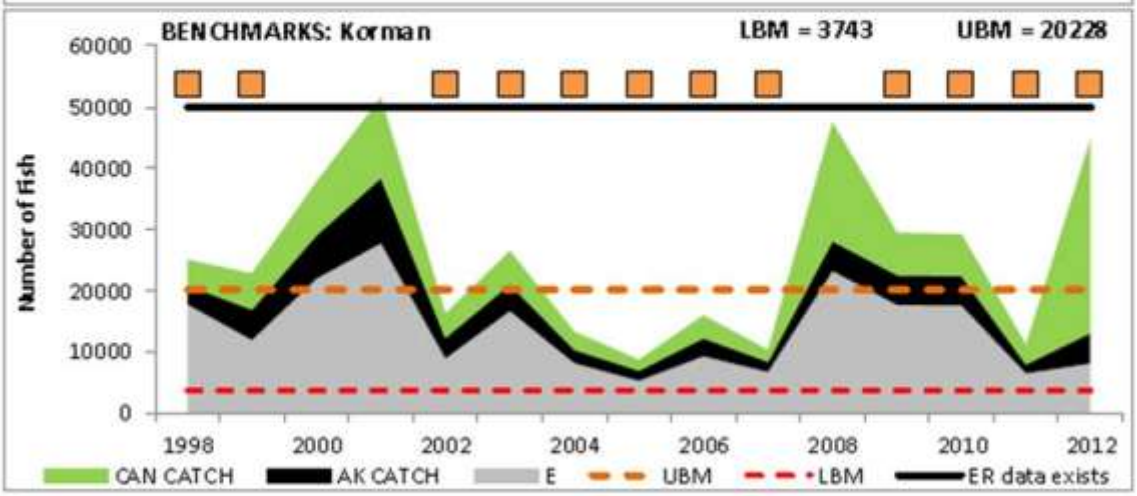
Chinook-Middle Skeena-large lakes

WILD SITES ONLY

ER INDICATOR: Chinook-Skeena

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-37.8%	-36.2%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.89	0.71





Escapement was below lower benchmark.

Escapement was between upper and lower benchmarks.

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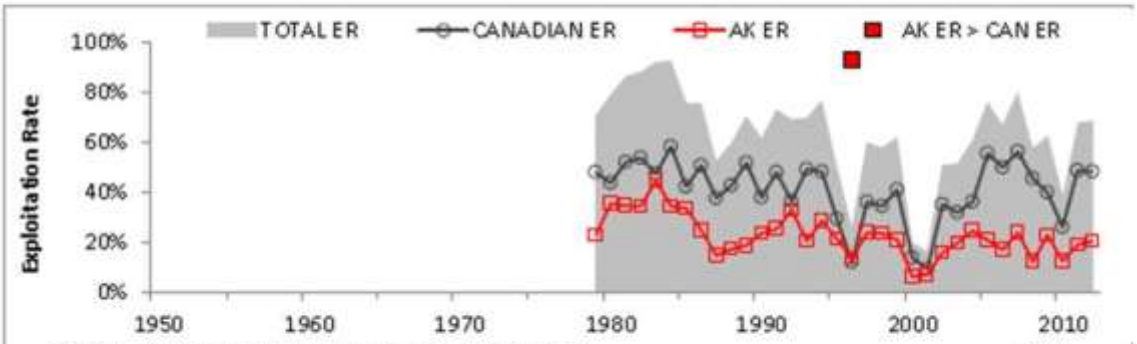
© Marine Stewardship Council, 2011

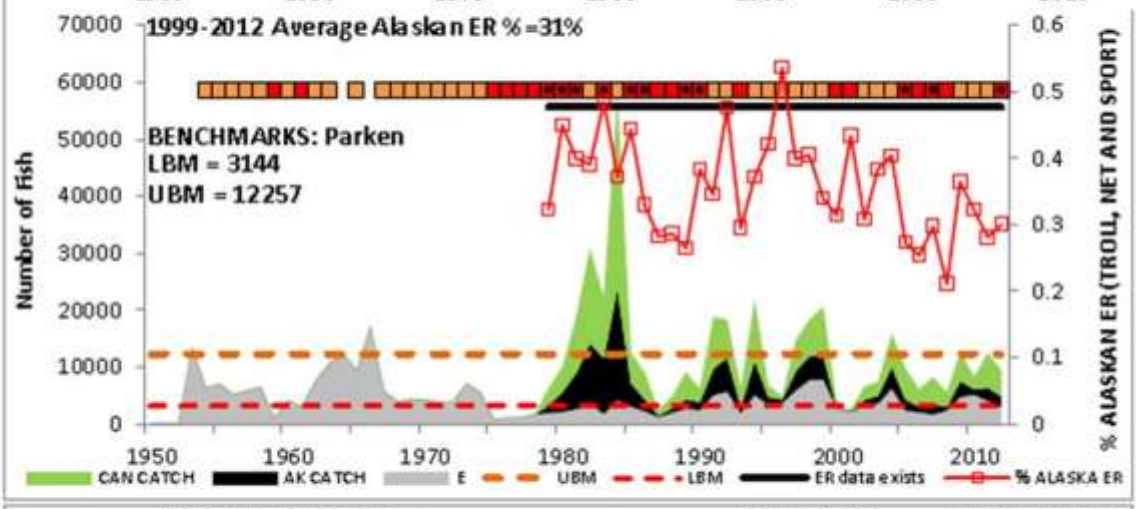
Chinook-Nootka and Kyuquot

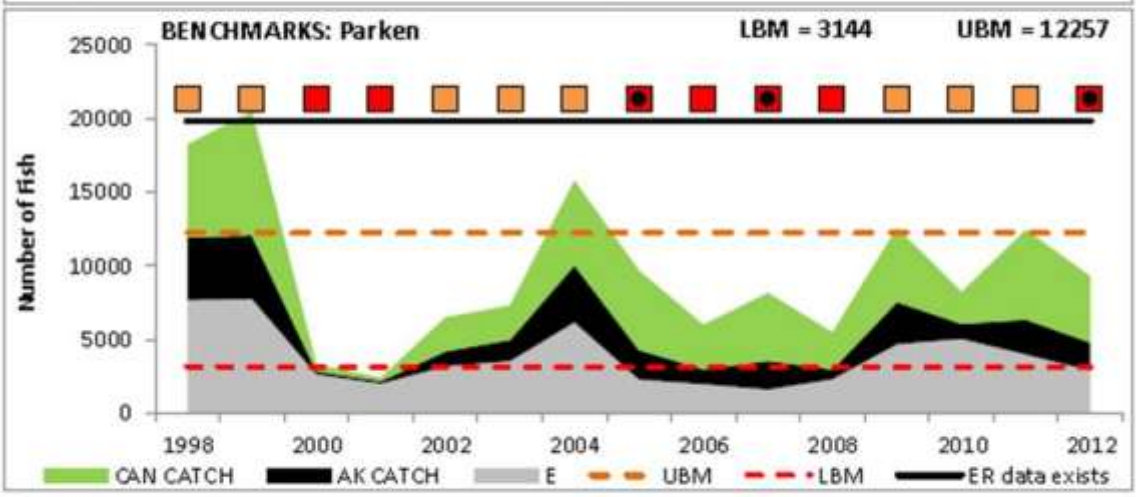
WILD SITES ONLY

ER INDICATOR: Chinook-Robertson

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-8.3%	61.6%
WSP (current generation to long term ratio)	2009-2012:1953-2012	0.92	0.91







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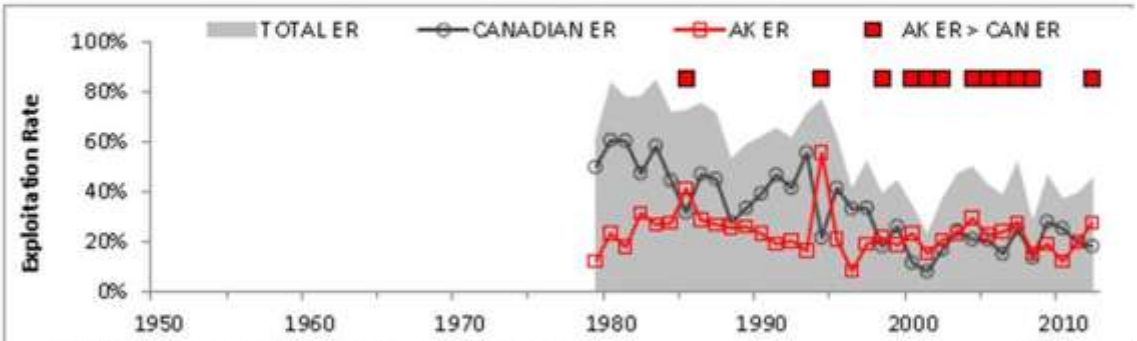
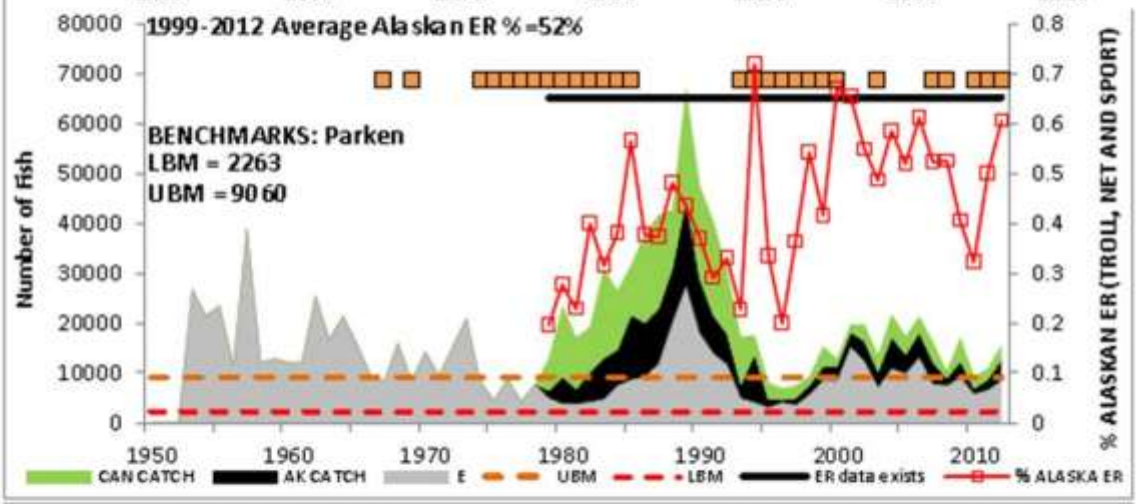
Chinook-Northeast Vancouver Island

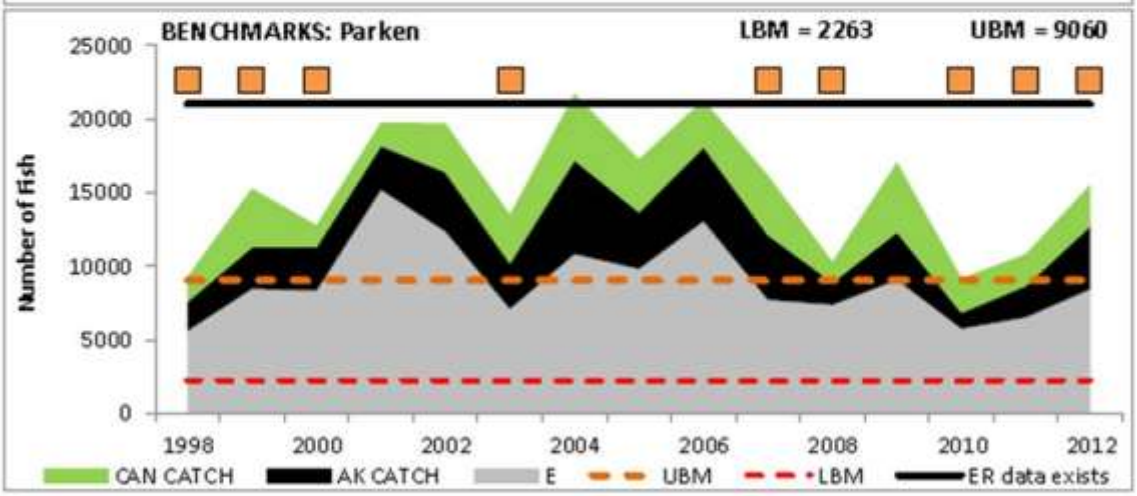
WILD SITES ONLY

ER INDICATOR: Chinook-Quinsam

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-29.7%	-23.4%
WSP (current generation to long term ratio)	2009-2012:1953-2012	0.79	0.68







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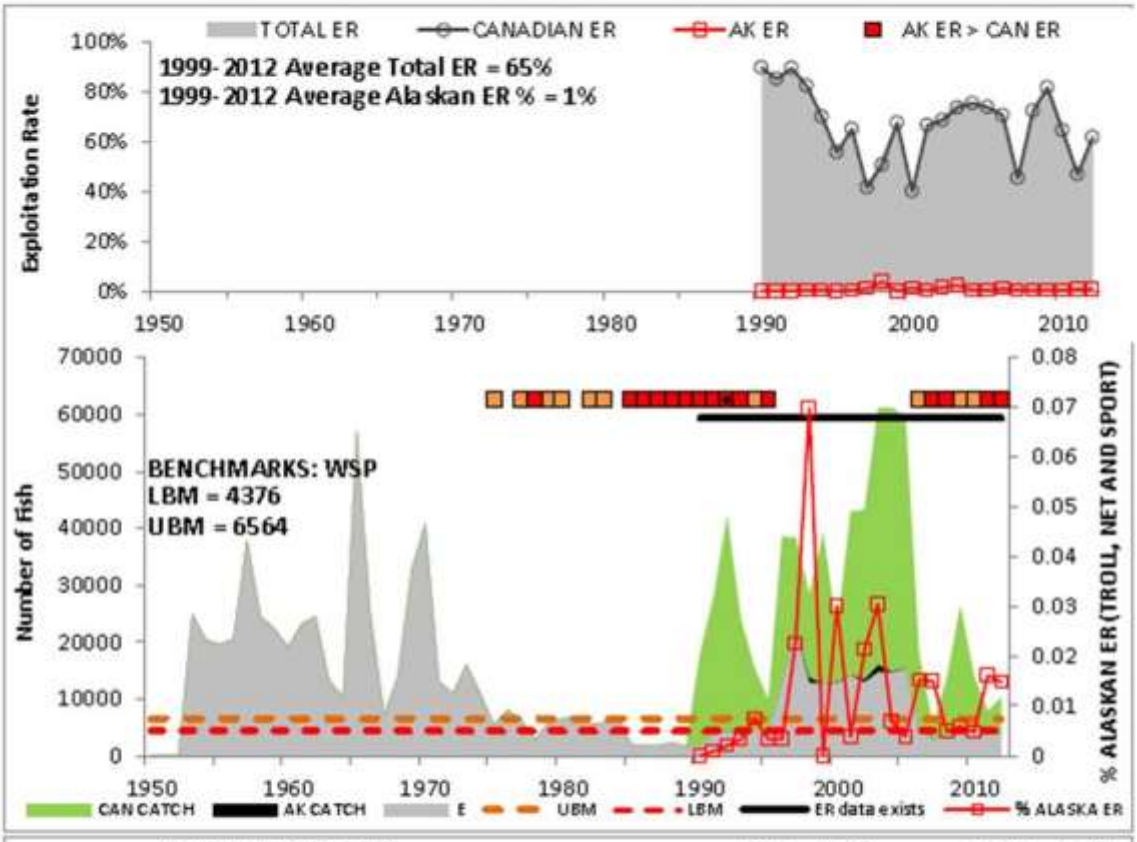
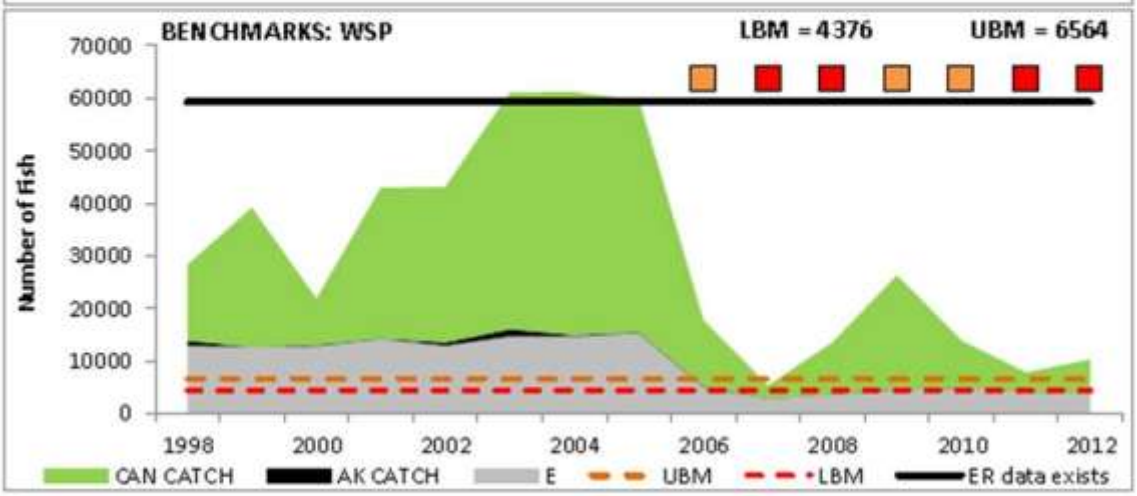
Chinook-South Coast-Georgia Strait

WILD SITES ONLY

ER INDICATOR: Chinook-Cowichan

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-79.1%	-76.0%
WSP (current generation to long term ratio)	2009-2012:1953-2012	0.47	0.53





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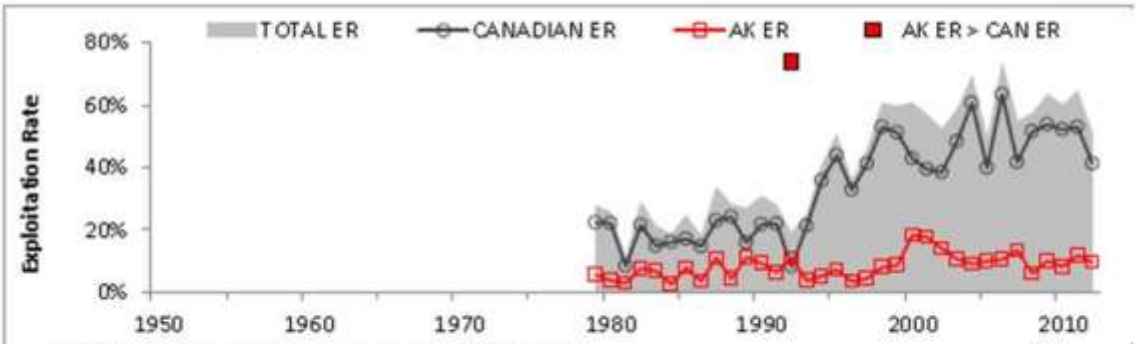
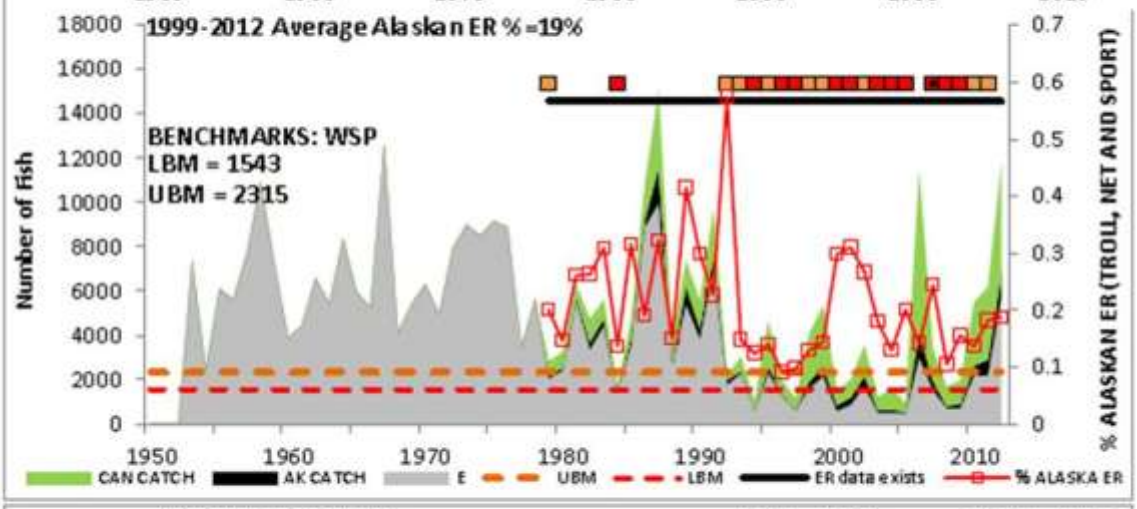
Chinook-South Coast-southern fjords

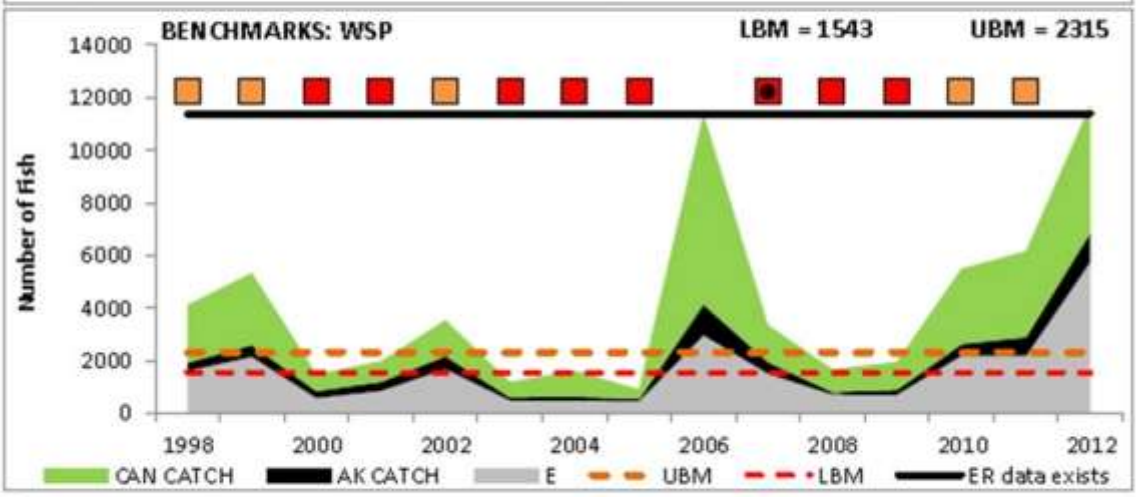
WILD SITES ONLY

ER INDICATOR: Chinook-Big Qualicum

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	71.4%	84.2%
WSP (current generation to long term ratio)	2009-2012:1953-2012	0.45	1.06







