CERTIFICATION REPORT

ON

COMMERCIAL SALMON FISHERIES

IN

ALASKA

Project Number: SCS-MFCP-F-0003

December 2000

Accredited Certification Body:
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Amendments Issued Since Original Draft

Amd. No	Date	Description Of Amendment
1	**5/2/2000**	Edits required after internal review by ADF&G
2	**6/26/2000**	Edits required as part of the process of converting the test case to a full certification report. These comments follow after extended stakeholder consultation in Canada, and after additional collection and review of data.
3	**7/28/00**	Revisions after peer review comments and ADF&G 2nd round comments
4	**8/2/00**	**Revised with edits from Evaluation Team members and ADF&G**
5	**December 2000**	**Revised with edits from ADF&G and SCS**

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1.0 SUMMARY

1.1 Notable strengths of the fishery

Alaska's management of its commercial salmon fisheries provides an excellent example of a strict, effort controlled fishery with day to day adaptive management. In evaluating the information provided by the State of Alaska's Department of Fish & Game, the evaluation team found many strengths in the management system (see Section 9). Specifically, the system in Alaska has done a good job in adapting to new information in a timely fashion, tightly controlling effort in time and space to preserve stocks (even non-commercial stocks), and has even built into its legislation the requirement for sustainable salmon management. Some examples of specific strengths include:

- Statutes and regulations codify the authority and decisions of the management system.
- The Board of Fisheries (BOF) has adopted numerous management plans that control harvests and assure escapement in many important fisheries throughout Alaska. Management philosophy, articulated as BOF policy, has generally been codified as well.
- Clear, codified state laws and regulations establish the primacy of management for sustained yield and identify subsistence as the priority use for the harvestable surplus.
- The limited entry system has helped to controlled effort in salmon fisheries throughout the state and has thus facilitated management for sustained yield.
- The Emergency Order system allows rapid, on-site response to changed or unexpected fishery conditions.
- The management system has a very high success rate in achieving target escapements, and conducting orderly harvests of surplus stocks.
- Policies are in place (including a mixed stock policy that is also in regulation) that are aimed at protecting dominant and weak stocks.
- The management system has demonstrated the ability and willingness to close fishing areas and seasons to protect depleted stocks.
- An adopted Escapement Goal Policy (also submitted to the Board of Fisheries for regulatory action).

- An adopted Sustainable Fisheries Policy (placed in regulation 3/23/00)
- An adopted genetics policy
- A mandate for sustainable salmon fisheries in the state constitution
- Statutory priority of wild over enhances stocks (AS 16.05.730)

1.2 Main weaknesses of the fishery

Inevitably, every fishery and every management authority has areas that are less strong than others. Some may deem these weaknesses; however, they may simply be considered areas for improvement. The term weakness, as typically used, connotes something that is not sufficient or is unable to hold its own. While we use the term in this report, what we are specifically referring to are items that can be improved. Most of these items have been, and are still working reasonably well, so they do not fit the typical definition of a weakness. For example, the evaluation team found that the two most significant areas for improvement were in bycatch monitoring and a need for improvement in some aspects of the stock assessments and setting of escapement targets. Specific issues for consideration can be found in detail in Section 9 of this report.

1.3 Certification recommendation

During the phase of this project known as the "test-case", the evaluation team found that the information they were provided on the management of commercial Alaska salmon fisheries statewide conformed to the MSC Principles and Criteria. With the conversion of this information into an official assessment of Alaska salmon management, and with the addition of the information gained in extending the review process, it is still the consensus of the evaluation team that the commercial salmon fisheries under the management of Alaska's Department of Fish and Game meet the MSC Principles and Criteria.

1.4 Justification of certification recommendation

Using the methodology prescribed by the Marine Stewardship Council, the assessment team found that Alaska's commercial salmon fisheries met all three MSC Principles and Criteria independently. Given

the potential for scores between 0 and 100 for each Principle, with a score of 80 being the minimum level required in achieving certification, the assessment team scored the fishery as follows:

- Principle 1 84
- Principle 2 84
- Principle 3A 91
- Principle 3B 84

1.5 Proposed requirements for continued certification.

It is the assessment team's consensus judgement that the management of Alaska's commercial salmon fisheries overall complies with the MSC Principles and Criteria. On balance, the team was most impressed with the management system and the required day to day management activities. The team was also impressed with the resource sustainability of the fisheries in Alaska; however, the team did feel there was room for improvement on several fronts. Specifically, the Assessment Team found that the Alaska Department of Fish & Game would need to comply with the specific requirements listed below if the fisheries are to maintain certification. These issues would be the focus of continued monitoring after the initial certification to ensure the sustainability of salmon fisheries.

- ADF&G must recognize that MSC standards require regular monitoring inspections at least once a year, focusing on compliance with the requirements set forth in the report (as outlined below) and continued conformity with the standards of certification.

- ADF&G must recognize that MSC standards require re-evaluation for certification purposes (as opposed to yearly monitoring for update purposes) on a five-year cycle.

1.5.1 Specific Requirements for Continued Certification

In addition to the general requirements outlined above, Alaska must also agree in a Memorandum of Understanding with SCS to meet specific requirements with recommended timelines as described below.

1.5.1.1 Performance Indicator 1E - Target Reference Points

Within 3 years of certification the Alaska Department of Fish & Game must:

1. Determine the number of salmon spawning stocks or spawning stock aggregates in the state that are managed on the basis of (1) escapement goals determined by stock-recruitment analysis, (2) escapement goals determined by average escapements, and (3) no established escapement goals.

2. Categorize each spawning stock or spawning stock aggregate according to relevant characteristics such as: whether it is a mixed stock fishery, the number of individual stocks exploited, methods used to estimate escapement, whether escapement goals were based on data before or after the mid-1970s, and whether the monitored stocks exploited in the mixed stock fisheries are representative of unmonitored stocks exploited.

3. Present the distributions in terms of the number of spawning populations, the number of fish, and the economic value of the fishery.

1.5.1.2 Performance Indicator 1F - Limit Reference Points

1. Within 3 years after certification ADF&G must provide an explanation to the certification body about how Alaska salmon fisheries will continue to be sustainably managed even if there is an event that changes ocean survivals back to rates equivalent to those seen in the 1950s, 1960s, and 1970s. The explanation provided should at a minimum include:

a) What types of analyses are being conducted to understand how potentially lower ocean survival rates effect population abundance and commercial catches (use stock recruitment data where available).
b) An assessment of the projected distribution of catches over spawning populations, the distribution of fisheries that would be shut down, and the socio-economic impact.
c) A description of how ADF&G would respond to these conditions and to well-reasoned arguments that most escapement goals are arbitrarily set at an average level, therefore are not based on population dynamics and should be lowered.
d) A description of the department's response to poor salmon survival conditions experienced historically including the 3 years in the early 1970s.

2. Within 1 year after certification ADF&G must provide evidence to the certification body that the joint stock status report for northern coho required by the Pacific Salmon Treaty is being undertaken in a timely and cooperative manner. This can take the form of presenting the certification body with ADF&G's portion of the report, or presenting copies of the correspondence from ADF&G to the appropriate PST representatives regarding progress being made.

3. Within 2 years after certification ADF&G must present to the certification body an explanation of why ADF&G believes the stocks being co-managed under the PST are considered sustainable based on the current management paradigm.

1.5.1.3 Performance Indicator 2A - Bycatch and discards:

1. Within 3 years after certification the state must implement a sampling program to identify major non-salmon fish species, birds and marine mammals taken in the salmon net fisheries of the State. The program should be designed to provide a reasonable understanding of fish, shellfish, birds and marine mammals taken incidentally in the fisheries. This requirement can be met in a number of ways. For example, one solution is that the sampling program may involve collection of bycatch information in the course of the department's test fisheries, and reference to similar data collected by the National Marine Fisheries Service. The certification body is not requiring any specific

method, merely evidence that ADF&G is utilizing some process to collect the necessary information to adequately understand bycatch in the net fisheries.