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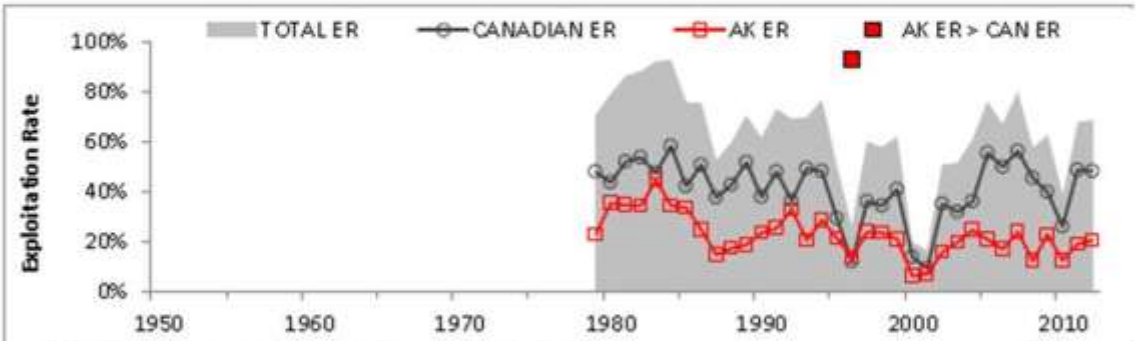
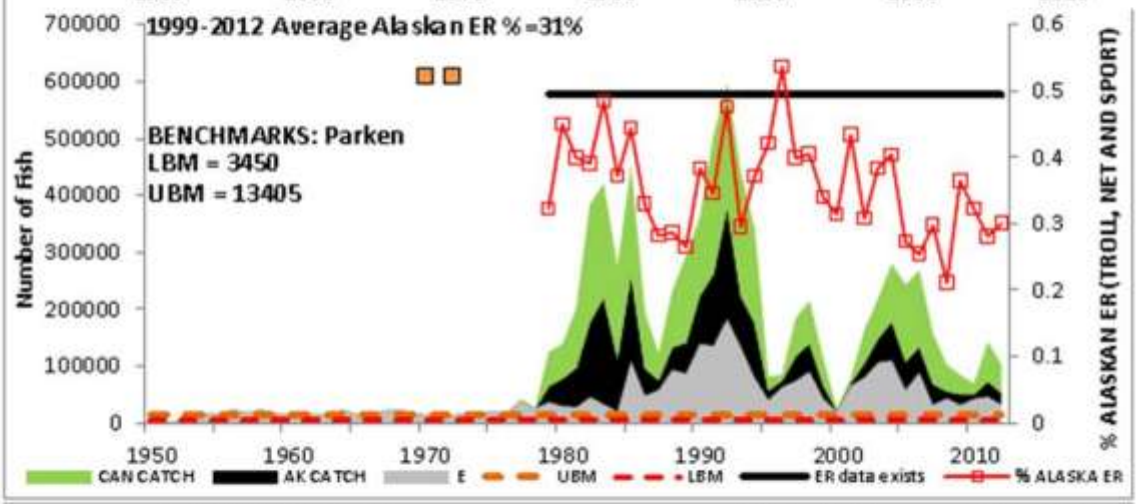
Chinook-Southwest Vancouver Island

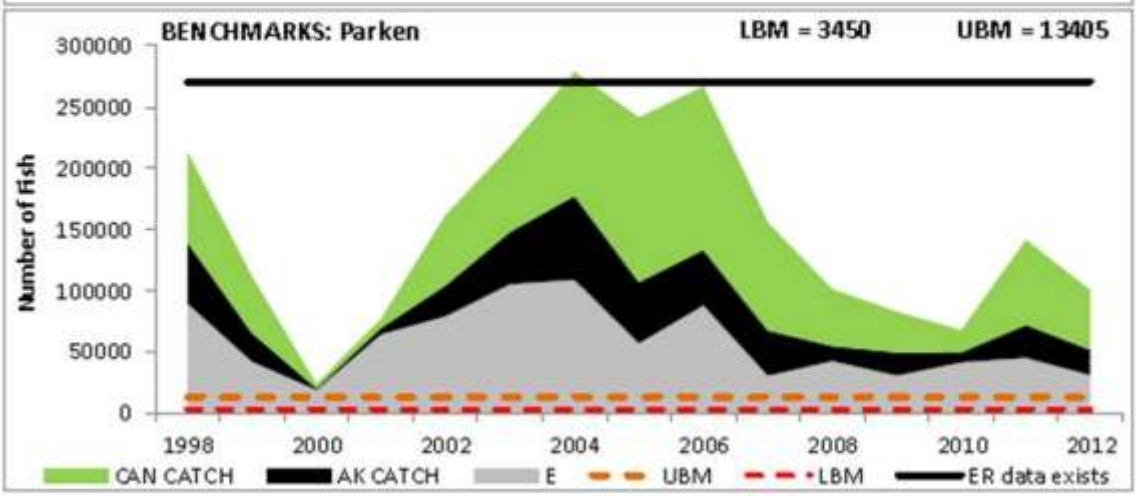
WILD SITES ONLY

ER INDICATOR: Chinook-Robertson

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-37.5%	10.0%
WSP (current generation to long term ratio)	2009-2012:1953-2012	1.16	0.57







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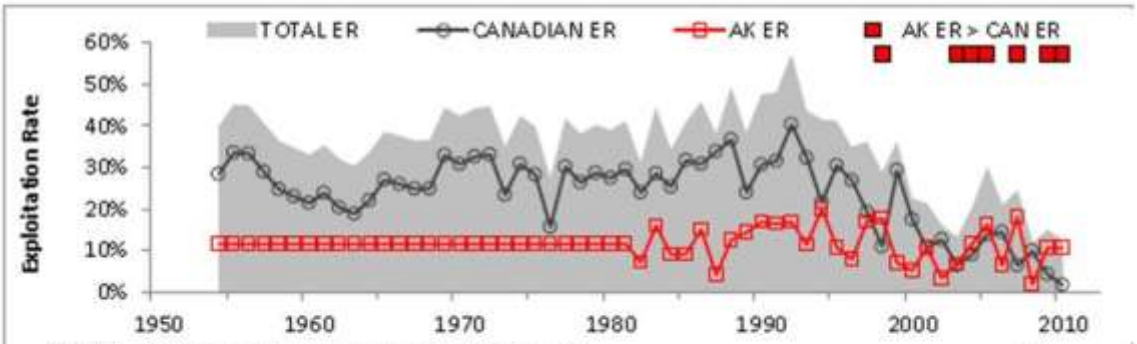
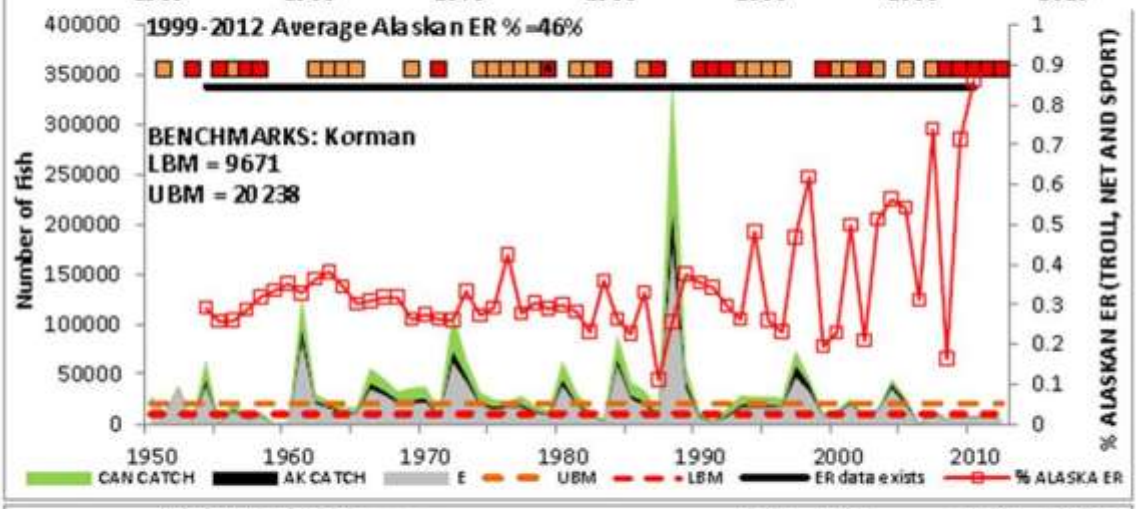
Chum-Lower Skeena

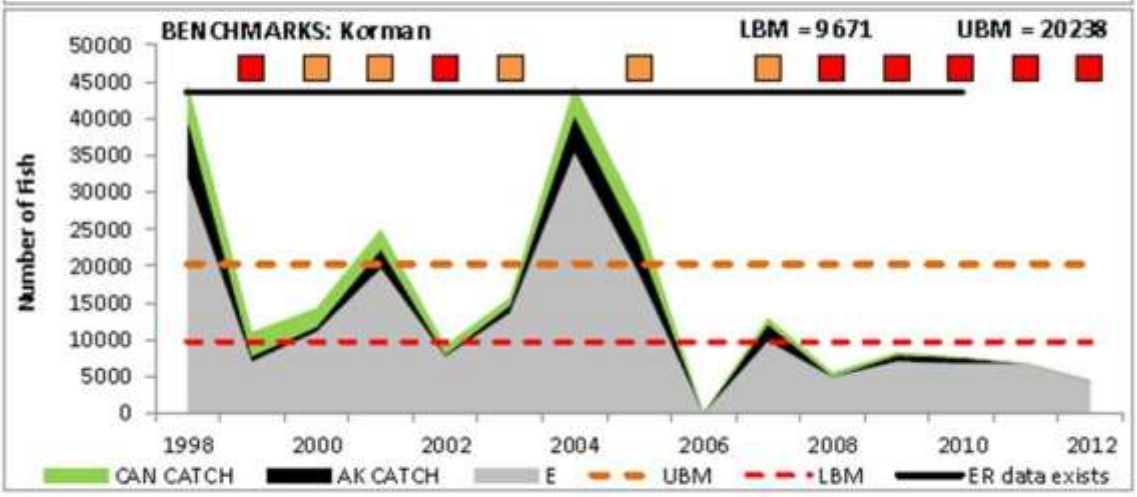
WILD SITES ONLY

ER INDICATOR: Chum-Area 4

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-60.8%	-60.0%
WSP (current generation to long term ratio)	2009-2012:1950-2012	0.45	0.53







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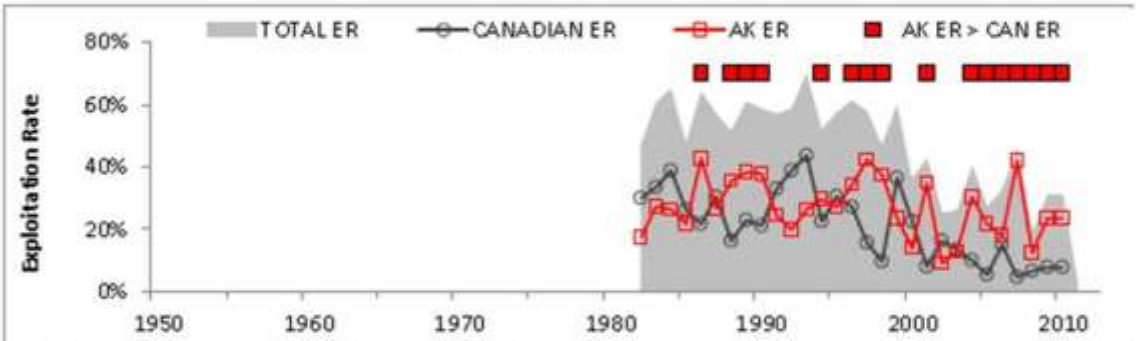
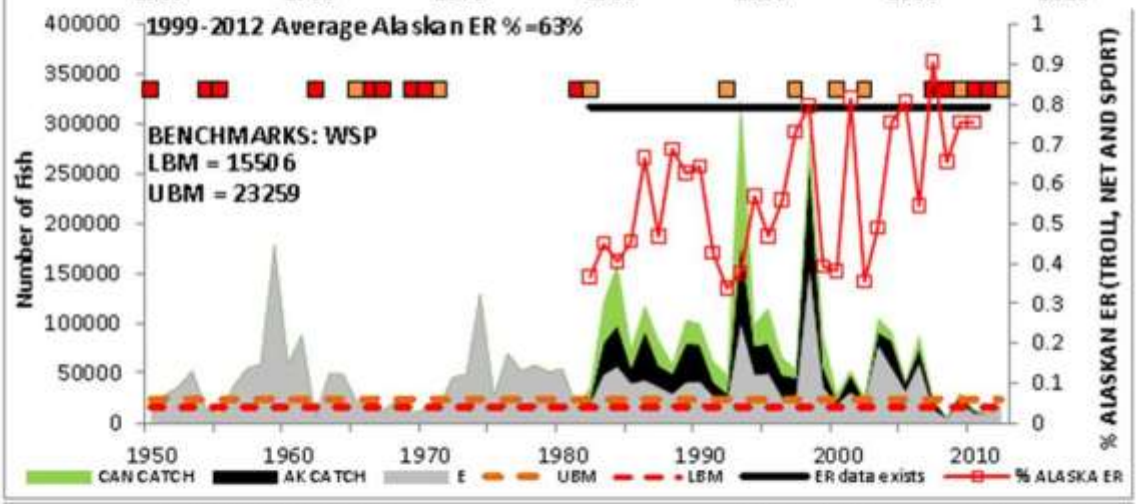
Chum-Portland Canal-Observatory

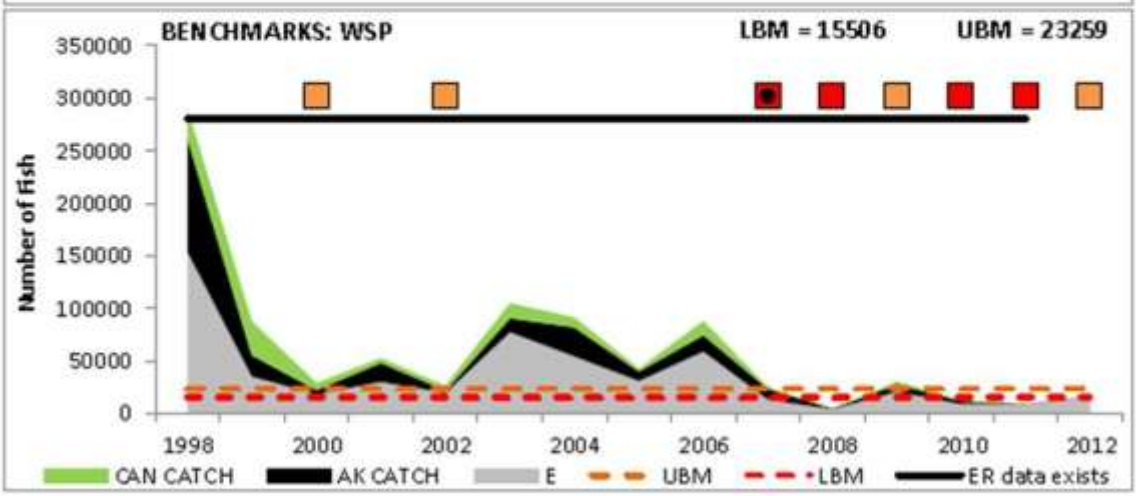
WILD SITES ONLY

ER INDICATOR: Chum-Area 3

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-76.1%	-75.5%
WSP (current generation to long term ratio)	2009-2012:1934-2012	0.38	0.43







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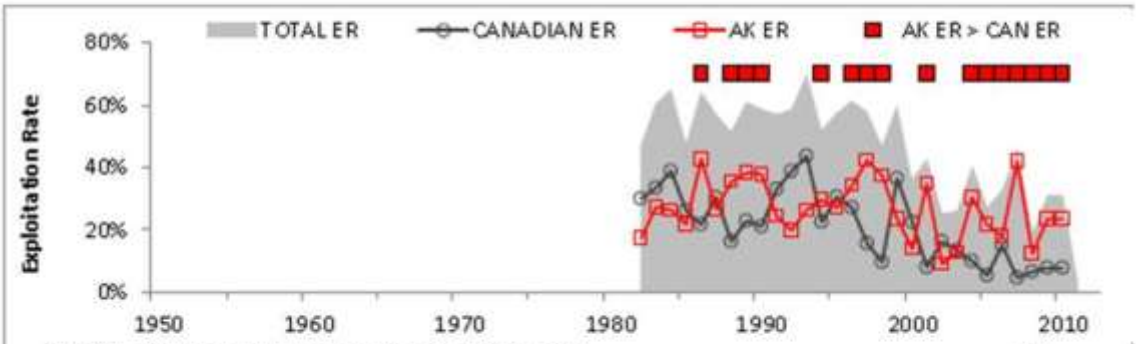
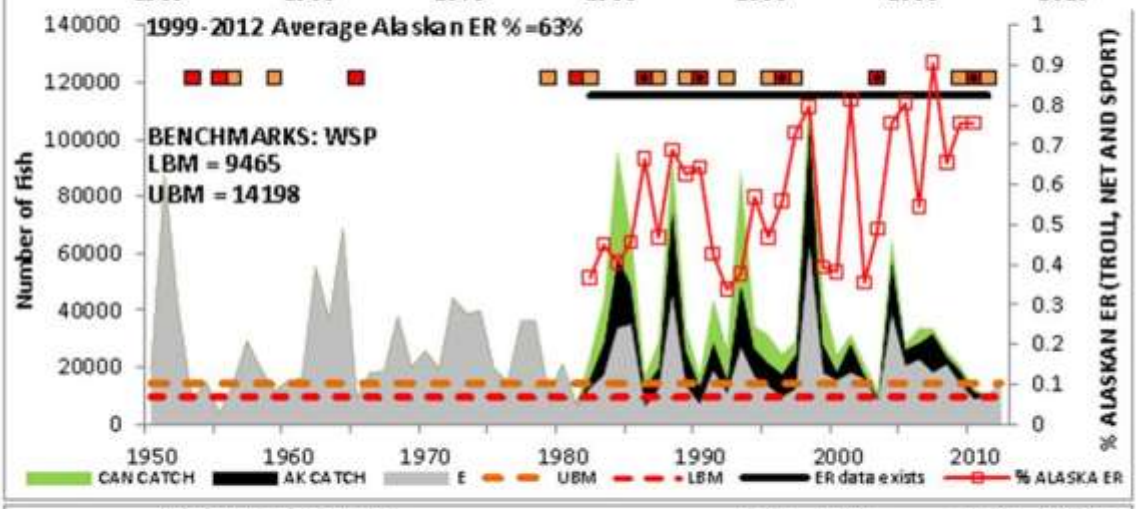
Chum-Portland Inlet

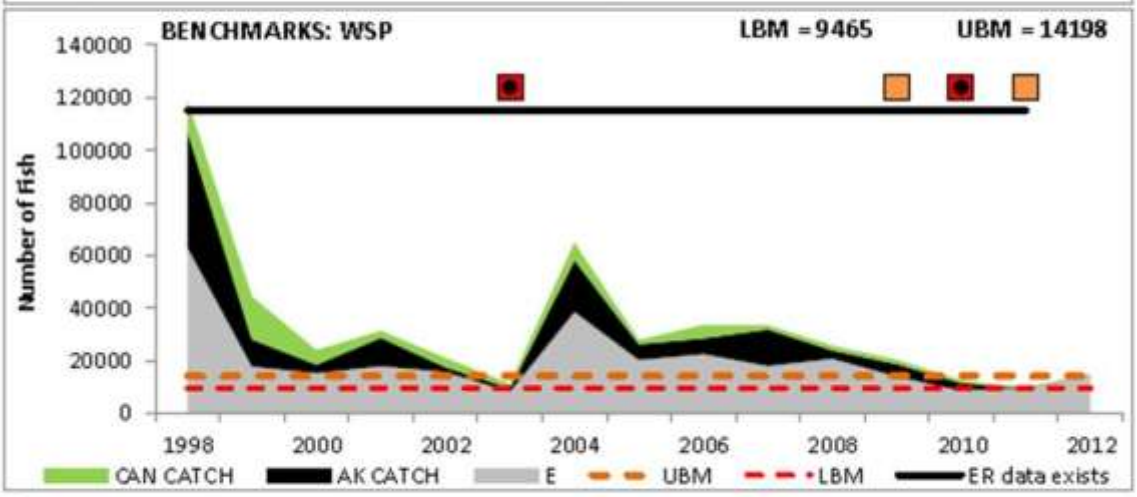
WILD SITES ONLY

ER INDICATOR: Chum-Area 3

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-29.8%	-38.0%
WSP (current generation to long term ratio)	2009-2012:1934-2012	0.74	0.87