2. Before 5 years pass after certification, ADF&G must provide evidence and a summary regarding its findings on bycatch of non-salmon species taken in the Alaskan salmon fisheries to an accredited certification body.

1.5.1.4 Performance Indicator 3C - Management system incentives and subsidies for sustainable fishing

1. Within 2 years of certification ADF&G must present information to the certification body reporting on progress made by the Commercial Fisheries Entry Commission on reducing the number of permits to the numbers determined to be consistent with the limited entry law on an annual basis.

2. The Department must identify long-range research needed to assess the magnitude of the interaction of hatchery programs on the wild stock gene pool and the effect on the reproductive fitness of those stocks. The department must document the programs, policies and regulations and statutes as well as specific actions taken to assure the consistency of the hatchery program with the Genetics Policy.

2.0 ADMINISTRATIVE CONTEXT

2.1 Historical, Administrative and Statutory Framework

After purchasing Alaska from Russia in 1867, the United States made the area a customs district under the Treasury Department. The first salmon saltery was opened in 1868 and the first salmon cannery in 1878. By 1920 there were 160 salmon canneries in operation in Alaska.

At statehood (1959), Alaska assumed control of its fisheries. The Alaska Constitution is unusual in that it dedicates an entire segment, Article VIII to natural resources. There are several sections that are

especially pertinent to the management and conservation of salmon. Section 2 directs the legislature to "*provide for the utilization, development and conservation of all natural resources…for the maximum benefit of its people"*. Section 3 reserves natural resources *'to the people for common use"*. In Section 4, it directs that natural resources be *"utilized, developed, and maintained on the sustained use principle"*.

The state legislature created the Alaska Department of Fish and Game with the commissioner as principal executive (AS16.05.010) and charged the incumbent to*: "manage, protect, maintain, improve, and extend the fish, game and aquatic plant resources of the state…"* AS 16.05.020(2). It also established the Alaska Board of Fisheries, seven members appointed by the governor and confirmed by the state legislature and detailed their authority which includes in part:

> *- establishing open and closed seasons;*
> *- setting quotas, bag limits, harvest limits, sex and size limitations;*
> *- establishing the methods and means employed in the pursuit, capture and transport of fish;*
> *- watershed and habitat improvement, management, conservation, protection, use, disposal, propagation and stocking of fish;*
> *-regulating commercial, sport, guided sport, subsistence, and personal use fishing as needed for the conservation, development, and utilization of fisheries.*

The State is organized into discrete fishery management areas encompassing the fishing districts delineated by the BOF. Each management area has an assigned Area Management Biologist and additional professional and technical support personnel. An important aspect of state management is a system that allows rapid, in-season management changes to regulations. AS 16.05.060, *Emergency Orders*, gives the department field staff the authority to make regulatory announcements based on management decisions that can be placed into effect immediately and carry the full force and effect of law. In so doing, the Alaska system sets in place a structure that actually allows for daily management decisions to be made and implemented as required to sustain salmon populations and catches throughout the state.

In 1973, the state constitution was amended to establish a limited entry program. The Commercial Fisheries Entry Commission was established the following year. For purposes of limited entry, the state was divided into a number of administrative regions. Within each region legal gear types were defined. Entry has been limited in all regions, and permits were issued to individuals who could demonstrate a history of participation within that segment of the fishery.

As previously stated, the Alaska state constitution mandates sustained yield of its natural resources. It further mandates management for maximum benefit. The ADF&G has the authority under AS 16.05.020 to establish the annual level of salmon spawning required to maintain a sustained harvest and also to manage fisheries to ensure that those spawning escapement requirements are met. The ADFG Escapement Goal Policy describes a key element of the state's management philosophy and intent:

> *"Unless otherwise directed by regulation, the department will manage Alaska's salmon fisheries, to the extent possible, for maximum sustained yield. To this end, the department will aggressively pursue the further development of escapement enumeration programs, in-season fishery management programs, and scientific methods to determine escapement levels which produce maximum sustained yield."*

In 1981, the state legislature created the Habitat Division within the ADFG with a mission that includes:

- *maintain and protect fish, wildlife and their habitat*
- *carry out a regulatory program for the maintenance and protection of the biological integrity of all anadromous spawning, rearing and migration areas*
- *carry out a regulatory program which is designed to ensure that opportunities continue to exist for free movement of all fish species in the waters of the State.*

The Division is responsible for maintaining and updating the *Catalog of Waters important for the Spawning, Rearing or Migration of Anadromous Fishes*. Any individual, agency or commercial entity

must acquire project approval in the form of an ADFG fish habitat permit, prior to undertaking any use or activity within waters listed in the catalog.

The US Forest Service manages commercial logging in Alaska on federal lands, or by the Alaska Department of Natural Resources (ADNR) on state and private lands. Alaska has adopted a Forest Practices Act (AS 41) that regulates activities affecting fish habitat. ADFG Habitat Division is responsible for providing expert advice to the ADNR on issues of logging near anadromous waters.

The Alaska Department of Environmental Conservation is responsible for water quality enforcement within the state.

2.2 Historic Production of the Salmon Fishery

The Alaska salmon fishery occurs within the US territorial waters adjacent to the coast of the State of Alaska. It targets five species of Pacific salmon: sockeye (*Oncorhynchus nerka*); chum (*O. keta*); chinook (*O. tshawytscha*); coho *(O. kisutch*); and, pink (*O. gorbuscha*). Salmon are harvested by nets (drift and set gillnets, purse seine) and by trolling. The fishery occurs within management districts delineated by the Board of Fisheries (BOF) and is managed by the biological staff of the Alaska Department of Fish and Game (ADFG).

At statehood the average annual harvest had fallen to about 25 million salmon, the lowest since 1900. Harvests generally improved after 1959, for a period of about 12 years, averaging approximately 40 million per year. However, poor harvests, generally attributed to lower survival during severe winter weather, occurred in 1967 and, 1972 – 1975. Catches since then have been increasingly robust. While the improvement has been largely attributed to a long-term improvement in the biological productivity of the ocean in the Gulf of Alaska, other factors have also played a role. The elimination of high seas drift net fishing and the implementation of the Magnusen Fisheries Management and Conservation Act in 1976 have been significant contributing factors to the sustainability of Alaska salmon fisheries. Equally important has been effective fisheries management on the part of ADF&G. The state of

Alaska continues to invest in research and management programs designed to better assess and manage salmon stocks. Significant hatchery programs also began in 1974.

Catches in the past decade have been generally above 190 million salmon with ex-vessel values exceeding US$400 million annually. Numerically, pink salmon predominate in the harvest, comprising more than one-half of the statewide harvest. Roughly one-fourth of the harvest is sockeye salmon, followed by chum, coho and chinook salmon. In product value, sockeye salmon have always been the primary species. At the time of statehood essentially the entire harvest was canned or salted. In recent years more than 80 percent has been sold whole or eviscerated. Seventy-five percent of the fresh or frozen product is exported with Japan purchasing about 80 percent of that. The canned product is sold primarily within Europe and the United States.

2.3 Other Fisheries Activities and Issues

2.3.1 Commercial Fisheries

Other commercial fisheries occur within the areas delineated for commercial salmon fishing. Some examples include net fisheries for herring, longline fishing for halibut and rockfish, pot fisheries for crab, pot and trawl fisheries for shrimp and groundfish, and small, localized fisheries for clams, sea urchins, and sea cucumbers. In general non-salmon commercial fisheries do not overlap in time and area with the fisheries being evaluated. There appears to be little significant impact on non-salmon species by the salmon fishery. Similarly, although there is some bycatch of salmon in the large offshore trawl fisheries, the non-salmon fisheries do not appear to significantly impact the operation of the Alaska salmon fisheries.