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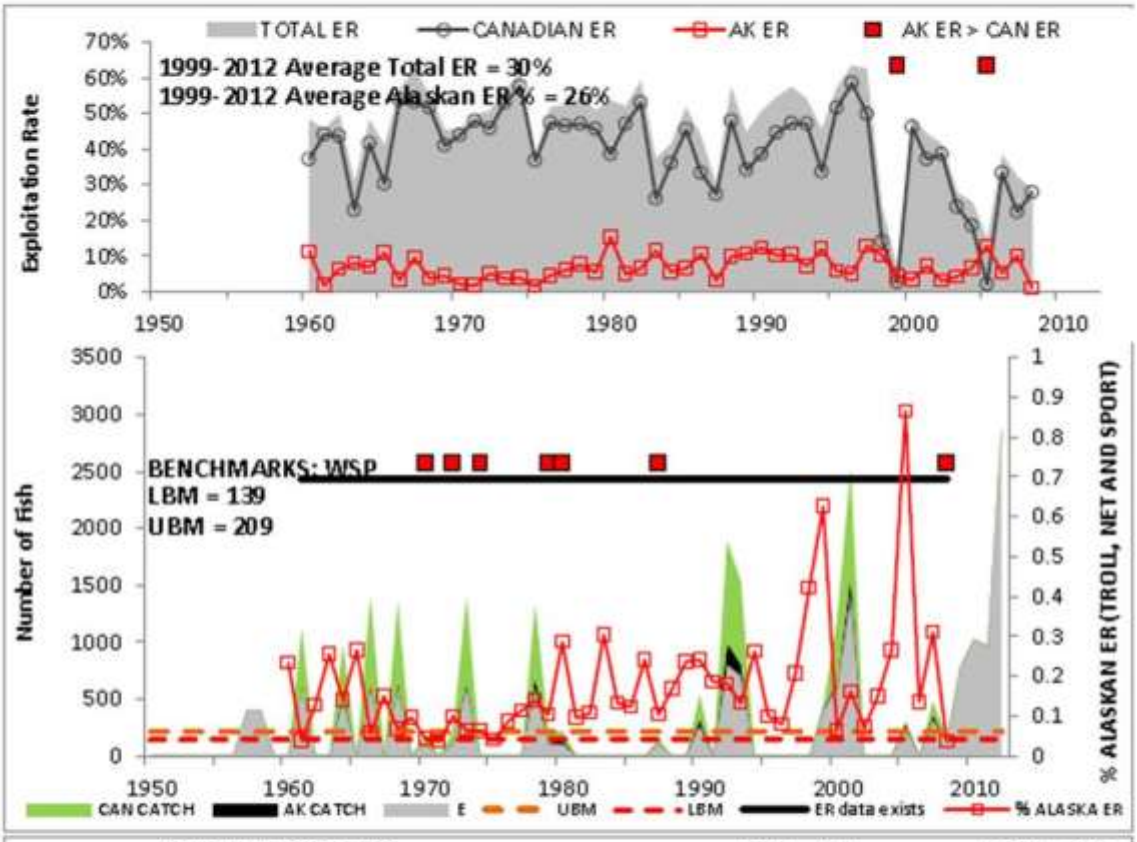
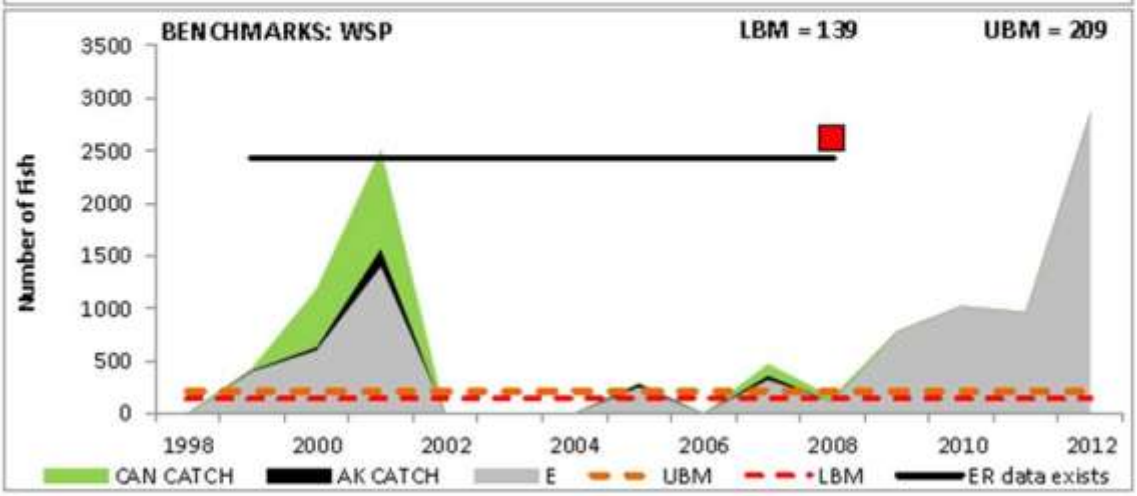
Sockeye-Lake-Asitika

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Bear

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-44.0%	-70.7%
WSP (current generation to long term ratio)	2008-2012:1950-2012	1.38	1.26





Escapement was below lower benchmark.

Escapement was between upper and lower benchmarks.

Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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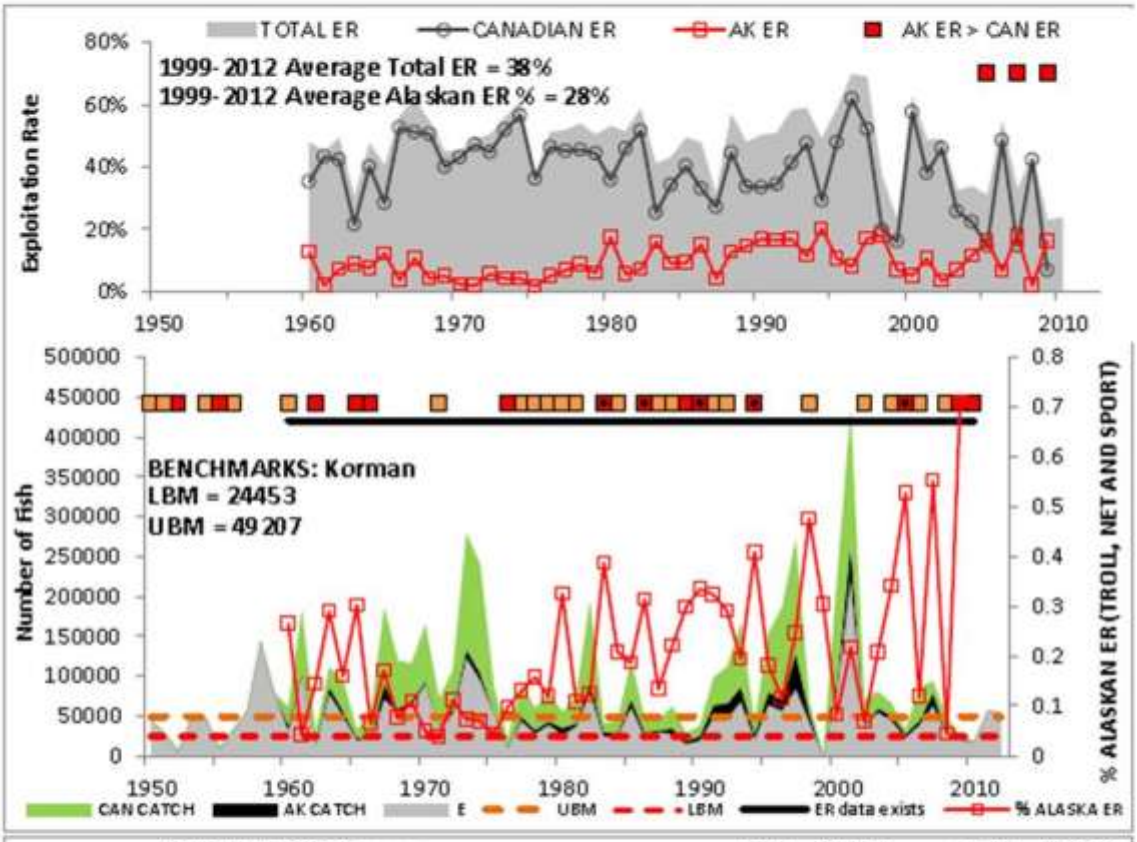
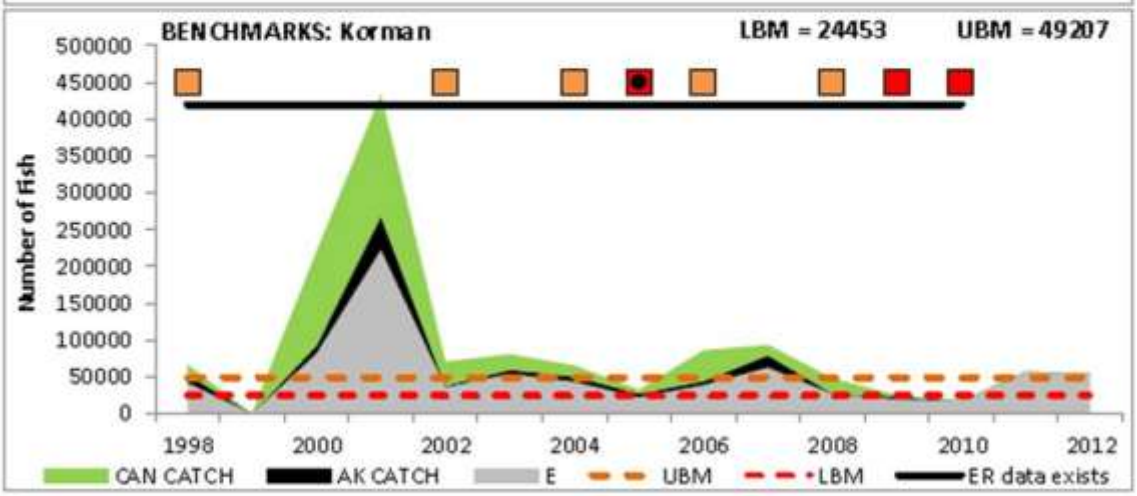
Sockeye-Lake-Babine(Early-Wild)

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Babine

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-61.4%	-69.6%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.79	0.70





- Escapement was below lower benchmark.
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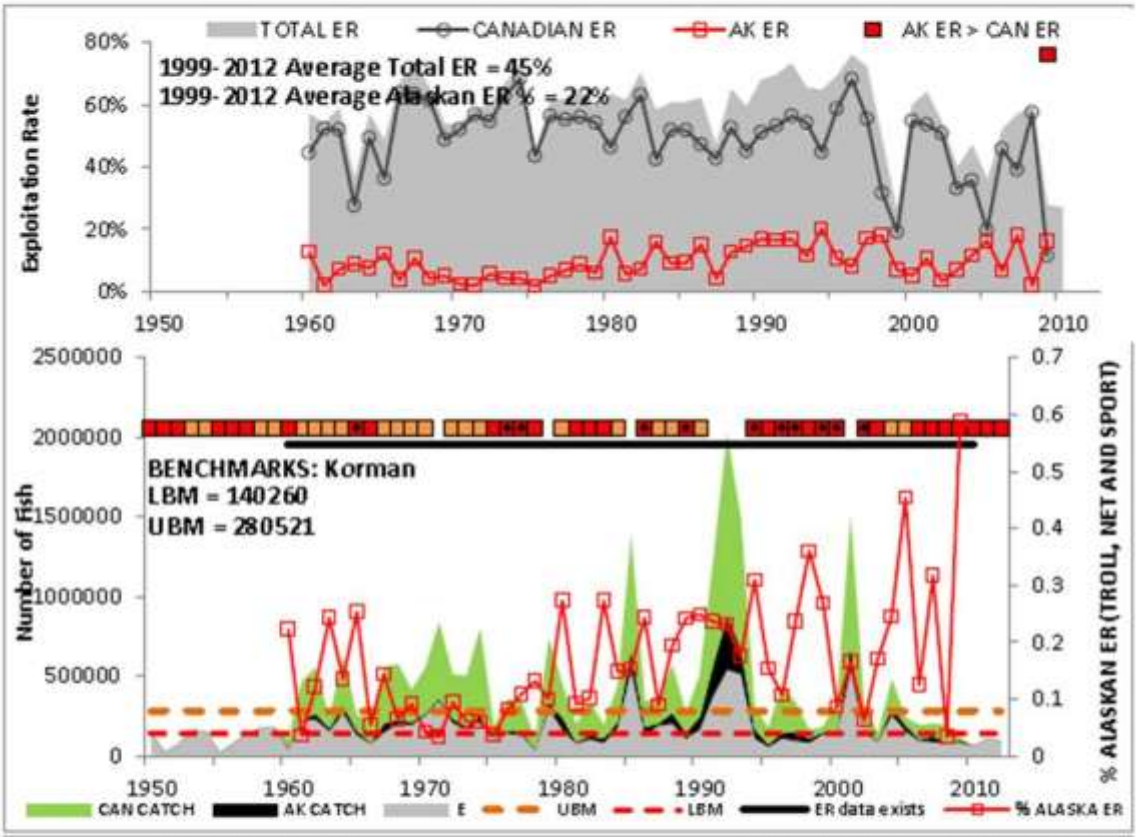
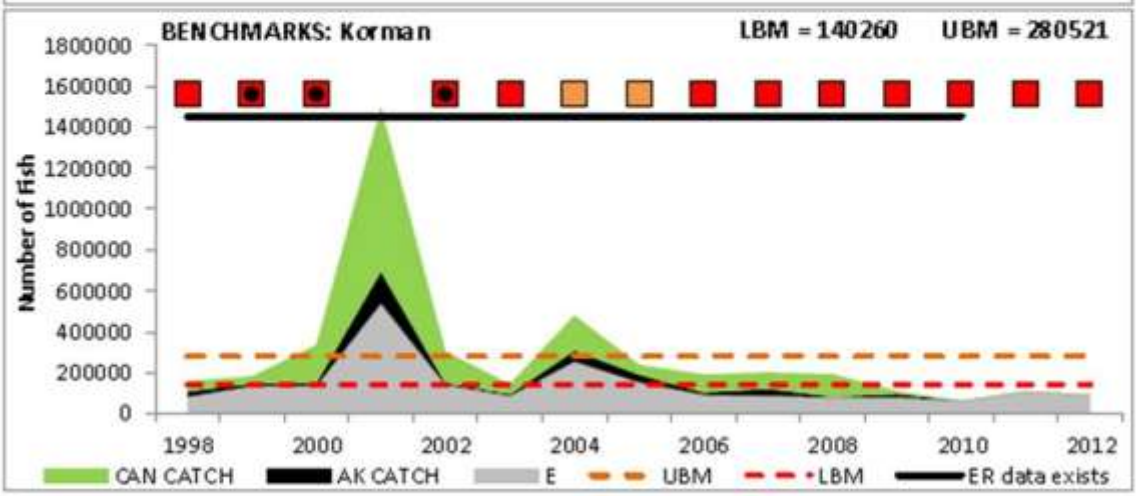
Sockeye-Lake-Babine(Late-Wild)

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Babine

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-26.3%	-53.0%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.68	0.58





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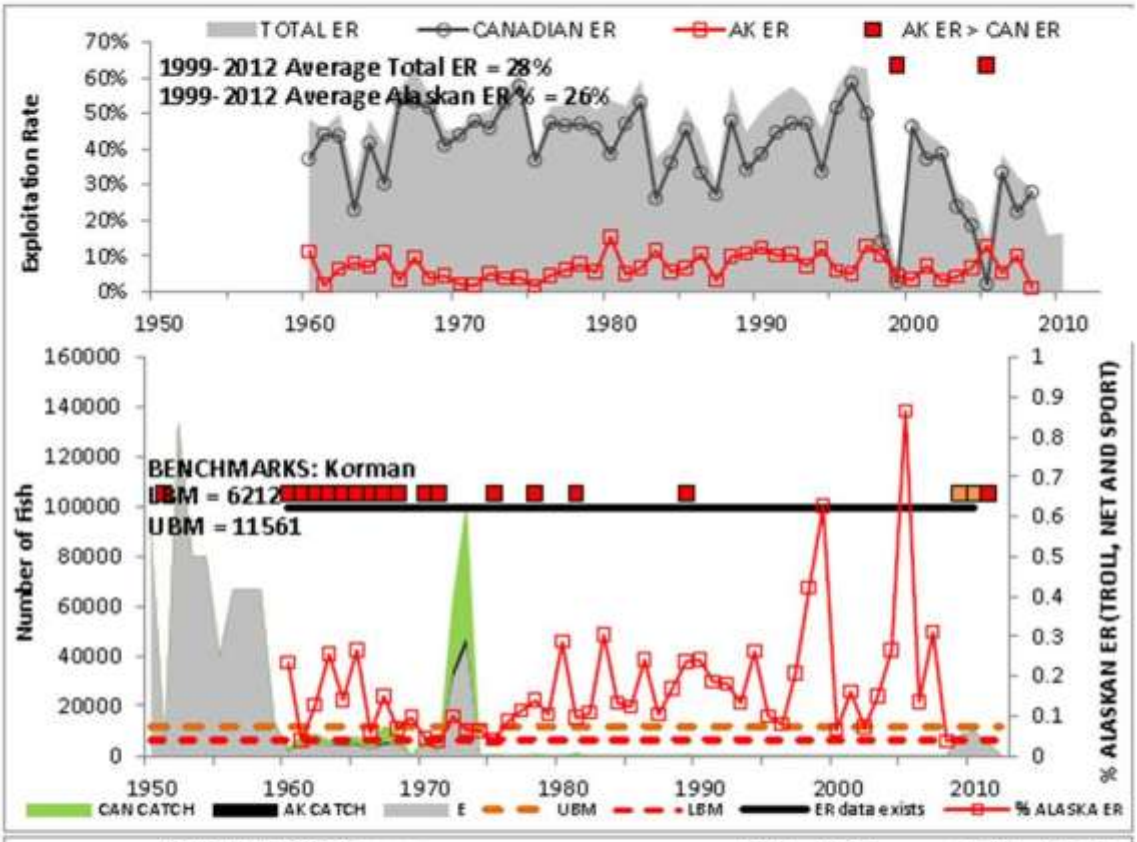
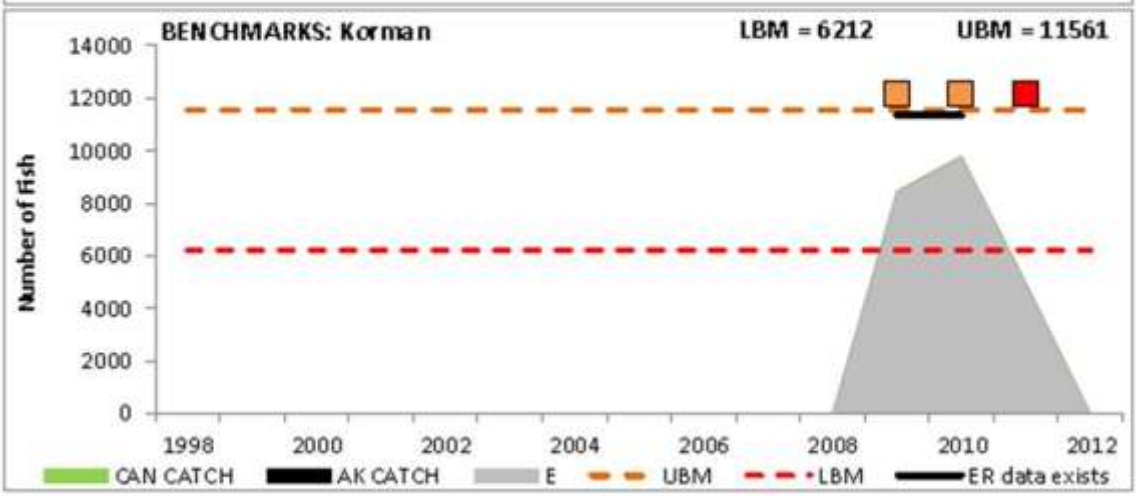
Sockeye-Lake-Bear

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Bear

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-75.8%	N/A
WSP (current generation to long term ratio)	2008-2012:1950-2012	1.14	N/A





- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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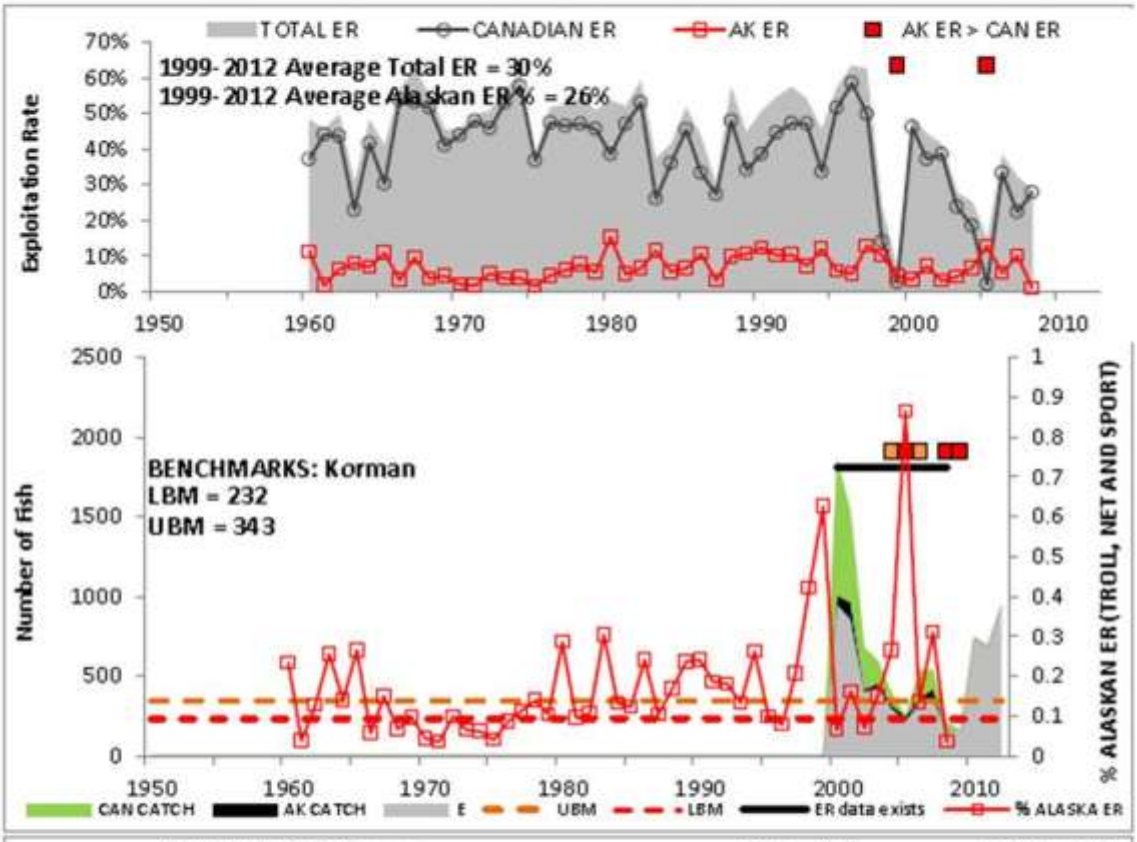
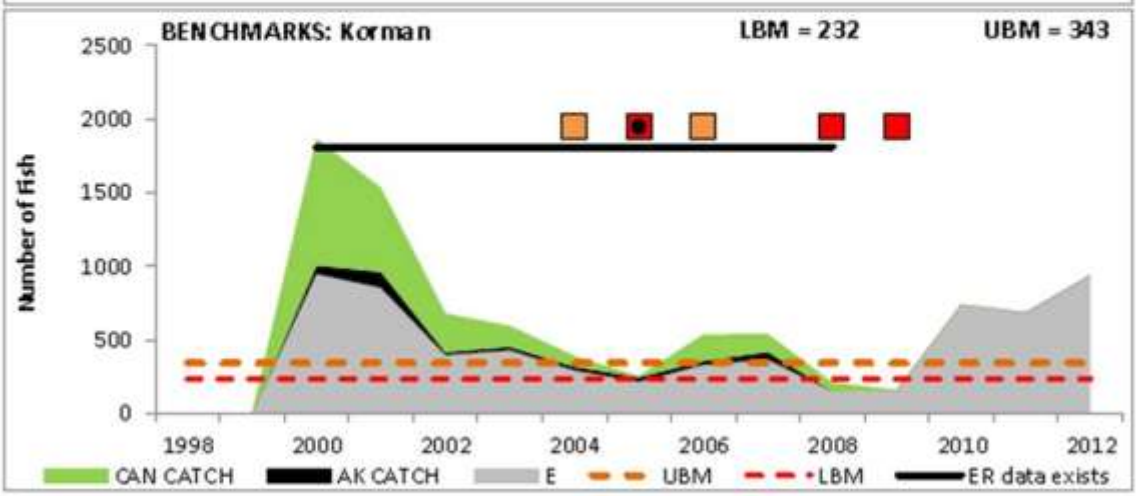
Sockeye-Lake-Damshilgwit