2.3.2 Hatchery Enhancement

In the late 1970's the state embarked on an ambitious program of hatchery construction. In addition to the building of state facilities, laws were passed to create the framework within which non-profit corporations could develop private hatcheries. By the mid-1980's, government interest in hatcheries had waned and the public facilities were gradually given to the private non-profit corporations. In

1996, hatcheries in Alaska collected and incubated 1.7 billion salmon eggs. Fry, fingerling and smolt releases have exceeded 1.5 billion per year. The adult return from Alaska hatchery operation was estimated at more than 38 million fish in 1995.

Effects on the salmon fishery by the hatchery program fall into two broad categories. First, returning hatchery fish mix with natural stocks as they enter fishing areas. Hatchery stocks are able to withstand very high exploitation rates that may exceed those tolerable by a stock that spawns under natural conditions. Therefore, harvest of mixed hatchery and wild stocks can be a difficult task wherein attempts are made to maximize hatchery harvest while ensuring adequate protection is still provided for naturally spawning stocks. Second, some data suggest the release of large numbers of hatchery juveniles into nearshore rearing areas may have an effect on the growth and survival of natural stocks through competition for food. Also, straying and spawning of hatchery-origin fish into natural spawning areas may affect fitness and productivity of wild populations. Studies have been and are continuing to be conducted in Alaska and throughout the Pacific coast to better understand and address these issues.

2.3.3 Federal – State Subsistence Jurisdiction

Following the assumption of federal subsistence fisheries management in waters claimed by the federal government in October 1999, it remains unclear how far federal subsistence management will reach. It is possible that existing commercial fisheries, currently managed by the state, could be affected as the federal agencies take action to assure adequate upriver returns to satisfy subsistence needs on or adjacent to federal lands. Further, the federal agencies (Bureau of Indian Affairs, Bureau of Land Management, National Park Service, US Forest Service and US Fish and Wildlife Service) do not have the same management mandates that the ADF&G does. Although the federal subsistence program must adhere to basic conservation principles, there is no specific mandate for it to manage for escapements to sustain current levels of commercial fishing, since their mission relates to assurance of subsistence use only. The State of Alaska is also required by law to protect subsistence fishing; however, it does so with a mandate to also manage for overall conservation and sustainability of salmon stocks and for commercial salmon fishing. It is recognized that authorities are overlapping and

there may be contradictory or confusing regulations for some fishery components; however, the present level of coordination between the federal and the state management systems is improving. While substantial progress has been made in development of an in-season management protocol, as yet there is little to guide sharing of data and expertise, or coordination of the two regulatory bodies. There is however a growing understanding between the two management authorities of how to achieve agreed goals. To date, there is no evidence that co-management has compromised the sustainability of salmon fisheries, but this is an area for continued monitoring and concern.

3.0 THE CERTIFICATION ASSESSMENT PROCESS

Recognizing that market incentives have the potential to improve fisheries management and to turn chronic over-fishing into recovery, sustainability and economic stability; the Marine Stewardship Council (MSC) was established in 1997. The goal of the MSC is to harness these incentives in such a way as to provide the fishers, processors and retailers with greater security of supply and employment than has been possible to date.

The MSC is an independent, charitable, not-for-profit, and non-governmental international organization working to achieve sustainable marine fisheries by promoting responsible, environmentally appropriate, socially beneficial and economically viable fisheries practices, while maintaining the biological diversity, productivity and ecological processes of the marine environment.

To accomplish its objectives, the MSC proposed a new approach to change the incentive structure so that benefits accrue to the fishers, fish processors, traders, retailers and consumers in adopting a more responsible and sustainable approach to fisheries exploitation. At the center of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which are used in an independent assessment as a standard by which an independent assessment team evaluates a fishery. In this project these standards were used in the evaluation of Alaska's commercial salmon fisheries.

3.1 Evaluation team

One of the more important aspects of conducting an independent evaluation of a fishery using the requirements and methods outlined by the Marine Stewardship Council is forming a team of experts to review information about the fishery and make final judgements regarding the fishery's ability to meet the MSC Principles and Criteria. A team approach has been adopted to limit internal bias and to ensure appropriate understanding and review of the widely varied sets of information needed to prove that fisheries meet all the MSC requirements from good management practices to ecosystem impacts. To choose members of the assessment team, SCS spent 7 weeks interviewing prospective candidates by e-mail, phone, and fax. Over 27 people were considered before making final selections. The determinants for choosing and contracting team members were technical expertise in fisheries management, stock assessment, or ecosystem management; specific knowledge of Alaskan fisheries and fisheries management, with special emphasis on salmon; scientific credibility; and the ability to provide an objective assessment.

Recommendations for potential team members were solicited, although not always received, from individuals within stakeholder organizations in the fishery including but not limited to:

Industry	United Fisherman of Alaska
	United Southeastern Alaska Gillnetters
	At-Sea Processors
	BBEDC/FDI
	Taku Smokeries
	Icicle Seafoods, Inc.
	Bering Sea Fisherman’s Association
	Cordova District Fishermen United
	Pacific Seafood Processors Association
Government	Alaska Department of Commerce & Economic Development
	Alaska Department of Fish and Game

	Alaska Department of Commerce & Economic Development
	Alaska Seafood Marketing Institute
	Board of Fisheries
Non-government Organizations	AMCC (Alaska Marine Conservation Council)
	SEACC (Southeast Alaska Conservation Council)
	CMC (Center for Marine Conservation)
	Audubon Society
	WWF (World Wildlife Fund)
	EDF (Environmental Defense Fund)
	NRDC (Natural Resource Defense Council)
Academic Institutions	Simon Frasier University
	University of Washington
	University of Alaska, Fairbanks

Curriculum Vitae were requested from all candidates fully under consideration and reviewed.

Names of Evaluation Team Members:

Three experts were chosen by SCS to evaluate the extent to which the commercial salmon fisheries in Alaska comply with the MSC Principles and Criteria. The experts are:

Dr. Dayton Lee Alverson
Natural Resources Consultants, Inc.
1900 Nickerson Ave.
Seattle, WA 98199
USA

Dr. Lou Botsford
Professor
Wildlife, Fish, & Conservation Biology Department
University of California
1077 Academic Surge
Davis, CA 95616
USA

Mr. Paul Krasnowski
Fisheries Consultant/Retired ADF&G
234Sudden Valley
Bellingham, WA 98226
USA.

The fourth member of the evaluation team was from SCS:

Dr. Chet Chaffee
Manager, Marine Fisheries Certification Program
Scientific Certification Systems, Inc.
2004 Sunnyview Lane
Mountain View, California 94040
USA.

Dr. Chaffee was responsible for ensuring that the evaluation team followed the MSC methodological protocols and also facilitated all group discussion pertaining to the evaluation and scoring of the fisheries against the MSC Principles and Criteria.

3.2 Summary of previous certification evaluations and conclusions, with any recommendations and requirements.

No other officially sanctioned Marine Stewardship Council certifications have been completed on this or any other fishery in Alaska. This is the first official evaluation of commercial salmon fisheries in Alaska by a third party using the MSC Principles & Criteria as the evaluation standard. Previous to this report, SCS using the same members of the evaluation team did conduct an evaluation of Alaska salmon fisheries as a test case under contract to the MSC. The majority of the work conducted during the 'test case' evaluation formed the basis for this report along with additional work conducted under direct contract to ADF&G.