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Bear

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	2001-2012	-57.0%	-86.2%
WSP (current generation to long term ratio)	2009-2012:1950-2012	0.84	0.64





- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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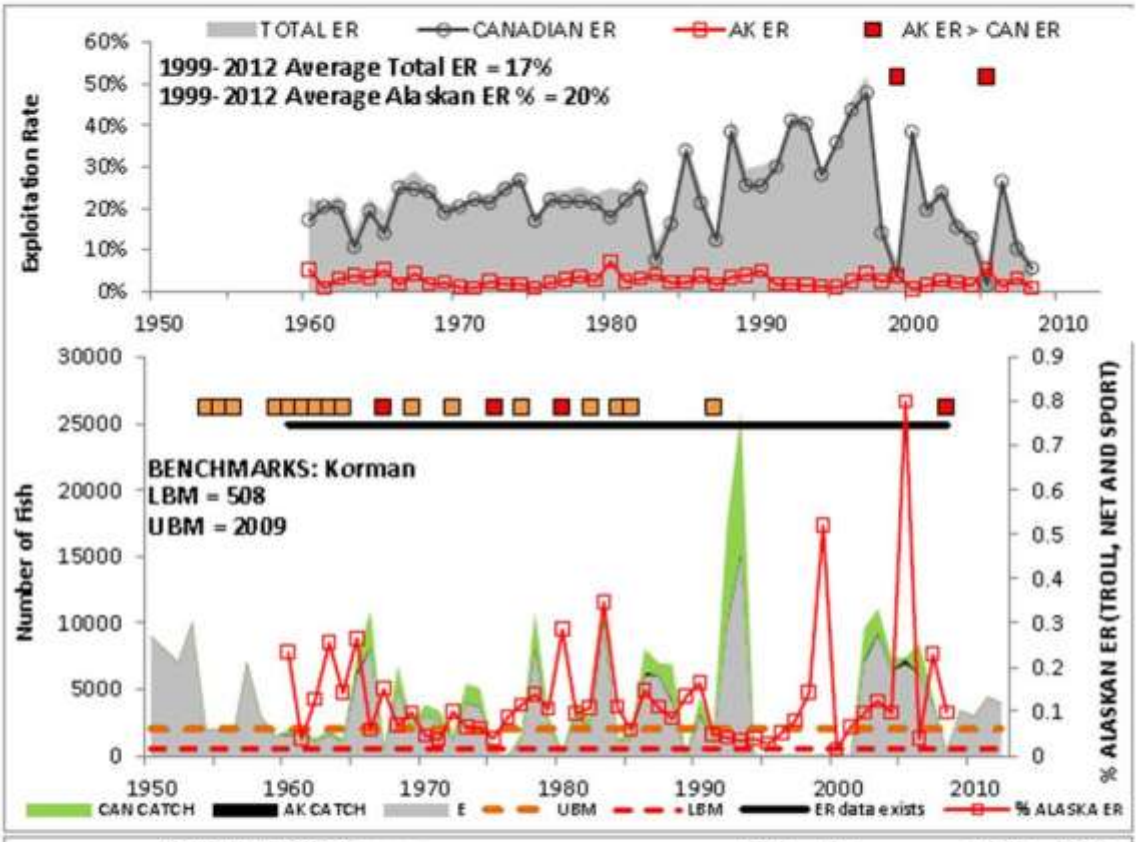
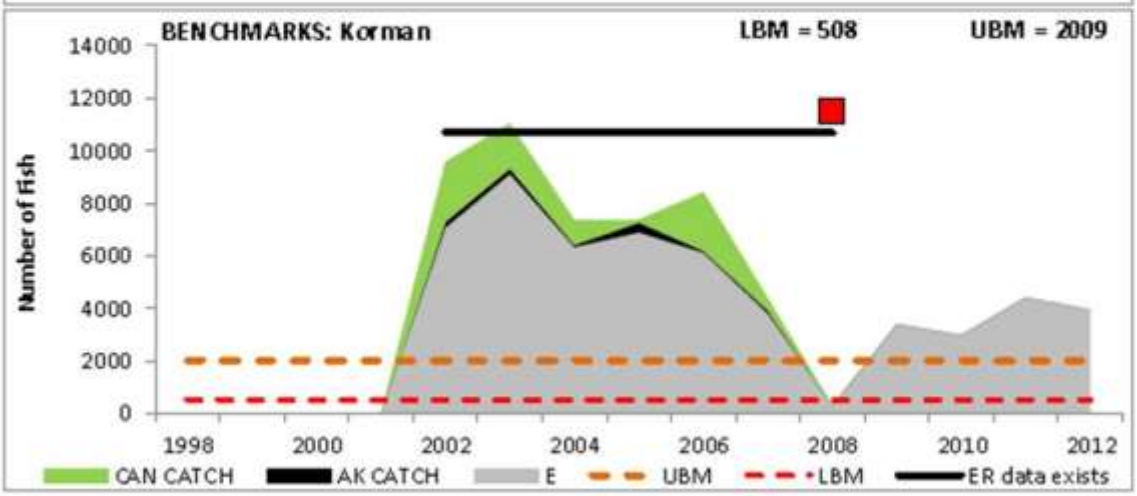
Sockeye-Lake-Mcdonell

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Mcdonell

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-91.9%	-88.6%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.85	1.25





- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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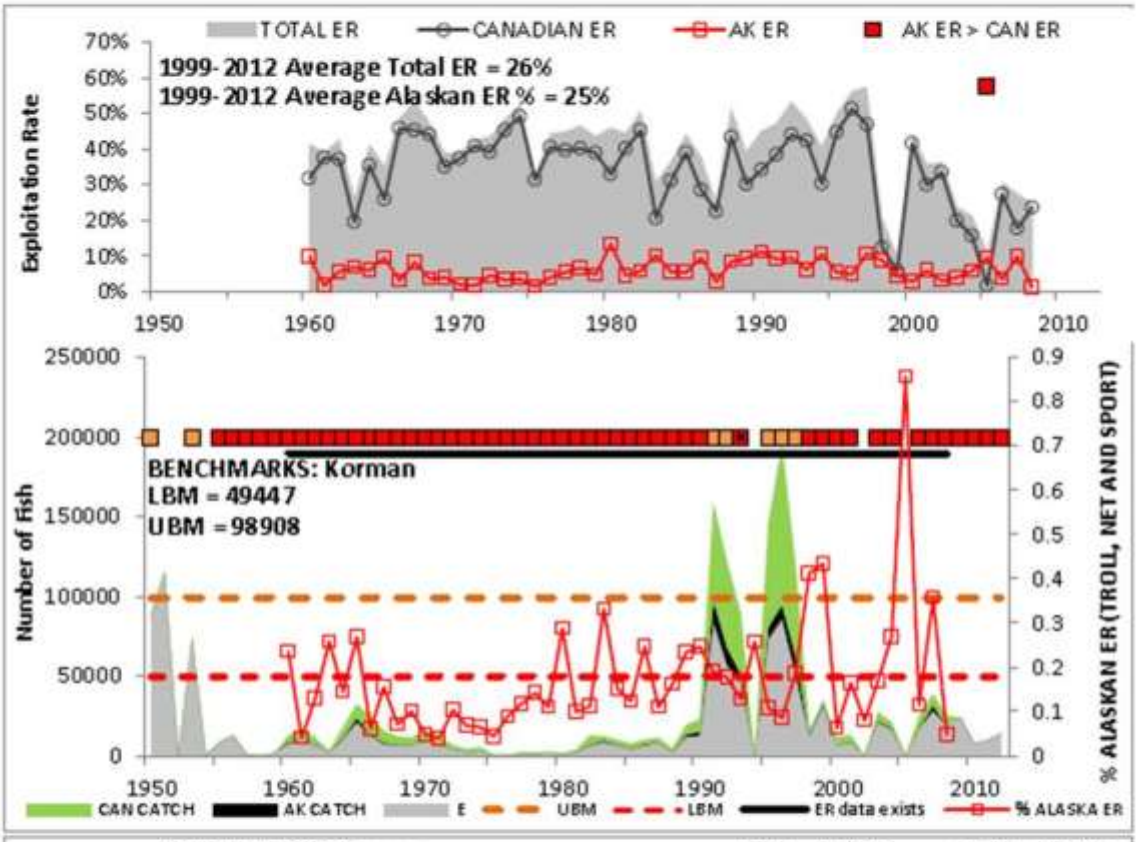
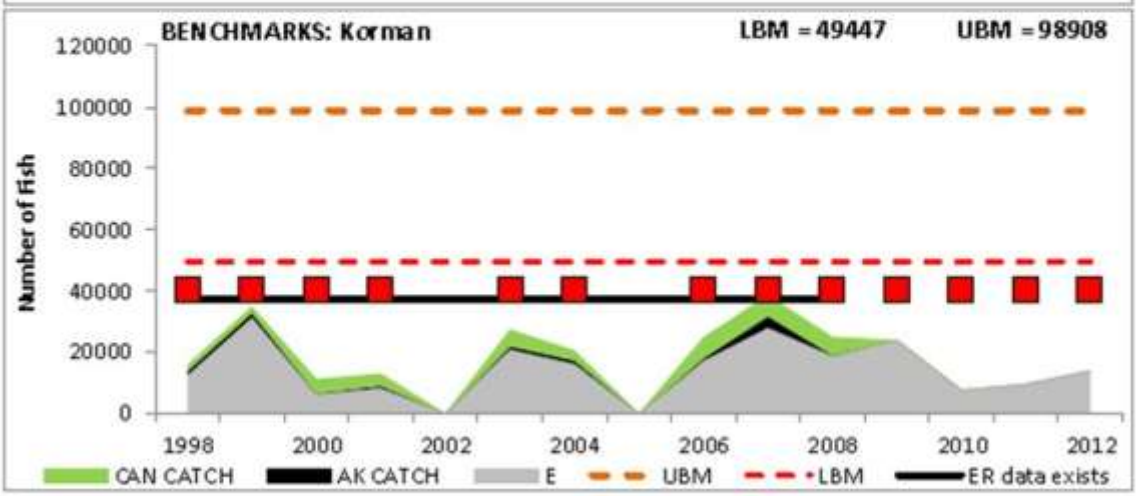
Sockeye-Lake-Morice

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Morice

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-45.4%	-87.4%
WSP (current generation to long term ratio)	2008-2012:1950-2012	2.17	1.71





- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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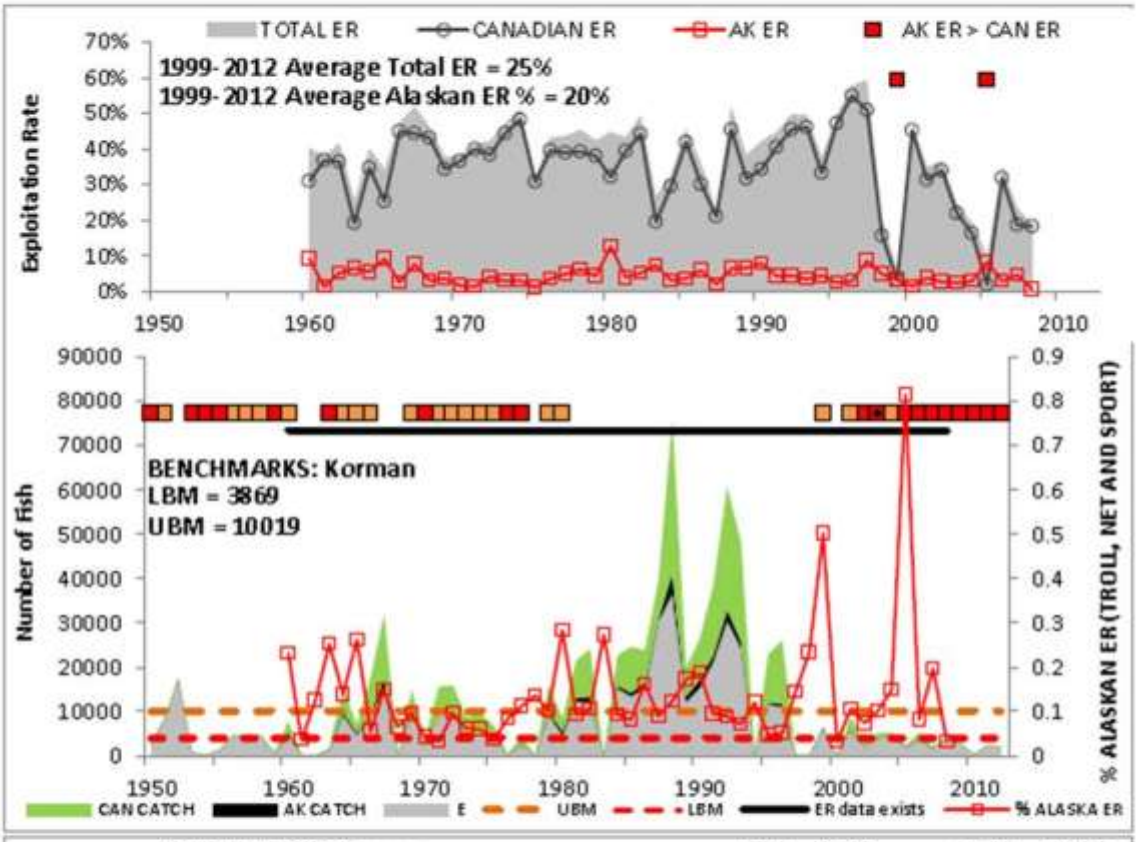
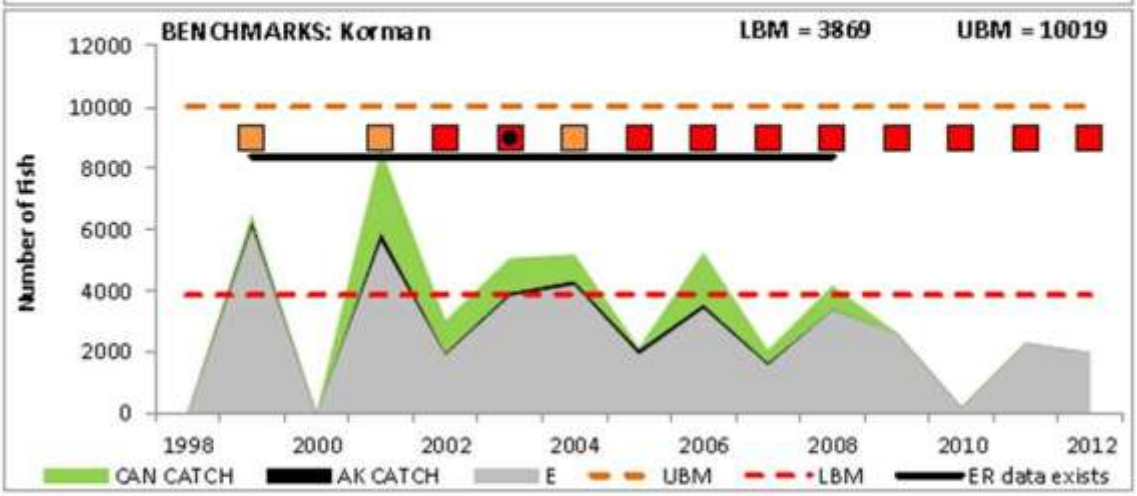
Sockeye-Lake-Swan

WILD SITES ONLY

ER INDICATOR: Sockeye-Lake-Swan

CU Status	Date Range	ESC	ABUND
COSEWIC (trend in last 3 generations)	1998-2012	-85.6%	-94.6%
WSP (current generation to long term ratio)	2008-2012:1950-2012	0.38	0.40





- Escapement was below lower benchmark.
- Escapement was between upper and lower benchmarks.
- Escapement was below lower benchmark but would have been above if Alaska catch was zero.

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Skeena Wild Conservation Trust

SkeenaWild CONSERVATION TRUST
4505 Greig Avenue, Terrace, British Columbia, Canada, V8G 1M6
Tel: 250.638.0998 E-mail: info@skeenawild.org Web: www.skeenawild.org

August 28, 2013
Dr. Rob Blyth-Skyrme
Intertek Moody Marine
1801 Hollis Street, Suite 1220
Halifax, Nova Scotia,
B3J 3N4 Canada

Re: Alaska Salmon Fishery Public Comment Draft Report

Dear Mr. Blyth-Skyrme,

SkeenaWild Conservation Trust (SWCT) has been involved in the recertification process for Alaskan salmon since 2012, and has worked extensively on MSC certifications for sockeye, pink, and chum salmon in British Columbia since 2007. SWCT had hoped to provide feedback on the PCDR with the intention of strengthening fisheries certification. Upon reviewing the PCDR it is apparent that both the PCDR and MSC process offer little to improve sustainability issues in Alaskan fisheries. Our specific concern is that there are no mechanisms to understand or reduce Alaskan interceptions of weak stocks originating in British Columbia.

IMM Comment:

Thank you for commenting on the report. We have provided responses to detailed comments below.

Chum salmon have been identified by the Canadian Department of Fisheries & Oceans to be in widespread crisis across broad sections of the North & Central coast of British Columbia (Peacock et al, 2010; Peacock & Spilsted, 2010; DFO, 2013). Despite domestic actions to reduce and minimize impacts, these populations continue to decline. Alaskan fisheries in SE Alaska intercept Canadian chum in unknown numbers, and several large Alaskan gill net and seine fisheries take place within 50 miles of spawning systems, and along the migration routes for endangered Canadian chum stocks (Peacock et al, 2010; Peacock & Spilsted, 2010). ADF&G has never undertaken, and has no research plan in place to estimate the number of Canadian chum being harvested in SE Alaskan fisheries. Despite raising concerns at our meeting with the assessment team in Seattle on October 18th 2012, there has been no assessment of this issue discussed in the PCDR, no conditions placed on the fisheries to gather this basic information, and no mention at all of Canadian weak stock chum interceptions in the SE Alaska unit of certification. One must assume that the Assessment Team either did not take our concerns seriously, or simply classified Canadian chum under the IPI exclusion.

IMM Comment:

We accept that the BC chum harvest was not addressed in detail in the PCDR. More information has now been provided- please see below.

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Skeena and Nass Sockeye salmon are harvested in significant numbers in SE Alaskan gill net and seine fisheries. In some years exploitation rates in SE Alaska reach 20% on Skeena sockeye and over 40% on Nass sockeye (PSC, 2010). No mechanisms exist to deal with a conservation crisis if one of these stocks were to collapse, which is exactly what happened to Skeena sockeye in 2013.

IMM Comment:

With respect to the Nass and Skeena sockeye, the assessment report noted:
"*Two sockeye runs are potential IPI species. These are the Nass and Skeena runs that are taken in SEAK District 104 purse seine and District 101 Set gillnet fisheries (PSC 2012d). Over the period 2007-2011, these runs have comprised an average of 6.5% of the total annual SEAK sockeye harvest, but 0.1% of the total salmon harvest in SEAK. The last ten years of data (2002 – 2011) show that catches in these fisheries have consistently been below the annual allowable harvest (PSC 2012d).*"

SEAK Districts 101 and 104 are allowed by the Pacific Salmon Treaty to harvest a fixed percentage of the annual allowable catch of Nass and Skeena sockeye salmon (i.e., 2.45% of Nass/Skeena allowable catch in the District 104 purse seine through week 30 and 13.8% of the Nass allowable catch for District 101 drift gillnet)(PSC 2012d). Allowable catch is based on pre-season run forecast minus sockeye needed for escapement. Harvests of Nass and Skeena-bound sockeye salmon in Alaska have typically been below the allowable catch determined by the treaty process (PSC 2012). Historically, stock composition of the District 101 and 104 sockeye fishery was monitored with scale pattern analysis. Recently, Guthrie *et al.* (2010, 2011) applied genetic stock identification to sockeye fishery samples in Alaska and concluded that previous stock identification methods were consistent with GSI findings. These data show that Skeena and Nass sockeye continue to be captured after week 30. English *et al.* (2012) estimated exploitation rates (ER) in Alaska for sockeye salmon originating from key North Coast/Central Coast statistical areas for 1980-2008. Average ERs in Alaska fisheries were 24%, 9%, and 1% for sockeye originating from BC areas 3, 4, and 5, respectively, during 2006-2008.

Over 10,000 steelhead have been intercepted in SE Alaskan fisheries in some years, and it is assumed most of these fish originate from river systems in British Columbia (Harding & Coyle, 2011). Many steelhead populations in British Columbia remain depressed despite domestic actions to reduce impacts. Since 1997 fisheries in SE Alaska have not been reporting steelhead by-catch, and ADF&G currently does not require fisheries to collect basic steelhead interception information. A fundamental requirement of any fishery according to FAO guidelines is the collection of accurate by-catch information (FAO, 2009), yet the assessment team states that steelhead interception rates are low (contrary to the information that is available), and require no collection of basic by-catch data in SE Alaska.