4.0 STANDARDS FOR MSC CERTIFICATION

4.1 MSC Principles and Criteria

Recognizing that market incentives have the potential to improve fisheries management and to turn chronic over-fishing into recovery, sustainability and economic stability; the Marine Stewardship Council (MSC) was established in 1997. The goal of the MSC is to harness these incentives in such a way as to provide the fishers, processors and retailers with greater security of supply and employment than has been possible to date.

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To accomplish its objectives, the MSC proposed a new approach to change the incentive structure so that benefits accrue to the fishers, fish processors, traders, retailers and consumers in adopting a more responsible and sustainable approach to fisheries exploitation. At the center of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which are used in an independent assessment as a standard by which an independent assessment team evaluates a fishery. In this project these standards were used in the evaluation of Alaska's commercial salmon fisheries.

The MSC Principles and Criteria (P&Cs) have been developed by means of an extensive, international consultative process through which the views of stakeholders in fisheries have been gathered from around the world. Further international consultations will take place through 2001 at which time the MSC will revise the P&Cs as necessary. The P&Cs reflect a recognition that a sustainable fishery should be based upon:

- The maintenance and re-establishment of healthy populations of targeted species;
- The maintenance of the integrity of ecosystems;

- The development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and
- Compliance with relevant local and national local laws and standards and international understandings and agreements

The Principles and Criteria are further designed to recognize and emphasize that management efforts are most likely to be successful in accomplishing the goals of conservation and sustainable use of marine resources when there is full co-operation among the full range of fisheries stakeholders, including those who are dependent on fishing for their food and livelihood.

The scope of the MSC Principles and Criteria relates to marine fisheries activities up to but not beyond the point at which the fish are landed. The MSC Principles and Criteria apply at this stage only to marine fishes and invertebrates (including, but not limited to shellfish, crustaceans and cephalopods). Aquaculture, freshwater fisheries, and the harvest of other species are not currently included. Issues involving allocation of quotas and access to marine resources are considered to be beyond the scope of these Principles and Criteria.

For further information about the MSC Principles and Criteria or about other aspects of the Marine Stewardship Council, information can be found at the MSC website (www.msc.org).

PRINCIPLE 1

A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favor of short term interests. Thus, exploited populations would be

maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

PRINCIPLE 2:

Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the

precautionary approach and considering the ability of the population to produce long-term potential yields.

PRINCIPLE 3:

The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

1. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisinal, and fishing-dependent communities shall be addressed as part of this process;
2. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;
3. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;
4. incorporates an appropriate mechanism for the resolution of disputes arising within the system;

5. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;
6. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;
7. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;
8. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;
9. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
10. setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
11. identifying appropriate fishing methods that minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
12. providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
13. mechanisms in place to limit or close fisheries when designated catch limits are reached;
14. establishing no-take zones where appropriate;
15. contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

B. Operational Criteria

Fishing operations shall:

16. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimize mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;

17. implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
18. not use destructive fishing practices such as fishing with poisons or explosives;
19. minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;
20. be conducted in compliance with the fishery management system and all legal and administrative requirements; and
21. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

4.2 Interpretation of MSC Principles for Performance Evaluations

The MSC Principles and Criteria are general statements describing what aspects need to be present in fisheries to indicate that they are moving toward sustainable management. The certification approach or methodology adopted by the MSC requires that any assessment of a fishery or fisheries move beyond a management verification program that simply provides third-party assurances that a company's stated management policies are being implemented. The MSC's approach, detailed in its 'Certification Methodology' document (see www.msc.org), is designed to be an evaluation of a fishery's performance to determine if the fishery is being managed consistent with emerging international standards of sustainable fisheries. In particular, the requirements of the MSC are to bring to bear evaluation criteria or performance indicators that are consistent with emerging international standards of environmentally responsible fisheries management and the MSC Principles and Criteria.