IMM Comment:

Steelhead captured incidentally in commercial fisheries, such as those in SEAK, cannot be sold or bartered but they may be retained for personal use. These fish are required by state regulation to be reported on the fish tickets. Catch reporting, as shown by Harding & Coyle (2011) and reported in the PCDR, indicate the number of steelhead retained in commercial fisheries for personal use. The data show that bycatch of steelhead peaked in the mid to late 1980s (Harding & Coyle 2011), before measures were introduced in Alaska in 1994 to limit retention of steelhead to personal use only.

We noted in the PCDR that: "*Within Alaska, steelhead are most commonly found in the Southeast Alaska UoC (Augerot & SotS 2004), but the quantities taken even there are very small, with an average of 108 steelhead reported harvested annually in all commercial salmon gears from 2002 to 2011 (Harding & Coyle 2011).*"

The reported harvest of steelhead has declined significantly since the peak in the mid-late 1980s, with total

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Southeast Alaska commercial harvests (for personal use) of 837 fish in 1994, 453 in 1995, and 701 in 1996. In every year since then, less than 300 fish have been reported harvested, and the average for the period 2002 - 2011 is 108 fish. This decline is probably because of regulations that prohibit retention of steelhead except for personal use, and may in part be in response to environmental conditions. Monitored steelhead populations, such as Keogh River on Vancouver Island and other areas, have shown a significant decline, although Harding & Coyle (2011) reported that steelhead abundance in Southeast Alaska was generally higher than average between 2003 and 2007, while declining since 2008 to average or near-average levels.

Studies report that salmonids can have moderate to high survival post-release from commercial fishing gears (e.g., Welch et al. (2009) reported >1 week survival of adult steelhead of around 56% for those released from a gillnet and then tagged in good condition, Candy et al. (1996) reported a survival figure of ≈77 % for Chinook after 24 hours following purse seining, and Farell et al. (2000) reported a survival figure of ≈98% for coho after 24 hours following trolling), although survival will clearly depend on gear handling and sorting efficiency, amongst other factors.

Several British Columbia Chinook populations (Fraser River & West Coast Vancouver Island) are severely depressed (CSAS, 2010; FRAFS, 2012). These stocks are harvested in SE Alaska troll fisheries, yet because they make up a relatively small percentage of the catch they are simply classified under the IPI exclusion. Despite the fact that these stocks continue to decline, the PCDR offers no mechanism to ensure increased protection in Alaskan fisheries.

IMM Comment:

Harvest rates of non-local Chinook salmon in the SEAK fishery were presented in the PCDR. We provide additional information here and now in Table 6 of the FDR. PSC (2012c, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. The highest harvest rate is for local Alaska Chinook salmon (avg. 35%, 1985-2010), followed by Upper Georgia Strait (19.7%), WCVI Hatchery (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks is less than 10% and typically less than 5%. Harvest rates on WCVI Wild during 1985-2010 was 1.9%; it was 7.3% for Fraser River early Chinook and 0.14% for Fraser late Chinook. Harvest rates in recent years have declined relative to the base period in response to concerns to reduce overall impacts on weak Chinook stocks. ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf).

English *et al.* (2012) estimated exploitation rates (ER) in Alaska for Chinook salmon originating from key North Coast/Central Coast statistical areas, 1980-2010. Average ERs in Alaska fisheries were 2.4%, 16%, 16% and 9% for Chinook originating from BC areas 3, 4, 6, and 8, respectively, during 2006-2010. With respect to providing increased protection of Chinook, we note in the PCDR that "*In order to address conservation concerns in this and other runs, the renewal of the Pacific Salmon Treaty in 2009 resulted in agreement to reduce the total take of Chinook by 15% in the Southeast Region fishery and by 30% in the Canadian West Coast of Vancouver Island fishery.*"

None of the above weak stock interception and information gathering issues have been addressed in the PCDR. This has been enabled by the approach Intertek Moody Marine used to determine IPI exemptions, which has effectively created a loophole. While some of the weak populations originating in British Columbia may be taken in low percentages, there needs to be verification that Alaskan fisheries are not significantly impacting these socks. It is unknown whether some of these stocks can tolerate any fishing pressure. Further, there is no information to determine whether weak stock Canadian chum and steelhead are being intercepted in low enough numbers to meet the IPI exemptions. This effectively means that MSC recertification of Alaskan salmon is meaningless in dealing with serious sustainability

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issues around weak stocks originating in waters outside of Alaska. If these issues are not dealt with, it will seriously undermine the legitimacy and brand of the MSC, and Alaska's claims of sustainability in the market place.

IMM Comment:

Please see above comment regarding Chinook salmon. Harvests of sockeye salmon in Districts 101, 104, 106, 108 and 111 in southern SEAK are regulated through the Pacific Salmon Treaty to harvest a fixed percentage of the annual allowable catch of Nass, Skeena, Stikine and Taku sockeye salmon (e.g., 2.45% for District 104 purse seine and 13.8% of the Nass allowable catch for District 101 drift gillnet) (PSC 2012d). Allowable catch is based on pre-season run forecast minus sockeye needed for escapement. Harvests of Nass and Skeena-bound sockeye salmon in Alaska have been consistently below the allowable catch determined by the treaty process (PSC 2012). Historically, stock composition of the District 101 and 104 sockeye fishery was monitored with scale pattern analysis. Recently, Guthrie *et al.* (2010, 2011) applied genetic stock identification to sockeye fishery samples in Alaska and concluded that previous stock identification methods were consistent with GSI findings. English *et al*. (2012) estimated exploitation rates (ER) in Alaska for sockeye salmon originating from key North Coast/Central Coast statistical areas, 1980-2008. Average ERs in Alaska fisheries were 24%, 9%, and 1% for sockeye originating from BC areas 3, 4, and 5, respectively, during 2006-2008.

ADF&G manages its chum fisheries to achieve spawning escapement of wild chum salmon and to harvest surplus hatchery chum salmon. BC chum are a minor component of the Alaska chum harvest. English *et al*. (2012) estimated that the average annual ER for BC chum in Alaska fisheries during 2006-2010 was 24% for Area 3 stocks, 10% for Area 4 stocks, and 10% for Area 5 stocks, while the average total exploitation rates (i.e. including Canadian catches) for these stocks for the same period were 32%, 24% and 19% for Areas 3, 4 and 5 respectively. The 2009 annex to the PST has provisions to reduce impacts on Portland Canal chum harvested in both Alaska and British Columbia. The Raincoast Conservation Foundation & Watershed Watch Salmon Society presentation indicates that there has been a slight decline in the exploitation rate (ER) on these stocks in Alaska and a larger ER decline in British Columbia. In most years, when the escapement was less than the lower benchmark for analyzed stocks, the elimination of all harvests (BC & AK) would not have enabled the stock to exceed the lower benchmark, indicating that environmental issues are a key factor in the low abundance of these stocks.

ADF&G manages its coho fisheries to achieve spawning escapement of wild coho salmon. English et al. (2012) estimated exploitation rates (ER) in Alaska for coho salmon originating from key North Coast/Central Coast statistical areas, 1980-2010. Average ERs in Alaska fisheries were 4%, 4%, 37%, 14%, 5%, 14%, 8%, 8%, 3%, and 3% for coho originating from BC areas 2E, 2W, 3, 4, 5, 6, 7, 8, 9, and 10, respectively, during 2006-2010.

ADF&G manages its pink salmon fisheries to achieve spawning escapement of wild pink salmon. English et al. (2012) estimated exploitation rates (ER) in Alaska for pink salmon originating from key North Coast/Central Coast statistical areas, 1980-2010. Average ERs in Alaska fisheries were 9%, 9% and 8% for pinks originating from BC areas 3, 4, and 5, respectively, during 2006-2010.

In SEAK, fisheries management consider the abundances of non-local Chinook and sockeye salmon when opening the fisheries. Non-local abundances of pink, chum, and coho salmon are not directly considered in management decisions because locals stocks are much more abundant. Exploitation rate estimates presented above indicate harvests of non-local stocks originating from BC are typically low. In response to low abundances of chum salmon in northern BC, harvests of chum in BC fisheries have been significantly reduced.

Steelhead were not considered an IPI species in SEAK because they are not sold in the commercial fishery. Rather steelhead may be retained for personal use or discarded. If retained, they must be reported on the fish ticket.

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Sincerely,

Greg Knox,
Executive Director

CSAS. (2010). *Assessment of West Coast Vancouver Island Chinook and 2010 Forecast.* Canadian Science Advisory Secretariat Pacific Region. Science Advisory Report 2012/032

DFO. (2013). *2013 North Coast Integrated Fisheries Management Plan*. Department of Fisheries & Oceans Canada. 2013.

FAO. (2009). *Expert Consultation on International Guidelines for Bycatch Management and Reduction of Discards*. Rome, 30 November–3 December 2009. FAO Fisheries and Aquaculture Report No. 934

FRAFS. (2012). *Fraser River Aboriginal Fisheries Secretariat Fraser Chinook Update.* Watershed Talk, Volume IX Issue 5.

Peacock, D., Spilsted, B., Bocking, R., Duguid, W. (2010). *Nass Chum Stock Status.* Canadian Science Advisory Secretariat Working Paper, 2010/P58.

Peacock, D. & Spilsted, B., (2010). *Skeena River Chum Stock Status.* Canadian Science Advisory Secretariat Working Paper, 2010/059.

PSC. (2010). *Assessment of the Canadian and Alaskan Sockeye Stocks Harvested in the Northern Boundary Fisheries Using Run Reconstruction Techniques, 2004-2008.* For Pacific Salmon Commission Northern Boundary Technical Committee. Prepared by DFO & ADF&G.

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State of the Salmon

STATE OF THE SALMON

KNOWLEDGE ACROSS BORDERS ЗНАНИЕ СКВОЗЬ ГРАНИЦЫ 国境を超えた知識

August 28, 2013

Dr. Rob Blyth-Skyrme
Intertek Moody Marine
1801 Hollis Street, Suite 1220
Halifax, Nova Scotia, B3J 3N4
Canada

Sent via email

Re: Alaska Salmon Fishery Public Comment Draft Report

Dear Rob,

State of the Salmon (SoS) appreciates the opportunity to comment on the Intertek Moody Marine (IMM) July 2013 Public Comment Draft Report of the Alaska salmon fishery (PCDR). We are pleased that this reassessment under the Marine Stewardship Council (MSC) scheme is near completion, as credible third party certification is essential for translating the demand for sustainable seafood into sustainable performance of global fisheries.
Overall, we are pleased with the level of detail and analyses the team provided in the PCDR. In particular, more attention has been paid to hatchery issues than in previous assessments and a condition has been added to begin monitoring potential hatchery impacts in the Kodiak Unit of Certification (UoC).

Nonetheless, we believe there are still some issues in the report that require clarification and possible modification. The treatment and exemption of IPI stocks has led to a less than transparent and robust assessment of the management performance in relation to impacts on weak stocks. Some Performance Indicators (PIs) appear to be scored rather high given the amount of information provided in the scoring justifications, and questions remain on some of the outstanding conditions from the 2007 reassessment. In addition, the team did not adequately describe and assess the management system as it relates to hatchery permitting decisions. Finally, the Client Action Plan (CAP) places more emphasis on passive actions such as strategy finalization and information gathering than on management actions to improve fishery practices and outcomes. More detailed comments on these and other topics are provided below.
IMM Comment:

Thank you. Comments are provided against the points in the following sections.

Principle 1

Performance Indicator 1.1.1

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In UoCs with large hatchery programs, high levels of straying raise significant uncertainty regarding the status of the wild stocks. In the Southeast Alaska (SEAK) UoC for example, hatchery produced fish represented 83.5% of the commercial common property chum salmon harvest in 2012 (Vercessi 2013). Limited sampling of naturally spawning chum salmon in index streams has found high proportions of hatchery-origin fish spawning within 50 km of hatchery release sites (Piston and Heinl 2012a-b). Yet, the SEAK UoC received a score of 90 for PI 1.1.1 even though the assessment team acknowledged "Chum salmon have failed to meet escapement goals in Northern Southeast Inside (NSI1) subarea for all of the years 2009 - 2011. The NSI area is also an area where hatchery enhancement of chum salmon has led to high levels of straying" (PCDR p.114). Chum salmon escapement goals are based on aggregate peak index stream counts. Piston and Heinl (2012b) noted:
"The current NSEI escapement goal would not have been met in 2011 if not for the presence of stray hatchery fish (Figure 7). Approximately 26% of the NSEI Subregion index value in 2011 originated from six index streams in Lynn Canal, including a record peak aerial survey count at the Endicott River that accounted for nearly 20% of the overall index. The Endicott River is located almost directly across Lynn Canal from Sawmill Creek where the proportion of hatchery strays was 66% in 2011. The Endicott River was not sampled in 2011 and it is not known if the record escapement to this system represented a strong wild chum salmon run, large numbers of stray hatchery fish, or both."
Thus one stream within close proximity to hatchery release sites out of 63 index streams in the NSEI subarea accounted for 20% of the aggregate escapement index in 2011. The NSEI was apparently above the lower bound of the escapement goal in 2012 (Davidson et al. 2013), but information was not provided on the relative contribution of individual streams to this result. More information is needed to determine how much hatchery straying is influencing this result. The assessment team should provide additional rationale for concluding that SEAK meets the SG80 scoring issue b (the wild stock is at or fluctuating around its target reference point) in light of the significant uncertainty about the status of the wild stock due to high levels of hatchery straying.

IMM Comment:

The revised escapement goal in the NSI area was met during 11 of the last 15 years after assuming 20% of the spawners were strays and subtracting those strays from the count (Piston & Heinl 2012b, Fig. 7). The NSEI escapement goal was achieved in 2012 and nearly achieved in 2011 (after subtracting strays). Most of the other seven chum escapement goals in SEAK were met during the past 5 years.

The score of 90 awarded for PI 1.1.1 reflects that the fishery was considered to meet the SG80 level of performance but did not meet one of the two SIs at the SG100 level. For SI 80b, the assessment team noted "*... that the target reference point (lower bound of the escapement goal), which serves in Alaska fisheries as a limit reference point, is being based on a time series of return rates, rather than on evidence that may reflect negative interactions with the large remote releases of hatchery reared chum salmon. As such, the chum fishery is considered to meet this level of performance but no higher.*" The fishery was therefore not considered to meet SI 100b (*There is a high degree of certainty that the wild stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.)*

Given this information, the assessment team concluded that SEAK chum was fluctuating around the escapement goal even when hatchery strays were subtracted from the count; therefore SG80b was met. With regard to SG100a, the assessment team concluded that SEAK fishery (including chum salmon) provided a high degree of certainty that the wild stock was above the point where recruitment would be impaired. This conclusion was based on MSC criteria as described in the

[1] The Northern Southeast Inside stock subarea or subregion is abbreviated as NSEI within ADF&G reports.

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report, i.e., spawning escapements exceeded 50% of the lower bound of the escapement goal range in the last ten years. Thus, the score is not changed.

Performance Indicator 1.1.2

In this fishery's 2007 reassessment, Condition 31a was raised and reported as unmet at the fourth surveillance audit: "Refine knowledge of sub-stock structure of Copper salmon. Incorporate information as appropriate into stock productivity estimates and refinement of escapement goals. (p. 84 of PCDR, Table 8)."

IMM notes that these conditions have now been met, and the justification in scoring table for PI 1.1.2 (SG80 scoring issue e) includes a reference to pristine habitat and harvest management strategies used to meet reference points (PCDR, p.169-70). It is not clear how these points are relevant to the question of adequacy of reference points for maintaining the diversity and productivity of stock subcomponents or whether the prior condition was met with respect to incorporating substock structure information into refinement of escapement goals. It seems like a review would have occurred to either make refinements or deem they were unnecessary, but there is no reference to such a review in either rationale for closing this condition or with respect to scoring issue SG 80 e.

IMM Comment:

Against Section 3.1.1, and Table 8, the assessment report noted:
"*ADF&G conducted extensive genetic studies, created a baseline data set, and uses these data to identify component stocks in the commercial fishery (Ackerman et al. 2010, Ackerman et al. 2011, Templin et al. 2011a). These studies complement earlier studies using genetics and radio telemetry (Savereide 2005, Templin et al. 2008) such that these conditions are considered closed*."

The assessment team relied heavily upon Templin *et al*. (2011a), who describe a very conservative management strategy to allow Chinook harvests based upon only two evenly spaced harvest periods per week as escapement allows. They reported river-wide harvest rates ranging from only 20% to 50% during the four-year study period of 2005-2008. The authors further report the distribution of these harvests among upper, middle, and lower river stocks.

The assessment team notes that maintenance of relatively pristine habitat is key to maintaining stock diversity and productivity because diversity of habitats supports diversity of populations. Escapement goals in the Copper River were recently re-examined by Fair *et al*. (2011), who used stock recruitment and yield analyses to develop escapement goals for Chinook salmon as a means to provide the potential for high future yield. The escapement goal of 24,000 Chinook has been exceeded in 8 of the past 9 years, indicating that the management system is careful to achieve the escapement goal. The assessment team believes that this approach protects subcomponent stocks from reaching a level at which recruitment might be impaired. The escapement goal approach and relatively low harvest rates indicate the potential for relatively high productivity of subcomponent stocks is maintained. Evidence for this stems from relatively robust harvests over many years.

Performance Indicator 1.2.1

In this fishery's 2007 reassessment a performance issue was identified for the Copper/Bering UoC under PI 1.1.1.3, which led to raising Conditions 28, 30 and 31 that were unmet at the fourth surveillance audit, specifically:

> *"Continue to improve information on contributions of component stocks of sockeye and* Chinook salmon to the commercial fishery by time and area and demonstrate that current

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harvest strategies are adequate to maintain the high productivity of all target stock components." (p. 81 of PCDR, Table 8)

IMM notes that these conditions have now been met, and the justification under scoring table for PI 1.2.1 at the SG80 (scoring issue a) simply states that "The fishery exceeds this level of performance" (p. 157 of PCDR). We question the basis for this conclusion since there is no evidence that these conditions have been fully met, which required a demonstration that "current harvest strategies are adequate to maintain the high productivity of all target stock components" in addition to developing genetic baseline information. We suggest that IMM review its conclusions about the status of these conditions and the scoring of PI 1.2.1.

IMM Comment:

Please see our response to PI 1.1.2 above. We have not changed the score of this PI.

Performance Indicators 1.3.1, 1.3.3

While we generally agree with the assessment of hatchery programs in the Kodiak UoC, we question why monitoring of hatchery-produced sockeye salmon was not included in Condition 5, given the scale of hatchery programs, the lack of research on straying and fitness impacts, and uncertainty about estimating harvest pressure on comingling wild stocks of sockeye in this region. Hatchery marking programs have not been implemented in the Kodiak UoC, and sockeye hatchery contribution estimates to fishery harvests and natural escapements have been based primarily on scale pattern analysis (e.g. Nelson and Swanton 1996, Foster 2010, Baer and Honnold 2002, Wadle and Honnold 2000). In addition, the two sockeye straying studies (Baer and Honnold 2002, Wadle and Honnold 2000) focused on early-run sockeye, but similar studies have not been conducted for the dominant late-run hatchery program, particularly that of Spiridon Lake (Musslewhite 2010a). The use of sockeye scale pattern analysis has been shown to be unreliable in other areas of Alaska (e.g. Waltemyer et al. 1996), and Foster (2010) noted that the run reconstruction method used for Spiridon Lake was based on scale patterns described during an earlier period (1994-1997) "*developed under a different fishery climate and broodstock*" (page 4, Foster 2010). These results presumably led Musslewhite (2011a, p. 25) to recommend that "*scale pattern analysis alone may not be reliable and an otolith marking program or other means of identifying Spiridon sockeye salmon should be considered*". In addition to providing a more rigorous method of quantifying straying, otolith marking of hatchery fish will improve stock composition estimates of the mixed stock fisheries occurring in Westside fisheries (westside of Kodiak Island, including Uyak and Uganik fisheries, as described in Foster 2010). Improved stock composition estimates are essential to accurately reconstruct runs and estimate harvest pressure on wild sockeye in this region. We strongly concur with Musslewhite's recommendation and urge IMM to include sockeye in Condition 5.

IMM Comment:

Under PI 1.3.1 for the Kodiak UoC, the report noted:

"*Stocking of relatively large quantities of reared sockeye fry in Spiridon Lake have been continuing for over a decade, with periodic evaluations of interceptions in the fishery by use of scale pattern analysis (Nelson and Swanton 1996; Foster 2010). These scales are quite unique and allow visual separation of Spiridon stocks from other migrating salmon. Also, sockeye have a high degree of fidelity to their natal areas (or areas imprinted as fry), so the team believes it is highly likely that sockeye salmon stocks do not have negative impacts on wild stocks.*"

We note that Foster (2011) responded to the concern cited above with an additional study using scale pattern analysis and compared the results with previous work for validity. As stated by Foster (2011):

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"….. a visual determination (Baer and Honnold 2002) of commercial catch scale samples was conducted of the Uyak and Uganik (Westside) commercial sockeye scale samples. From 7 June through early August, roughly 4,000 individual scales from the commercial harvests in Uyak and Uganik were assessed for the presence of the unique 2010 Spiridon age-2.2 scale pattern, similar to the method used in 2008 and 2009. Results were compared to the stock separation SPA conducted from 1994 to 1997 and 2008…..to gauge the validity of the analysis.

This Spiridon-bound Westside catch estimate was combined with the SBSHA sockeye salmon catch to estimate the size of the 2010 Spiridon Lake run. This enhanced run was fully utilized; therefore, there was no escapement. The age composition of the SBSHA commercial harvest samples was applied to the total Spiridon Lake run to estimate the age structure of the run."

The assessment team did not find any indication by Foster (2011) that the recent scale pattern analysis of 2.2 aged scales from Spiridon were not adequate to identify stocks from the hatchery program that were co-migrating with other stocks. Consequently we do not see the need for a condition to institute a fish marking program. We agree with the reviewers and with Musselwhite (2011) that a marking program could improve the management of this stock in providing a higher degree of certainty of the identification of the hatchery fish, but did not find the previous programs sufficiently lacking to mandate a condition.

We are also concerned about the lack of attention to a new hatchery program for pink salmon in Lower Cook Inlet (Tutka Bay Lagoon on Kenai Peninsula, described in Stopha and Musslewhite 2012). In the PCDR (under PI 1.3.3, p. 184) the assessment team noted that pink salmon are "*not currently being produced*". However, the Cook Inlet Aquaculture Association (CIAA) decided to renew their pink salmon hatchery program in 2010 (Stopha and Musslewhite 2012). According to the Alaska Department of Fish and Game (ADF&G) mark, tag and age lab database, 11.2 million unmarked pink salmon fry were released from the Tutka Bay hatchery in 2012. We have been unable to determine what level of pink salmon releases occurred during 2013 or the marking status of those releases. Stopha and Musslewhite (2012) noted concerns about straying of pink salmon into a neighboring wild stock sanctuary and other wild pink salmon streams in close proximity to the hatchery release site. They reference a "planned marking program" to monitor straying, but we have found no evidence that a marking program has yet been implemented. As a result, we believe IMM should review their assessment and score of 90 assigned to PI 1.3.3 for the LCI UoC.

IMM Comment:

Thank you for the update on pink salmon releases in Lower Cook Inlet. We were aware of the potential for the re-start of the pink salmon hatchery and now we confirm that 11.25 million pink fry were released in 2012. In light of the releases of unmarked fish in 2011, we agree with the reviewers that a marking program should be implemented. We note the following from the Cook Inlet Aquaculture Association 2012 Annual Report:

"While Trail Lakes Hatchery has been thermal marking fish for some time, Tutka Bay Lagoon Hatchery did not have the infrastructure or equipment necessary to perform this task at the time of starting operations in 2011. Within one year after the start-up of fish production, this capability does now exist with the purchase of a boiler, heat exchangers, pumps and piping additions. All brood year 2012 pink fry released from Tutka Bay Hatchery will be 100% marked similar to all fry and smolts (sockeye and coho) released from Trail Lakes Hatchery."

Thus, a condition similar to Kodiak is not needed as they have met the requirement.

Other Principle 1 issues

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The assessment team generally did a good job providing information on the stocks of concern (SoC). However, according to Table 17 in Munro and Volk (2013), Swanson Lagoon sockeye was added as a management SoC at the March 2013 Board of Fisheries meeting. The discussion of the Peninsula/Aleutian Islands UoC section on page 51 of the PCDR states that there are no stocks of concern designated for the UoC. This section and table 2 of the report should be updated to reflect the SoC designation for Swanson Lagoon sockeye.

IMM Comment:

Thank you- the report has been updated with this new information on Stocks of Concern, as reported by Munro & Volk (2013). At the time of writing, the proposed action by ADF&G had not been acted upon by the Board.

Principle 2

Inseparable or Practically Inseparable Catches (IPI)

We believe the approach used by IMM to determine IPI exemptions in the assessment results in a less than thorough and transparent evaluation of fishery management performance in relation to impacts on weak and ETP stocks. While the rationale provided for these exemptions did touch on some of the relevant issues (e.g., proportion of a depleted stock's total exploitation taken in certain AK fisheries), the need to verify that the AK salmon fisheries are not significantly impacting the status of depressed and ETP populations was largely impeded by the IPI exemptions. Verification would have only strengthened the conclusions and credibility of the assessment. We outline some specific concerns below to illustrate these problems.

UoC Definitions

We have questions about the approach used to define UoCs, which differ from those used in the 2007 reassessment. A clear definition of the UoCs for the Alaska salmon fishery reassessment was not publically available until the recent release of the PCDR. There was no reference to the UoCs in IMM's July 2012 assessment announcement posted on MSC's website and, until recently, summary information on the MSC site noted 16 rather than 14 UoCs to be assessed, leading to a logical conclusion that the UoCs would follow the 2007 reassessment structure. But the decision by IMM to lump all salmon fisheries within Southeast Alaska into one UoC and those in Yakutat into another has led to an illogical application of IPI provisions under the MSC scheme. Specifically, the Southeast Alaska/Yakutat summer troll fishery (Figure 12) is essentially managed as one fishery and occurs largely off the coast of Alaska. Troll fishers can, and often do, traverse the Northern Outside and Central Outside management areas during normal fishing operations. This makes it difficult to accurately assign catches to either Yakutat or SEAK UoCs (we note that there is no attempt to do this in the PCDR). Artificially dividing this fishery into two UoCs does not make sense from a management perspective. Further, commercial net fisheries in Southeast Alaska and Yakutat operate along migration corridors, terminal areas within inside waters, or close to the surf line. These fisheries are clearly managed separately from the troll fishery.

IMM Comment:

A single SEAK UoC was defined very early in the assessment process, at the point at which the fishery reassessment process commenced and when the other 13 UoCs were also defined. The 14 UoCs were defined on the basis of geographic region in order to simplify the assessment process in comparison to the 2007 certification. More information is provided below.

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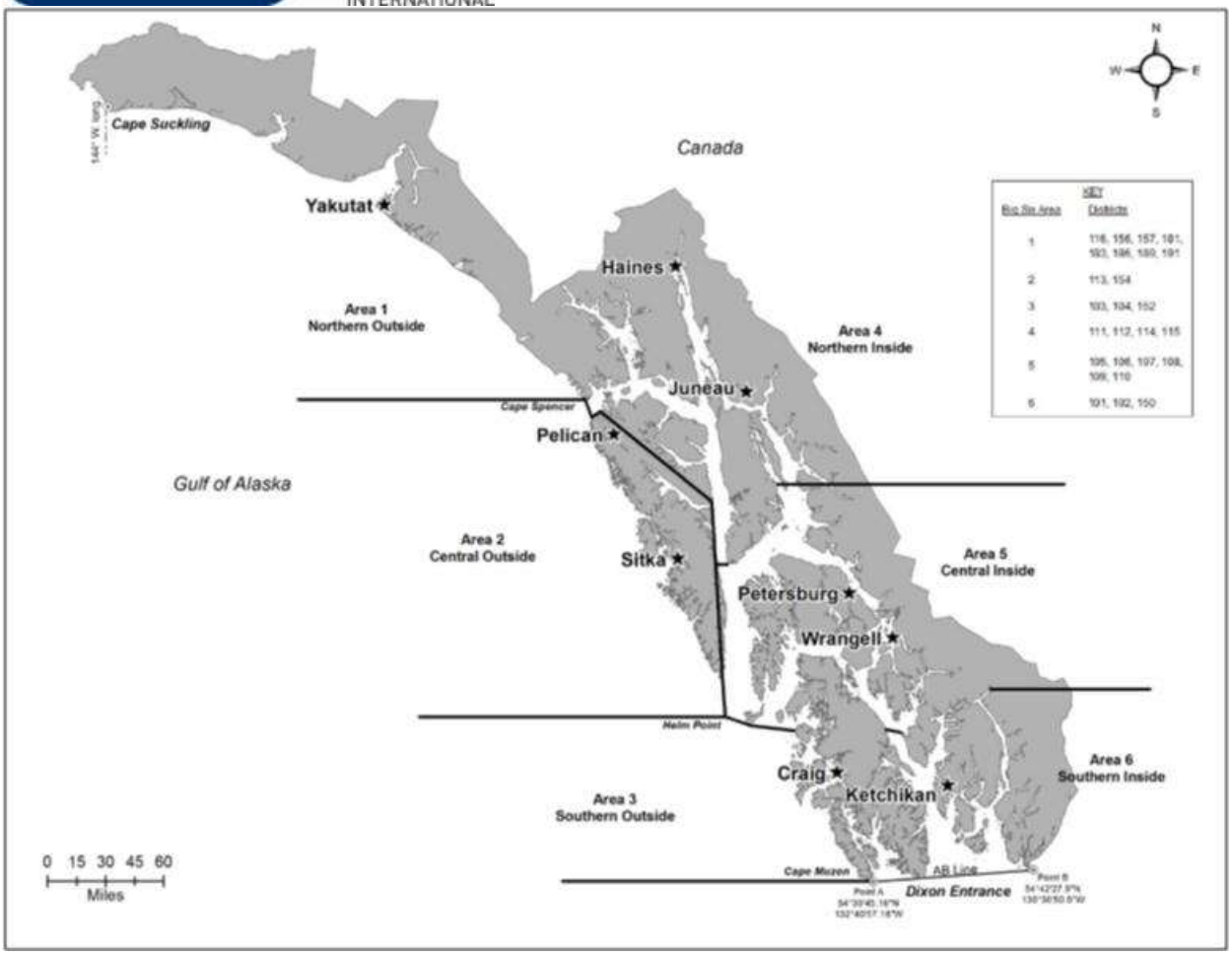

Figure 12. Map of Southeast Alaska commercial troll fishing and Big Six management areas (taken from Skannes et al. 2013).

The Alaska troll fishery targets Chinook salmon as a primary component of the fishery; they are distinguishable during normal fishing operations and can be feasibly separated. This is demonstrated by the fact that Chinook of certain length are required to be released in the fishery, and troll caught Chinook are commonly identified as such in retail markets. As noted above ADF&G manages the troll fishery separately from the purse seine and drift gillnet fisheries in SEAK, which largely target sockeye, chum and pink salmon. By combining all SEAK net and troll fisheries into a single SEAK UoC, the proportion of IPI stocks across all species was less than 2%, allowing SEAK to be exempt from assessment of IPI stocks under the retained species component of Principle 2. None of this arithmetic manipulation changes the fact that Alaska troll caught Chinook are clearly separable species in the SEAK region.

If the Southeast/Yakutat troll fisheries had been treated as a separate UoC (as in the 2007 reassessment) the current reassessment would have been much more in line with the intent of MSC's IPI criteria and allowed a robust evaluation of the management performance of the fishery. A credible and robust assessment of this fishery is essential given its mixed-stock nature, where over 80% of Chinook salmon harvested are of non-local origin (Carlile 2007, Templin et al. 2011). In summary, there was no clear rationale for the IPI determination for SEAK troll caught Chinook, which appeared to be simply an artifact of the way the SEAK UoC was defined.

IMM Comment:

Having taken the decision to reduce the number of UoCs to 14, it later became apparent that the IPI considerations were potentially relevant. And, having completed the calculations, it became clear that the Chinook catch fell well below the 2% threshold. It is certainly appreciated that the assessment of

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salmon fisheries is complicated by the life history of the fish, but the MSC assessment methodology allows for small quantities of species other than those defined as main target species to be caught and to carry the MSC logo through the IPI allowances.

A significant consideration in combining the gear types in all UoCs is the fact that all gear types can and do take all salmon species. For example, from 2008 - 2012, an average of 34.1% of the Chinook taken in the Southeast Alaska fishery were harvested using non-troll gear types (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf), while the troll fishery landed 1.2 million coho, 168,583 pink and 476,469 chum. As such, the assessment team considers that there is sufficient cross-over among the different gear types used in the Southeast Alaska area to justify including all gears within the SEAK UoC, following the same approach used to define the other UoCs.

The report noted the following against PI 2.1.1, which the assessment team still considers to be appropriate: "The MSC has granted a variation that means these ESA fish can be considered IPI category 'b' fish (i.e. of the same species as a target species within a UoC, but originating from outside the UoC) on the basis that the SEAK and Yakutat fisheries are awarded incidental take permits for these runs, the fisheries are not considered to be the major limiting factor for populations in any of these ESUs, harvest limits implemented since 2008 have reduced the potential impact of the fishery on these runs, and fish from these runs comprise a very small percentage of the overall harvest."

In the comment above, SOS requested additional information on impacts of the SEAK fishery on ETP Chinook salmon. The average harvest rate of the all-gear SEAK fishery is shown on page 58 of the PCDR. The average harvest rate on Puget Sound Chinook ranged from 0% to 6.4% during 1985-2010 depending on population within the ESU. The average harvest rate on Snake River fall Chinook was 5.2% (see page 58). Harvest rates on Upper Willamette and Lower Columbia Bright Chinook ESUs were 7.7% or less. Overall Chinook harvests in SEAK in recent years have been lower.

ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). PSC (2012c, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. The highest harvest rate is for local Alaska Chinook salmon (avg. 35%, 1985-2010), followed by Upper Georgia Strait (19.7%), WCVI (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks are less than 10% and typically less than 5%. Spawning escapement goals have been achieved for most of the 25 Chinook Technical Committee-approved Chinook stocks in all years (PSC 2013c).

Transboundary River Stocks not Considered as IPI

It is not apparent that transboundary river Canadian salmon populations were considered as non-local IPI stocks. The following transboundary rivers are identified by the Pacific Salmon Commission (PSC): Taku and Stikine (SEAK UoC), and Alsek Rivers (Yakutat UoC). These stocks are targeted by Alaska fisheries under Pacific Salmon Treaty (PST) provisions. These stocks are not mentioned in Table 6 in the PCDR and are not referenced as IPI stocks in the respective UoC chapters under Principle 1 (2.3.3). The Yakutat UoC section of Table 6 indicates that sockeye, Chinook, coho and pink salmon are non-local IPI, but the narrative only mentions Chinook salmon catches in the troll fishery and non-target IPI chum salmon. Were catches of Alsek River sockeye, coho and pink evaluated under IPI provisions and found to exceed the 15% limit, or was it merely an oversight that they were not discussed?

IMM Comment:

Other IPI stocks have now been detailed in the report under Table 6. Alsek sockeye was found to exceed the 2% IPI exemption level in the Yakutat UoC and so is assessed under the PI 2.1.1 - 2.1.3 retained catch provisions.

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IPI Exclusion Impedes Assessment

Chinook salmon are classified as an IPI species in the Peninsula/Aleutian Islands UoC, but because the Chinook harvest for the region was only 0.1% of the total salmon catch (PCDR, p. 61), they were exempt from being assessed under PIs 2.1.1-2.1.3. We offer this as another specific example where an IPI determination impedes a basic assessment of how catches in a region, even though they might be relatively small and represent a small portion of the all species catch, could be affecting stock status. Fisheries in the Peninsula/Aleutian Islands UoC are believed to intercept both local and non-local populations. Incidental take of Chinook in this fishery likely includes fish from western and southcentral Alaska (Larson et al. 2013), where Chinook are in decline (PCDR, p.64). Similarly, Chinook spawning escapements in the Peninsula/Aleutian Islands UoC have been declining locally in recent years. For instance, the 2009-2012 escapements were estimated to be about half of the recent 10-yr average, with 2013 being the second lowest in 40 years (Wilbur and Nichols 2013). The one Chinook stock with an escapement goal in this UoC (Nelson River) has been below the lower end of its escapement goal range for three of the past four years. Yet there was no analysis of these issues in the PCDR because of the IPI exclusion. If the IPI determination had not impeded questions from being asked and answered in the assessment through scoring of relevant PIs, we surmise that the assessment team would have further investigated the stock composition of Chinook harvest in this area and whether the fishery may be contributing to current stock status problems.

IMM Comment:

We note your comment on IPI species and Chinook status. Chinook salmon abundance has been declining throughout the state of Alaska for a number of years, indicating a large regional environmental effect (see report at http://www.aykssi.org/) rather than insufficient harvest management of Chinook salmon. In response to the overall decline, Chinook escapement to Nelson River has been below its goal in recent years, but the goal was achieved in 6 of the past 9 years. ADF&G monitors escapement of other Alaska Peninsula Chinook stocks. During 2002-2011, overall escapement of Chinook salmon averaged 21,787 fish and was similar or higher than counts dating back to 1962 (Wilburn & Nichols 2013). Escapement in 2012 was unusually low.

In summary we believe that application of IPI criteria to salmon fisheries, as exemplified in this IMM assessment of the Alaska salmon fishery, hinders the transparent assessment of how well the management system is addressing the potential issues of weak stock impacts in intercepting fisheries, which has been recognized as a growing issue for example with Chinook stocks originating in Alaska and other regions to the south. This is a very relevant question for any management system, including Alaska's that has had less history dealing with weak stock management issues in comparison to jurisdictions, for example, in the Pacific Northwest. We recognize that the design of IPI criteria is one that has been specified by MSC and not IMM, raising some questions beyond this assessment that should be addressed by MSC. Nevertheless, the issues noted above for SEAK and Yakutat UoCs are, in fact, ones created by what we believe to be inappropriate applications of MSC fishery certification requirements.

IMM Comment:

The assessment team notes the comments on the application of the IPI criteria. We have not assessed every interaction in detail because of the application of the IPI exemption criteria for small quantities, but we believe we have not mis-applied the IPI criteria, and that there is good justification for adopting them. Nevertheless, we have provided information in the PCDR and in our response here on the Alsek River and harvest rates of 30 Chinook salmon stocks in the SEAK fishery, as well as on sockeye, chum and coho runs that comprise a small percentage of the SEAK harvest. These data indicate relatively low harvest rates on non-local stocks. The 2009 annex to the Pacific

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salmon treaty provides additional harvest management restrictions to conserve Chinook, sockeye, chum, and pink salmon in addition the goal of achieving escapement goals in Alaska.

Performance Indicator 2.1.3

We question whether information collected on bycatch of steelhead in SEAK justifies the score of 95 for PI 2.1.3. SEAK and Yakutat were the only UoCs considered to have retained species, as Alaska troll fisheries are allowed to retain steelhead and some non-salmonid species. IMM notes (PCDR, page 337) that quantities of steelhead taken in the SEAK UoC are *"very small, with an average of 108 steelhead reported harvested annually in all commercial salmon gears from 2002 to 2011"*. However, steelhead catches were much higher prior to the early 1990s, exceeding 10,000 fish in 1986 (Figure 13). Harding and Coyle (2011 p. 10) noted *"A complete analysis of the reported catch of steelhead in the commercial fisheries is difficult because of data gaps and incomplete records."* In light of the uncertainty regarding this issue, we question whether there is adequate steelhead bycatch information to support the assigned score of 95 for PI 2.1.3 for SEAK. We recommend that IMM review their rationale for this score.

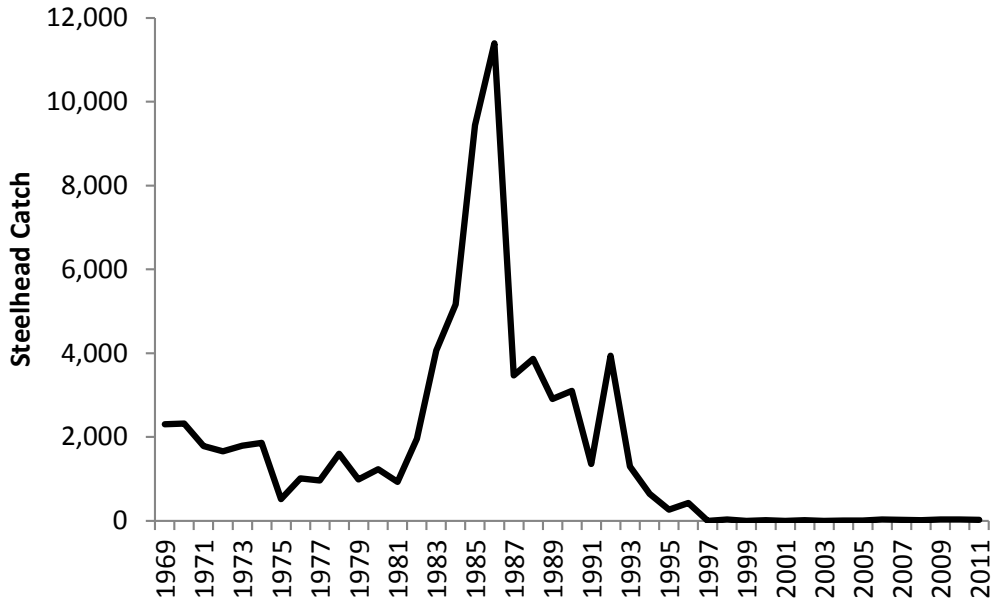

Figure 13. Reported catch of steelhead in Southeast Alaska commercial purse seine and drift gill net fisheries, 1969-2011 (data taken from Harding and Coyle 2011).

IMM Comment:

The reported harvest of steelhead has declined significantly since the peak in the mid-late 1980s, with total Southeast Alaska commercial harvests (for personal use) of 837 fish in 1994, 453 in 1995, and 701 in 1996. In every year since then, less than 300 fish have been reported harvested, and the average for the period 2002 - 2011 is 108 fish. This decline is probably because of regulations that prohibit retention of steelhead except for personal use, and may in part be in response to environmental conditions. Monitored steelhead populations, such as Keogh River on Vancouver Island and other areas, have shown a significant decline, although Harding & Coyle (2011) reported that steelhead abundance in Southeast Alaska was generally higher than average between 2003 and 2007, while declining since 2008 to average or near-average levels.

In recognition of Harding & Coyle (2011) noting the difficulty of discerning a spatial or temporal trend in steelhead catches due to the paucity of data, we have lowered the score of PI 2.1.3 in SEAK and Yakutat from 95. However, the evidence of low commercial harvests from 1993 onwards (non-retention requirements were introduced in 1994), the continued very low figures for commercial personal use harvests in the last 10 years, the absence of evidence of systematic illegal practices

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with respect to reporting, the apparent average or higher than average abundance of steelhead in Southeast Alaska in the last decade, and the maintenance of sportfishing catches of steelhead in Southeast Alaska rivers for the period 1990 - 2010, together support scores of 80 for PI 2.1.1, 2.1.2 an 2.1.3.

Performance Indicators 2.5.1-2.5.3

It is not apparent that IMM considered hatchery impacts on other finfish and aquatic species as defined in the modified default assessment tree adopted for this fishery. For example, the scoring rationale for PI 2.5.1 at SG 60 (b) states (see Evaluation Table, p. 364):

> ***"****In this reassessment of the Alaska salmon fishery, the assessment team has addressed the impacts of hatchery salmon species on other salmon species under the Principle 1 PIs 1.3.1, 1.3.2 and 1.3.3. Impacts of hatchery salmon species on other finfish species and other aquatic populations are addressed here under the Principle 2 PIs 2.5.1, 2.5.2 and 2.5.3."*

We find this problematic for two reasons. First, the 'b' scoring issues for scoring guideposts under PI 2.5.1 are stated in terms of the likelihood that enhanced fish *"have a minimal negative impact on the productivity of wild salmon and other aquatic populations as a result of predation, competition and disease transmission."* The explicit scoring language referring to impact on wild salmon was adopted by IMM for this indicator in September 2012, and is consistent with draft scoring intent provided by MSC in its July 2012 public consultation document entitled *Draft Annex CM: Modifications to the Default Assessment Tree for Salmon Fisheries*. Thus not assessing these issues under Principle 2 has the effect of changing the structure and weighting of the assessment tree from that adopted by IMM at the beginning of the assessment.

IMM Comment:

The reason for stating that the assessment would be undertaken in this manner was because all Pacific salmon species found in Alaska are also enhanced, and PIs 1.3.1 - 1.3.3 are specific to the effect of enhancement activities on wild stocks. Assessing wild salmon stocks in PI 2.5.1 - 2.5.3 would therefore entail considerable duplication. Nevertheless, because of the lower number of PIs within Principle 1 (10) as compared with Principle 2 (15), assessing the impact of enhancement on wild stocks under Principle 1 prevents the fishery from being assessed at a lower standard than intended. And, as an example of the assessment team's awareness of the impact of enhancement on wild salmonid stocks, the SEAK and Kodiak UoCs were scored at 75 for PI 2.5.2, with links made from those scores and associated Conditions to the scores and Conditions placed on those UoCs for Principle 1 PIs.

Secondly, some performance issues were not specifically evaluated and scored in the draft assessment. There is no evidence in the scoring rationale for PI 1.3.1 (which deals with reproductive interactions between hatchery and wild salmon) that the potential impacts on competition, predation or disease transmission on the productivity of wild salmon populations was considered by the assessment team in its scoring.

IMM Comment:

The Team did consider the magnitude of hatchery production and did consider potential impacts via competition, predation, and disease transmission. For example, in SEAK, Sturdevant *et al.* (2012) suggested hatchery chum did not impact growth of wild chum, as noted in the PCDR. The vast majority of hatchery production in Alaska stems from releases of pink and chum fry (and sockeye fry into lakes). Releases of these planktivorous species would not consume wild salmonids. Health and disease of salmon in Alaska hatcheries is carefully monitored and diseased fish are not to be released so as to not create a health risk for wild salmon. Nevertheless, a number of conditions were developed in relation to hatchery production in SEAK, Copper River and Kodiak.

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Similarly, we find no evidence that the team evaluated potential impacts of competition, predation and disease transmission on the productivity of other species for scoring issues of PIs 2.5.2 and 2.5.3. We also see no evidence that the assessment team evaluated these scoring issues at 1.3.2 and 1.3.3 as implied under the scoring rationale above. There is some discussion in the evaluation table at SG 80.e (p. 366) that appears intended to create some scoring and condition linkage between PI 2.5.2 and PIs 1.3.1 and 1.3.3. However, it is not apparent how this directly relates to the specific ecological interactions issues articulated for PIs 2.5.1-2.5.3.

IMM Comment:

As noted above, the assessment team did consider the magnitude of hatchery production and did consider potential impacts via competition, predation, and disease transmission. The pathology laboratory of ADF&G has a mandate to inspect and monitor hatcheries to ensure disease free operations of hatcheries. The vast majority of hatchery salmon released into Alaskan waters are planktivorous (pink, chum, sockeye) rather than predatory (coho, Chinook). Predation by hatchery Chinook and coho on wild pink or chum fry is likely limited spatially and temporally (to areas near the release location) because they are size-selective (selecting smaller fishes). The large total maximum harvest of chum salmon in SEAK (~11 million) exceeds maximum harvests prior to large hatchery production (9.5 million), but the study by Sturdevant *et al*. (2012) did not find evidence of competition in the SEAK study area. Evidence for competition between exceptionally large releases of hatchery pink salmon in Prince William Sound and herring was briefly discussed in the PCDR, but the PWS UoC remains in assessment and was not scored.

In summary the assessment team should evaluate and score the performance dimensions surrounding the ecological interactions between hatchery and wild fish in this assessment within PIs 2.5.1-2.5.3, according to the assessment tree adopted by IMM in September 2012.

IMM Comment:

We believe we have answered why the scoring approach taken was appropriate in earlier comments.

Principle 3

Performance Indicator 3.1.2

It is not clear what evidence the assessment team used to conclude that fishery exceeds the SG 60 and 80 levels of performance for the respective scoring issues (see Evaluation Table, p. 375). Our understanding is that the fishery management system uses different processes to consult about fishery harvest vs. enhancement activities. Specifically, in the former case there is a well-structured public process leading up to Alaska Board of Fisheries (BOF) review of fishery management issues, which appears very open and transparent to the public. However, with respect to enhancement activities, it is not clear what processes that the ADF&G Commissioner and Regional Planning Teams (RPTs; comprised of fishermen, representatives from regional aquaculture associations, and regional ADF&G staff), use to ensure effective consultation that are open to interested and affected parties. Further, our understanding is that the RPTs make recommendations to the Commissioner, who makes the final determination on hatchery permitting matters. We would be specifically interested in understanding what evidence the assessment team evaluated in scoring the SG 80 b with respect to consultation processes that regularly seek and accept relevant information on enhancement issues and decisions and demonstrates how the management system considers the information obtained during consultation. At the SG 100 we would be similarly interested to understand the evidence the assessment team used to conclude that the management system explains how information from

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consultation processes is used or not used in making decisions about enhancement. There seems to be a heavy reliance on BOF processes in scoring the SG 100 for this indicator, and it is not clear how this is relevant to assessing consultations processes for enhancement, which appear to be much less open and transparent than those used for fishery related decisions. In summary we question the 100 score for PI 3.1.2 given the rationale provided.

IMM Comment:

Thank you for this comment. Please see response below which is inclusive of the above concern.

Performance Indicator 3.2.2

The assessment team has not provided clear evidence and rational to support the assigned scoring at SGs 80 and 100 with respect to decision processes surrounding hatcheries. At SG 80 a, for instance, the fact that the Regional Planning Teams make recommendations to the Commissioner's Office for decisions on hatchery permit related issues (e.g. permit alteration requests) does not determine whether ultimate decisions result in measures and strategies to achieve objectives. Especially given that several significant performance issues related to PI 1.3.1 have been identified in the assessment, we would like to understand what evidence the assessment team used to conclude that these decision processes are effective.

At SG 80 b, it is not clear what basis the assessment team used to conclude that the decision making processes respond to important issues in a transparent, timely and adaptive manner. The rationale seems related to the BOF process and as noted under PI 3.1.2, the decision process for enhancement activities follows a different pathway than those referenced in the Evaluation Table (p. 382). The draft assessment has not provided rationale that the decision making process for enhancement is effectively adapting strategies to meet the policy objectives reviewed under PI 3.2.1. Similarly at SG 80 c the evidence and rationale is unclear for concluding the precautionary approach is applied to hatchery decisions. And at SG 80 d the rationale included does not appear to have any relevance as to how (or if) explanations are provided by the management system with respect to enhancement activities.

IMM Comment:

SI 80a for PI 3.2.2 states: "There are established decision-making processes that result in measures and strategies to achieve the fishery-specific and enhancement objectives."

Consultative decision-making processes are in place, including for hatcheries. Regional Planning Team meetings are open to the public and are advertised online ahead of time (e.g. http://www.adfg.alaska.gov/static/home/news/pdfs/newsreleases/cf/238077916.pdf). For permit alteration requests (PARs), sign-off from the Commissioner is required. Sign off by a senior official is neither unusual nor unnecessary in fishery management. The Regional planning team review process is established by regulation as follows:

"5 AAC 40.170. Regional planning team review

(a) The appropriate regional planning team, as established under 5 AAC 40.300, shall review each application to determine if the proposed hatchery is compatible with the appropriate regional comprehensive salmon plan. The regional planning team shall use the following application review criteria:

(1) the contribution the proposed hatchery would make to the common property fishery;

(2) the provisions for protection of the naturally occurring stocks from **any adverse effects** which may originate from the proposed hatchery;

(3) the compatibility of the proposed hatchery with the goals and objectives of the comprehensive

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salmon plan for the region; and

(4) whether the proposed hatchery would make the best use of the site's potential to benefit the common property fishery. "

The assessment team believes that the regulatory responsibility for protection of naturally occurring stocks from any adverse effects is precautionary. Nevertheless, in hindsight, it can become apparent that decisions taken may not always be optimal across all issues. As such, and given that the assessment team has pointed to concerns regarding enhancement, we have rescored UoCs with enhancement. In this regard, we also point to the fact that recent PARs in SEAK were not agreed to by the planning team and the Commissioner. We feel that this provides good evidence that the fishery meets this PI at the SG80 level.

Performance Indicator 3.2.3

We note (not unique to this indicator) that when the team only states under the scoring rationale that "*The fishery and enhancement activities exceed this level of performance*", there is no basis to understand how such a conclusion was reached (for instance, see SG 80 a-c, p. 384).

IMM Comment:

The purpose of stating "*The fishery and enhancement activities exceed this performance level*." is to highlight that the fishery meets a higher level of performance for that scoring issue and to point the reader to relevant information elsewhere in the scoring table for that PI. Similarly, stating (for example) "*The enhancement activities undertaken in SEAK, Copper/Bering, LCI, UCI and Kodiak do not meet this level of performance*" is to highlight that the fishery only met a lower level of performance. This approach for completing the scoring table is not unique to this fishery, and has been accepted by the MSC through the publication of other reports as a means to avoid unnecessary repetition of information.

Performance Indicator 3.2.5

There is no evidence or rationale provided to support the conclusion at SG 80 a and b that monitoring and evaluation mechanisms are in place to assess the performance of key elements of the hatchery management system against meeting its objectives or to what extent there is occasional external review. The current scope of the internal review process mentioned under SG 100 a and b, as reported by ADF&G (e.g., Musslewhite 2011b), is primarily intended to focus on administrative aspects of the hatchery program rather than the extent to which key requirements of Alaska's policy for the management of sustainable salmon fisheries are being met, such as: "wild salmon stocks and fisheries on those stocks should be protected from adverse impacts from artificial propagation and enhancement efforts" as referenced by the assessment team in its scoring rationale for PI 3.1.3 (SG 100 a, p. 377). According to the internal review schedule, it could be 5-8 years before some of the key aspects of the policy may be evaluated.

IMM Comment:

As noted in the report, enhancement activities are undertaken in SEAK, Copper/Bering, LCI, UCI and Kodiak. Other UoCs are therefore assumed to be clear of criticism in regard of this comment. The PCDR states:

"The enhancement program is currently undergoing an internal review that essentially considers all parts of the management system. A new region is reviewed each year. To date, hatchery programs in Kodiak and Cook Inlet have been reviewed and are available on the web

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(e.g., http://www.adfg.alaska.gov/FedAidPDFs/RIR.5J.2013.02.pdf)."

The assessment team agrees that the regular internal review process, at least to date, does not cover all aspects of enhancement and interactions with wild salmon management, therefore UoC regions with enhancement were rescored from 90 to 80. The scope of the reports may be broad but their execution and content, at least during the first review may be limited. The first round of reviews (e.g. Musselwhite 2011) addresses the elements involving wild/hatchery interactions but identified the difficulty in determining the compliance with the broader wild/hatchery interaction policy and has limited the scope during the initial round. Consequently, the review process is not constrained, other than by the broader issues of uncertainty revolving around wild/hatchery interactions, and did not evaluate that policy. We do note however, that these ADF&G internal reviews do not preclude including the issues of wild/hatchery interactions in future reviews following the five year cycle. ADF&G has proposed and has initiated long term investigations that do address this issue.

Client Action Plan (CAP)

We were pleased to see support for external peer review of hatchery practices in the assessment (PCDR, p. 399). We strongly support the notion of subjecting methods, results and conclusions to external peer review to assure sufficient scientific rigor. However, some portions of the CAP appear to focus more on gathering information and plan development than on improving management actions.

The CAP seems relatively weak in terms of addressing the existing risks and uncertainties of high stray rates that led to low scores and the need for conditions. The 10 year timeline for Condition 1 for example seems a long time to wait to assess the need to address potential risks from current hatchery practices. Preliminary results from a genetic study in Prince William Sound have indicated that chum salmon populations close to hatcheries had introgression rates that exceeded recommended levels (Habicht et al. 2012). Similarly, in response to Condition 3, the need to implement management strategies to reduce high stray rates if/where observed, the CAP notes the client will seek implementation of actions. A number of practical hatchery management strategies currently exist to reduce currently high levels of straying that would allow the management system to demonstrate its capacity to implement precautionary management responses. We suggest that the client should actively work with the State and hatchery operators to begin testing and evaluating such practical measures to address the issues outlined in this and other conditions. This would demonstrate leadership by the hatchery management system to resolve existing issues.

IMM Comment:

Thank you for the comment; the assessment team agrees and notes that where clients are dependent on actions carried out by other bodies, that efforts need to be made to work proactively with those bodies in an effort to address Conditions as early as possible.

Thank you once again for the opportunity to provide feedback on the 2013 PCDR for Alaska salmon fisheries. We look forward to receiving your response to our comments.

Sincerely,

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Wild Fish Conservancy

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Assessment Details	
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Nature of Comment (select all that apply)		Additional Information/Detail Please attach additional pages if necessary.
e.g. ☒ ☐	I wish to indicate that I am a stakeholder in this fishery, please keep me informed about each stage of the assessment process	IMM Comment: We can confirm that the Wild Fish Conservancy is listed as a stakeholder in the assessment process, and will receive updates as provided to other stakeholders.
☐	I wish to suggest information or documents important for the assessment of this fishery *(you may either attach documents or provide references)*	
☐	I wish to suggest other individuals or organizations who should be considered stakeholders in the MSC assessment of this fishery *(please name them with contact information)*	
☐	Other (please specify)	

Comment		Nature of Comment	Justification Please attach additional pages if necessary.
☒	I wish to provide general comments about the assessment of this fishery against the MSC Principles and Criteria for Sustainable Fishing	1, 2, and 3	see attached pages. Because the comments apply to a number of separate Performance Indicators as well as various Units of Certification, their organization is based more on the latter (geographic and species) than the former. Recommendations are bolded.

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On 18 October 2012, Wild Fish Conservancy (WFC) and other stakeholders met with the Assessment Team (AT) as well as a representative of Moody Intertek, and observers from MSC and ASI. At that meeting we presented the AT with information regarding a number of issues. The PCDR characterization of that meeting states that no particular questions were posed by the AT or the Moody representative. The PCDR notes that at the meeting, the stakeholders were informed any additional information needed to be submitted to the AT by November 2012, because of the timeline for the assessment that was in place at that time. The timeline was subsequently revised three additional times.

IMM Comment:

As noted, a meeting was held with stakeholders on October 18th 2012. At that time, it was stated that any additional information that stakeholders wanted to be considered in the first draft of the report should be submitted to the assessment team by November because the intention was to complete the draft report and submit it for public consultation early in 2013. The assessment was subsequently delayed, and it is possible that new information could have been considered after November if any had been submitted. It is accepted that this additional opportunity was not made clear to stakeholders, although it is also noted that the PCDR represents the main opportunity for stakeholders to review the report and comment on findings, as has been done here.

Designation of non-Alaska Chinook stocks as IPI and the implications.

We also are concerned that the "variation request" from IMM to MSC, dated 12 March 2013, and the MSC granting of the variance dated 19 March 2013, to accept a number of non-Alaska-origin Chinook salmon stocks as Inseparable/Practically Inseparable (IPI) species, was made well after stakeholder meetings in the autumn of 2012 at which the specific issue of interception of depressed British Columbia Chinook stocks, and US ESA-listed Chinook stocks by the SE Alaska troll fishery was raised and documented. Timely notification to stakeholders – and the opportunity for stakeholder comments -- was absent for both the request by Moody and the granting of the request by MSC. Comments on this very significant request can only be provided now, at the 11th hour, in the context of comments on the PCDR. It is unclear why no stakeholder notification and comment opportunity was offered. The timeline was revised two times after the request and the MSC's granting of the variance one week after the request.

IMM Comment:

There is no specific requirement to consult stakeholders when extending the timeline for an assessment or requesting a Variation Request from the MSC. As noted, the assessment was delayed and the timing of the Variation Request, in March 2013, was based on the time taken to ensure that, as far as possible, the data collected for the VR were comprehensive and accurate.

Not only does the designation of these stocks as IPI clear the way for high scores for the various PIs, it also obviates the need for any conditions to improve the fishery. For an organization such as MSC, that meticulously notifies stakeholders of (almost) every step in the process, this omission is telling. It is difficult for one to avoid the impression that the variation request for IPI status was made because an otherwise objective evaluation of these interceptions would render it difficult if not impossible for the Assessment Team to certify the SE Alaska Chinook fishery, or at the very least, require conditions on the fishery.

IMM Comment:

A single SEAK UoC was defined very early in the assessment process, at the point at which the fishery

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reassessment process commenced and when the other 13 UoCs were also defined. The 14 UoCs were defined on the basis of geographic region and the Management Areas used by ADF&G. It was considered that this would simplify the assessment process in comparison to the 2007 certification. For that certification, 12 of the 16 UoCs were based solely on geographic regions but the 4 UoCs in Southeast Alaska and Yakutat were divided up on the basis of gear types.

Having taken the approach of defining the UoCs on the basis of the ADF&G Management Areas for this new certification, it became apparent that the IPI considerations were potentially relevant and, having completed the calculations, it became clear that the Chinook catch fell well below the 2% threshold. It is certainly appreciated that the assessment of salmon fisheries is complicated by the life history of the fish, but the MSC assessment methodology allows for fish comprising small quantities of the total catch to be assessed through the IPI process. Nevertheless, we provide additional information below and in the revised PCDR.

The request acknowledges that "over the period 1985 – 2010, an average of 96.2% of the Chinook taken in the Southeast region fishery originated outside Alaska." In the very next sentence the request dismisses the significance of this data by noting that "non-local Chinook made up an average of just over 0.6% of the total all species catch within the Southeast Region." The magnitude of this latter percentage is simply irrelevant to the issue of the magnitude of the biological impact of the numbers of non-Alaska Chinook (or other salmon species) taken in the SE Alaska fishery and is contrary to the second criterion under MSC Principle 2:

> *The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.*

IMM Comment:

The assessment team acknowledges the importance of ensuring that the impact of the fishery on the non-local salmon is taken account of. In this regard, though, the estimates of impact on species that are listed as protected under national and international law have been considered through the IPI requirements under Table 6.

We also provide additional information here on exploitation rates of non-local Chinook salmon in the all-gear SEAK fishery. Chinook salmon harvests in SEAK are managed to meet Pacific Salmon Treaty obligations to Canada and escapements of Chinook salmon into SEAK rivers. PST harvests levels in SEAK are based on aggregate abundance indices of Chinook salmon. Fisheries in more terminal areas (BC and the Northwest) may utilize "individual stock-based management (ISBM)" to meet escapement goals for PST escapement goal stocks. PSC (2012, Appendix F.1) provides harvest rate estimates for 30 monitored Chinook stocks in the all-gear SEAK fishery. During 1985-2010, the highest harvest rate in SEAK was for local Alaska Chinook salmon (avg. 35%), followed by Upper Georgia Strait (19.7%), WCVI Hatchery and Wild (16.8%), Oregon Coast North (16%), Columbia Upriver Summer (14.4%), Columbia Upriver & Mid-Columbia Bright (13.3%), North/Central BC (10.3%), and WA Coastal Wild & Hatchery (<10.9%) Chinook salmon. Harvest rates on all other monitored Chinook stocks was less than 10% and typically less than 5%. Harvest rates were 7.3% for Fraser River early Chinook and 0.14% for Fraser late Chinook. Overall harvest rates in recent years have declined relative to the base period in response to concerns to reduce overall impacts on weak Chinook stocks. ADF&G management reports show that the total take of Chinook in SEAK is very close to the catch allowed under the Pacific Salmon Treaty (http://www.adfg.alaska.gov/FedAidPDFs/FMR13-06.pdf). Harvest rates on ESA salmon stocks in SEAK (<7.7%, 1985-2010) were shown in the PCDR report.

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English et al. (2012) estimated exploitation rates (ER) in Alaska for Chinook salmon originating from key North Coast/Central Coast statistical areas, 1980-2010 (calculated here by subtracting ER in Canada from total ER). Average ERs in Alaska fisheries were 2.4%, 16%, 16% and 9% for Chinook originating from BC areas 3, 4, 6, and 8, respectively, during 2006-2010.

The request itself proceeds to acknowledge that the SE Alaska fishery harvests a significant percentage of the total harvest on depressed West Coast Vancouver Island (BC) wild Chinook stocks. The request goes on to acknowledge and then dismiss impacts of the SE Alaska fishery on US ESA-listed Chinook stocks. Arguably, the impacts on ESA-listed Stillaguamish Summer/Fall, Lewis River Fall, and Snake River Fall Chinook are not trivial, regardless of the degree to which these harvest impacts may contribute to the current condition of these and other ESA-listed salmon populations.

Similarly, the designation of Nass and Skeena (BC) sockeye salmon runs taken in SE Alaska District 104 purse seine and District 101 set gillnet fisheries as IPI species is not convincing. The harvest level described in the request (6.5% of the total annual SE Alaska sockeye harvest) may or may not be trivial to the stocks themselves. But, as with US and BC Chinook, the request appears to believe that the impacts can be minimized or ignored simply by noting that these catch totals comprise a mere 0.1% of the total salmon harvest in SE Alaska.

IMM Comment:

The assessment does not dismiss nor ignore the potential impacts of the SEAK fishery on the IPI runs as listed in Table 6. Instead, the assessment highlights the levels of catch taken in the fishery, but also that factors other than the SEAK fishery are considered to be the major limiting factors. Nevertheless, the renewal of the Pacific Salmon Treaty in 2009 included an agreement to reduce the take of Chinook by 15% in the SEAK region (and by 30% in the Canadian WCVI fishery). In all but one case, the 2011 catch was below that of the 1985-2010 average. As noted above, the avg. exploitation rate (1980-2010) for Stillaguamish Summer/Fall, Lewis River Wild, and Snake River Fall Chinook was approximately 6.3%, 7.8%, and 5.4%.

Sockeye harvests in southern SEAK are also managed through the PST. For example, Alaska fisheries are permitted to harvest a somewhat small percentage of total allowable catch of Skeena and Nass stocks calculated as the difference between projected run and escapement goal targets. The estimated exploitation rate in SEAK for BC sockeye originating from statistical areas 3, 4, and 5 during 2006-2010 was 24%, 9% and 9%, respectively (English et al. 2012). The harvest rates on Canadian Skeena and Nass stocks are within the limits identified each year in the Treaty process. The US harvest of Stikine and Taku stocks has been around or has somewhat exceeded the agreed limits in recent years (PSC 2010, 2013a, 2013b), although escapement goals for Stikine and Taku sockeye has been met in 8 of the last 9 years (Munro & Volk 2013).

We remind the Certifier that at the 18 October 2012 stakeholder meeting with the AT in Seattle, Nick Gayeski, a WFC staff fisheries scientist, specifically asked the AT and the MSC officials present if the existence of an Incidental Take statement in a Biological Opinion by National Marine Fisheries Service (NMFS) permitting harvest impacts, such as under the Pacific Salmon Treaty was sufficient to conclude that all such harvest impacts (including, inter alia, the SE Alaska Chinook troll fishery) were sustainable. Our recollection is that one member of the AT responded that he hoped that the bar for sustainability was higher than NMFS' no-jeopardy standard. We agree with the AT member that NMFS' no-jeopardy criteria are insufficient to qualify as sustainability standards of the kind to which the MSC would appear to aspire. The Request, however, explicitly refers to such "Federally-issued incidental take permits in the Southeast Region fishery" in its dismissal of the impacts of the fishery on US ESA-listed Chinook.

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This matter goes to the very heart of the meaning of sustainable harvest and the value of an MSC certification of a fishery. If the mere existence of a NMFS "no-jeopardy" decision for a federally permitted fishery that impacts ESA-listed salmon stocks suffices to assure that the fishery is sustainable, there would appear to be no independent value to an MSC certification. In fact, NMFS itself states that all US fisheries are "sustainable" because they are sanctioned under the US Magnuson-Stevens Act (relating to fisheries). Similarly, where ESA-listed stocks are not at issue, but where there are stocks of management concern, such as, for example, NSI (Northern Southeast Inside) chum salmon, consideration of whether or not ADF&G has a management plan for the fishery in place should not be sufficient for certification of the fishery. Yet, as we discuss below, it is difficult to see that the AT has been provided with standards that require rigorous evaluation of agency fishery management policies.

IMM Comment:

The Incidental Take statement essentially allows the fishery to proceed; in the absence of the statement, the fishery would not proceed. Nevertheless, the additional information available on the fishery:

1) the maximum take in the SEAK fishery is 7.7% of reported ESA Chinook runs (avg. 1985-2010; PSC 2012c)
2) other factors are considered to be the major limiting factors
3) catch has been reduced recently by 15% and 30% in the SEAK and WCVI fisheries respectively relative to allowable catch in 1999 (http://www.psc.org/about_treaty.htm)
4) most of the 25 PST-monitored Chinook stocks are meeting the CTC-accepted escapement goals (PSC 2013); is sufficient evidence for the assessment team to conclude that the SEAK fishery meets the MSC requirements.

We note that while NSI chum in SEAK have had difficulty in reaching the escapement goal in some recent years, it has not been identified as a Stock of Management Concern (Munro & Volk 2013). The PCDR identifies conditions related to hatchery chum straying in NSI.

In the interests of the transparency and rigor of the assessment, it seems to us to be incumbent on the Certification Body that the Assessment Team (AT) provide detailed biological explanations that present a plausible case that any or all of these impacts are highly unlikely to cause continued decline or depression of the individual stocks harvested, and do not inhibit their biological resilience and ability to rebuild/recover. In particular, where depressed stocks are intercepted but where such interceptions account for a minor proportion of the total catch of the stock and/or of the total annual return (run) of the stock, a cumulative effects analysis should be conducted as part of the certification process in order to provide assurance that the stock will not suffer a "death from a thousand cuts." The dismissals of the SE Alaska fishery interceptions of non-Alaska stocks found in the variation request are more than disconcerting from this perspective.

IMM Comment:

Please see information provided above on exploitation rates in the SEAK fishery. PSC (2012c) provides exploitation rates for indicator Chinook stocks in each of the fisheries along the west coast. PSC (2013) provides Chinook escapement versus escapement goal data. English *et al.* (2012) provides exploitation rates for each species in north/central coast British Columbia.

The AT should keep in mind the full suite of recommendations of NMFS – not simply the "no-jeopardy" decision – contained in the Biological Opinion on the most recent amendments to the Pacific Salmon Treaty (NMFS Tracking Number: F/NWR/2008/07706, December 22, 2008). That document (page 11-1) notes that the Treaty

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> *provides that the Parties may implement domestic policies that restrict their respective fisheries to a greater degree than is required by the specific provisions of the agreement… Although the overall objective of the agreement is to rebuild wild stocks,* ***the agreement was not intended to provide all the protection nor do so at the scale of detail that may be necessary for the component runs of listed salmon ESUs.*** *It is reasonable to expect that additional management actions will be required in some years that are targeted to the needs of particular species or stocks* (emphasis added).

While this "conservation recommendation" was made by NMFS to itself, we believe it should apply here to a body such as MSC. What additional measures could be taken to assist recovery of Puget Sound Chinook? Is the management of the SE AK Chinook fishery by ADF&G completely constrained by the Pacific Salmon Commission, or can the SE AK Chinook fishery take fewer fish altogether to reduce impacts on Puget Sound Chinook? Can fishing for Chinook be reduced in certain areas of SE AK? The assessment is silent on such measures. Instead, the SE AK Chinook fishery is simply allowed to continue, in the manner prescribed by the PSC, without any conditions or arguably even a complete assessment because of the granting of the "variation request" for IPI. This low threshold is hardly in keeping with the MSC Principles and Criteria, especially the second criterion of Principle 2 (cited above).

Even if the NFMS Biological Opinion was sufficient, the SE Alaska Chinook fishery affects other depleted runs that are not covered by the Biological Opinion.

WCVI Chinook concerns.

DFO's "Assessment of West Coast Vancouver Island Chinook and 2010 Forecast" (CSAS science advisory Report 2012/032, cited in the variation request), notes an overall continued depressed status for most WCVI wild Chinook populations. Large Chinook hatchery programs in several WCVI streams appears to be a major contributor to the depression of wild WCVI Chinook in two ways: increased harvest interceptions in AABM mixed-stock fisheries ostensibly targeting hatchery stocks; and, high levels of hatchery-origin Chinook spawning in the wild. The DFO Assessment specifically notes Alaskan interceptions as a significant contributing factor to the continued depressed status of WCVI Chinook: "The far northerly distribution of WCVI Chinook limits the ability to conserve WCVI Chinook, since a large proportion of the catch occurs in Alaska" (page 1).

The Summary page of the Assessment (page 2) "Many of the other index systems, which have not declined, are dependent on hatchery supplementation to maintain current spawner levels. Sampling of escapement for hatchery marks indicates that a high proportion of spawners in some systems in some years are hatchery origin fish." These populations, primarily in the northwest WCVI, are likely to suffer the dual impact of harvest in hatchery-augmented mixed stock AABM fisheries, including SE Alaska, and reduction in reproductive success due to high levels of interbreeding with hatchery-origin fish. Such fitness depression is expected even when the hatchery stock is founded from and/or maintained by local wild (i.e., natural-origin) broodstock.

These hatchery impacts in WCVI should be subject to the evaluation of the AT with respect to their sustainability. After all, SE Alaska troll-caught Chinook that will be sold with the MSC logo will include both WCVI wild and hatchery-origin fish. As with NMFS "no-jeopardy" opinion, one must ask "Is all that MSC need do is ask DFO if it has determined that the fisheries it permits are sustainable in its (DFO's) eyes?"

The AT has not fully investigated ways in which the SE Alaska Chinook fishery could minimize harvest of depleted runs, both US ESA-listed stocks and depleted WCVI stocks. The fishery should not be certified based on the information contained in the PCDR.

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IMM Comment:

The fishery assessment is intended to determine the performance of the fishery against established MSC criteria, and we specifically intend not to provide management advice. As noted above, the average exploitation rate for WCVI Wild Chinook in SEAK is 17.4%, 1985-2009. Nearly 50% of this stock's catch is taken in SEAK but this stock represents only 3.2% of the SEAK Chinook catch (PSC 2012). Canadian fisheries take the remaining 50% of the catch. Total ER (all fisheries) has declined over the years, from ~60% in the 1970s to 30% in the recent decade. As noted above, beginning in 2009, allowable Chinook catch in SEAK has been reduced by 15% relative to that allowed in Table 1 of the 1999 PST agreement.

SE Alaska Issues

General concerns:

We have concerns regarding the levels of releases of hatchery chum salmon in SE Alaska, and particularly in the Northern Southeast Inside subarea, the level of straying of hatchery-origin chum and the presence on the spawning grounds of high proportions of hatchery-origin chum, and the determination of sustainable escapement levels.

We find that the AT has failed to consider and evaluate the potential impacts on the marine food web of the large releases of SE Alaska hatchery chum salmon. The scale of these releases needs to be evaluated in the context of their contribution to the overall numbers of hatchery-origin juvenile salmon in the North Pacific, including the Bering Sea and Gulf of Alaska. Potential issues include direct competition for food resources between hatchery-origin and wild juveniles, and trophic impacts on the abundance of key prey items of several salmon species and the structure of the marine food web on which those prey items are dependent. PIs 2.5.1, 2.5.2, and 2.5.3 contain no mention of these specific issues. We disagree with the AT that the issue of resource competition is sufficiently addressed under PIs 1.3.1, 1.3.2, and 1.3.3.

IMM Comment:

The assessment team addressed the potential impacts of hatchery salmon on wild salmon under PIs 1.3.1 - 1.3.3, including the effects of competition on other species of salmon. The PCDR states that competition between hatchery and wild salmon is an issue, and this topic is specifically addressed in PI 1.3.1. As noted in the PCDR, in SEAK, one published study (Sturdevant *et al.* 2012) reported no effect of hatchery chum on growth of wild chum. PIs 2.5.1-2.5.3 involve the potential effects of hatchery salmon on non-salmonids. Little information is available on these interactions in SEAK; although the PCDR does mention the adverse effect that large releases of hatchery pink salmon into PWS reportedly have on the recovery of PWS herring, the releases in SEAK have been of a lesser magnitude and over a larger region than those in PWS.

We strongly disagree with the AT that ADF&G's escapement goal management policy, based on Maximum Sustained Yield (MSY), appropriately addresses ecosystem structure and function. First of all, several specific escapement goals are estimates that are provided as ranges. This is especially true of so-called "Sustainable Escapement Goals" (SEGs) and where these are in effect to guide fisheries management, their lower bounds generally function as target reference points. Consequently, even where uncertainty regarding the true MSY escapement level exists, harvest management policy appears designed to err in favor of the near-term interests of the fishery. But even where, *ex hypothesis*, the true MSY level of escapement is known and consistently achieved by managers, MSY escapement is not equivalent to sustaining ecosystem structure and function. It clearly ignores the consumption requirements of marine mammals that prey on salmon species and terrestrial carnivores and scavengers that rely on abundant salmon escapements. Nor does MSY escapement provide for the

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greatest sustained delivery of marine-derived nutrients to freshwater and riparian food webs. Greater-than-MSY escapements are generally required to optimally meet these ecosystem requirements.

IMM Comment:

Escapement goal-based management provides the potential for relatively large future production. When the salmon abundance is exceptionally large, the escapement goal approach reduces the potential for overcompensation, as has been observed in some pink and sockeye populations, which may crash following exceptionally large escapements. At low abundances, the escapement goal approach leads to reduced fishing or no direct fishing, thereby providing opportunity for relative large future production. The consistency in escapements provided by the escapement goal approach provides a consistent supply of food for animals that depend on salmon. It is recognized that the goals are not necessarily designed for maximum salmon returns, rather BEG goals are designed to provide for large future harvests.

Chum salmon straying in SE Alaska NSI:

The AT notes concerns with the high levels of straying of hatchery chum salmon in the NSI and the recent absence of monitoring of the impacts of straying on the productivity of wild chum stocks. Specific concerns are expressed with regard to PIs 1.3.1, 1.3.2, 1.3.3, and 2.5.2. In light of the considerable uncertainty expressed by the AT for PIs 1.3.1 – 1.3.3 in the Evaluation Table (PCDR pp. 129 – 135) we agree that the NSI chum fishery fails to meet meets the SG80 scoring level for PIs 1.3.1 and 1.3.3. But we disagree with the attendant Conditions placed on the fishery.

With respect to PI 1.3.1 we disagree that it is reasonable to conclude that the UoC meets the SG 60 scoring guideline. The evidence adduced that "there was no evidence of any correlation between recent declines in escapement relative to levels of straying observed in recent investigations of Piston & Heinl" (Evaluation Table, page 129) does not clearly support the conclusion that "It is **likely** that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks." Rather, the absence of appropriate monitoring studies directed at evaluating the impacts of hatchery straying and specific levels of interbreeding with wild stocks on wild stock fitness is a significant uncertainty that in itself poses a risk to wild stock fitness to a non-trivial degree, given what we do know about the fitness and local adaptation of wild salmon and the kinds of harmful impacts interbreeding with hatchery-origin conspecifics can pose. In fact, the AT appears to recognize this to some extent in its ensuing explanation for denying the fishery a score of 80 and motivating Condition 1:

> *the presence of such large straying rates suggests that enhancement activities for this species may have negative impacts on the local adaptation of wild stocks through introgression with the hatchery fish, which has the risk of decreasing the reproductive performance and diversity of wild stocks* (ibid.).

IMM Comment:

In terms of the MSC assessment process in general, it is highlighted that the SG60 level of performance does not constitute a pass of the MSC standard, and that Conditions are therefore introduced when scores of 60-75 are awarded for any PI; the aim of any Condition is to bring the performance of the fishery being assessed up to the SG80 standard as a minimum. If a score of less than 60 is awarded for any PI, the fishery being assessed cannot meet the MSC Standard overall, and that fishery would therefore fail the assessment. As such, an assessment team cannot award a score of less than 60 whilst also introducing a Condition. Nevertheless, for reasons described in the PCDR, the assessment team believes that the score of 60 that was awarded to the SEAK UoC for PI 1.3.1 is appropriate.

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Admittedly, it appears that the exact level and nature of such uncertainty is unknown, but this only underscores the importance of the need for a quantitative risk assessment in these contexts. This highlights a general and fundamental inadequacy in the scoring guidelines and in the task set before the AT, viz., the guidelines rely on the employment of vague, qualitative, terms relating to uncertainty ("likely", "highly likely", "high degree of certainty"). The application of these terms in any specific context by Assessment Teams fails to require the application of any quantitative risk assessment framework. The inevitable result is the members of Assessment Teams, as well as reviewers of Assessments are forced to rely on subjective assessments of data and circumstances when deciding whether one or another of the SGs is met. For the most part, in this and other Certifications, it would appear that when the kind of uncertainty that characterizes the impact of chum straying in the NSI obtains, the fishery receives the benefit of the doubt by attaining at least a 60 and more often than not an 80. The MSC certification process simply must strive for greater objectivity in identifying and applying criteria for the SGs.

IMM Comment:

The assessment team is required to work with the standard and guidance as devised by the MSC in consultation with a very wide range of stakeholders. Nevertheless, we agree that the MSC process must always strive for objectivity wherever possible.

In view of the documented levels of straying of hatchery chum salmon in the NSI and the significant uncertainty regarding the impacts this poses to wild stock fitness, we disagree with Conditions 1 and 2 as being far too lenient in view of the risk. In explaining its denial of a score of 80 for PI 1.3.2 issue b, the AT notes that it

> *sees two options that would allow the chum fishery to meet the SG80 level of performance for this SI. The first option is to reduce production levels and/or straying rates so that introgression and demographic effects are no longer a concern. The second option is to demonstrate that higher levels of straying, as previously observed, do not significantly negatively impact wild stocks (e.g., the study by ADF&G (2012f), which is discussed in Condition 1* (Evaluation Table, page 132).

The presentation of these two options by the AT appears to make them seem to be mutually exclusive. Yet, clearly they are not. Condition 1 requires that the SG80 scoring guideline for PI 1.3.1 be achieved by 2023 (approximately two chum salmon generations from the current assessment) on the basis of studies in the NSI on the impact of hatchery chum straying on the reproductive fitness of wild chum stocks proposed or planned by ADF&G. If, after the ten years' time the study "demonstrate[s] likely significant negative effects, changes will be required to the current aquaculture practices or fisheries management regime to reduce straying" (page 399). But allowing two additional generations of harmful impacts to have occurred by the time the study documents the negative impacts is insufficiently risk averse, and an inappropriate response to the uncertainty.

Therefore, we would prefer the outright adoption of the first option described by the AT, which would require the reduction of straying to some presumptively risk-averse low level, e.g., less than 5% pHOS (proportion of hatchery-origin spawners on the spawning grounds in the wild; Paquet et al. 2011). A reasonable compromise between this and the actual terms of Conditions 1 and 2 would be to require combinations of hatchery program reductions and fishery management regimes in the NSI to reduce straying levels in a majority of NSI rivers to low levels while retaining current release levels affecting other NSI rivers and focus the studies (for a period of two generations) of the impacts of hatchery straying on the fitness of wild stocks on those few rivers, using nearby rivers with little or no straying as paired controls, as was recommended a decade ago by the Salmon Recovery Science Review Panel (RSRP) in its review of hatchery supplementation programs in the Columbia River basin. Such an approach would considerably reduce the risk to a majority of NSI wild chum

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populations, while permitting the appropriate study of fitness impacts from a subset of rivers currently experiencing high levels of straying.

IMM Comment:

The assessment team notes the comments here on the suitability of the condition applied to PI 1.3.1. Condition 2 is focused on straying levels and ensuring that the fishery is meeting MSC guidelines.

Subsistence issues; focus on the Yukon.

Recent work published by Dr. Phillip Loring and colleagues (Loring 2013; Loring and Gerlach 2010) document important impacts on the food security of Alaska Natives dependent on both commercial fishing in the lower Yukon and subsistence fishing in the upper Yukon of harvest management of Chinook and chum in the Yukon. Alaskan Natives and other citizens of Alaska that reside in the Yukon and depend on a fraction of annual salmon runs (particularly Chinook and chum) for basic subsistence needs are inherent components of the Yukon ecosystem. Consequently, fishery management impacts on the basic subsistence requirements of these groups should be considered under PI 2.

Loring (2013) states

> Socioeconomic circumstances across the state do not mirror the vibrant images of thriving communities presented by ASMI and others. Rates of food insecurity, which describe households that do not have reliable access to safe, nutritious, and culturally preferred foods, are high and on the rise. Roughly 14% of Alaskans are currently food insecure, and although this rate is lower than the national average of 16%, estimates suggest that rates are as high as 30% in some rural areas. Contributing to these challenges are climate driven changes to ecosystems and weather, changes that are having significant effects on local people, community infrastructure, and natural resources (internal citations omitted).

Such high rates of food insecurity on the part of subsistence-fishery-dependent Alaskan citizens should lie at the very heart of what it means for a fishery and associated management system to be sustainable. Issues with sustenance fishers on the Yukon are not limited to Alaska's citizens. This year again, Chinook returns to Yukon the Alaska – British Columbia border are less than the "minimum" (http://alaska.fws.gov/asm/newsrel/r080813.pdf), affecting citizens in both nations.

Additional information can be gleaned from transcripts of meetings held by the "Federal Subsistence Board," a US multi-agency body tasked with implementing the "Federal Subsistence Management Program" under the authority of the "Alaska National Interest Lands Conservation Act" (ANILCA) passed in 1980. The Board manages subsistence uses on Federal public lands and waters on 230 million acres of Alaska (60% of the state's area). Public testimony varies from general support for the Board's efforts to accusations of violations of the UN Charter, but it is clear that subsistence users reliant on the resources of the Yukon River (and watershed) have been at issue for some time. Perhaps the most succinct summary came earlier this year from an Alaska citizen: "the Yukon River can't feed the people that are living on it now so there's no sense in letting it try to feed the rest of the world" (http://alaska.fws.gov/asm/pdf/board/20130123.pdf page 248).

Yet, this impact and these sources of information appear have fallen by the wayside in MSC's assessment scheme, and therefore, the Assessment Team has not considered this issue and these types of information. It is not sufficient to simply rely on the fact that there are avenues for subsistence fishers to air grievances. The Assessment needs to take a close look at the long-term health of the fisheries, the demands placed upon it from subsistence fishers, and how well the responsible institutions have addressed the problems of subsistence fishers. In this case, past performance is a

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good indicator of future performance. We as stakeholders failed to recognize this issue in 2012, but it is a significant and substantive issue, and the ultimate responsibility for assessing all issues and all sources of information lies more with MSC, the Certification Body, and the Assessment Team than it does with stakeholders.

We believe the PCDR should examine this issue under PIs 2.4 and 2.5 for the Yukon, Kuskokwim, and other UoC's as appropriate.

IMM Comment:

The assessment team notes the comments on Yukon subsistence fishers. The core of Principle 2 is that "*Fishing operations should be managed to maintain the structure, productivity, function and diversity of the ecosystem on which the fishery depends*." (MSC 2013a, our highlighting). PIs 2.4x and PIs 2.5x are then devoted to habitat and wider ecosystem considerations respectively. The sustainability of the fish stock is considered under Principle 1, and the rights of subsistence fishers are then considered explicitly under PI 3.1.1 (where the Alaska salmon fishery was scored 100). The PCDR stated that total Chinook run estimates in the Yukon were relatively stable at around 300,000 fish from 1982 to 1997, but have since declined sharply to an average of around 200,000 fish, with most recent years among the lowest (ADF&G 2012b). The last commercial fishery targeting Chinook salmon occurred in 2007. Chinook are an important species for subsistence harvest (avg. = 47,101 fish, 2000-2009), but repeated years of low Chinook abundance has led to progressively more stringent restrictions in the form of multi-day subsistence fishing closures and gillnets being limited to 6-inch or smaller mesh. Annual subsistence Chinook harvests have been below the lower end of the "Amounts Necessary for Subsistence" (ANS; 45,500-66,704 fish) since 2008 (ADF&G 2012a), indicating that subsistence fishermen have not harvested enough Chinook salmon to meet their needs. The failure to meet ANS is in part because of the low Chinook abundance and the various management actions, but also because of informed choice among some members of the public to reduce their Chinook catch in order to bolster escapement. Between 2007 and 2011, escapement goals were achieved 67% of the time for Chinook. Chinook is classified by the state as a Stock of Yield Concern.

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Appendix 12: Surveillance Frequency

(REQUIRED FOR THE PCR ONLY)

1. The report shall include a rationale for determining the surveillance score.
2. The report shall include a completed fishery surveillance plan table using the results from assessments described in CR 27.22.1

Table 19: Fishery Surveillance Plan

Score from CR Table C3	Surveillance Category	Year 1	Year 2	Year 3	Year 4
[e.g. 2 or more]	[e.g Normal Surveillance]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit]	[e.g. On-site surveillance audit & recertification site visit]

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Appendix 13: Client Agreement

(REQUIRED FOR PCR)

The report shall include confirmation from the CAB that the Client has accepted the PCR. This may be a statement from the CAB, or a signature or statement from the client. *(Reference: CR: 27.19.2)*

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Appendix 14: Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection. *(Reference: CR 27.19.1)*

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