Using its expertise in fisheries management, fisheries biology and ecology, ecosystem monitoring, and stock assessments, the assessment team developed a set of performance indicators (see section 6.2.2) to be consistent with the intent and extent of the MSC Principles and Criteria. Specifically, each MSC Principle and its associated Criteria were translated into a specific set of performance indicators that could be used by the assessment team either quantitatively or qualitatively to gauge performance.

To the extent possible, the assessment team endeavored to avoid overlap in performance indicators between the three principles. This was accomplished by recognizing that the three principles set forth by the MSC for use in certification can be broadly classified in the following manner:

- Principle 1 is concerned with maintaining the target species at productive levels and is therefore concerned with outcomes of a management system that provide documentation that the resource is being maintained at the appropriate levels.
- Principle 2 is concerned with restraining the impact of the fishery on ecological systems, and therefore is also concerned with documented outcomes of a management system showing that the fishery has or is moving toward an understanding of its impact on the environment.
- Principle 3 is concerned with sound management systems, and is therefore focused on processes. The intent is to show that all the processes necessary for moving toward and attaining a sustainable fishery are in place. In addition, Principle 3 embodies standards for management of fishing operations.

4.2.1 Developing numerical performance scores

The MSC methodology for fishery evaluations (see MSC Certification Methodology Document at the MSC website www.msc.org) utilizes a decision support process known as AHP (Analytic Hierarchy Process) to assist the team prioritize, weight, and score sets of performance indicators within each individual Principle. This allows the expert team of fisheries professionals to identify and prioritize performance indicators - sometimes called Scoring Criteria - according to which ones are most important for achieving the performance required by the MSC. AHP also provides a process by which the evaluation team can weight the set of performance indicators within each Principle on a scale of 0 to 1 based on each indicator's importance to the overall evaluation. Once each performance indicator within a Principle is weighted, a separate step is taken where each one is scored on a scale of 1 to 100 indicating how well the fishery performed for that given indicator. The weight of each indicator or criteria is then multiplied by its score to obtain a weighted score. All weighted scores for the performance indicators in a given Principle are then summed to provide a final normalized, weighted

measure of performance for the Principle, again on a scale of 0 to 100. Using this method, compliance with each MSC Principle evaluated independently.

The final normalized, weighted score for each Principle represents the team's evaluation as to the extent to which management systems in the fishery fully attain the goal of the Principle. In other words, "performance" is measured relative to full attainment of sustainable fisheries management as defined by the MSC's three Principles, not relative to the performance of other fisheries. Of course, consistent application of the evaluation standards to a number of different fisheries may generate scores that can be compared to those received by individual fisheries.

A normalized performance scale of 0 to 100 has been arbitrarily chosen for measuring performance. It is required that the fishery obtain a normalized, weighted score of 80 (arbitrarily chosen) for each of the 3 Principles in order to be certified. However, a fishery may score less than 80 (unweighted score) on any individual performance indicator. Where a fishery fails to achieve an unweighted score of 80 on individual indicators, it indicates the performance of the fishery is deficient in meeting the MSC requirements. The result of scoring less than 80 (unweighted score) on any specific performance indicator is that the fishery, if meeting all other aspects for certification, will be required to agree to meet certain specified requirements to come into compliance with the required performance. If the client agrees to meet the requirements specified by the evaluation team, thus agreeing to bring the score for that indicator to at least the benchmark level, the fishery would then be awarded a conditional certification.

The assignment of numerical performance scores is aided by written "Scoring Guideposts" that describe what constitutes an ideal fishery (score = 100) and what constitutes the minimum requirements for certification (the benchmark level; score =80). Scores are assigned based on team members' consensus expert judgement of how the fishery performs in relation to the scoring guides. The benchmark of 80 is chosen so that only the world’s best fisheries would pass on an individual Principle. This aspect of the methodology has been applied to ensure that an effective MSC certification process can be developed and implemented for global fisheries.

In applying this methodology, the assessment team for Alaska salmon had less difficulty in developing suitable scoring guideposts for Principles 1 and 3 (resource sustainability and management) at the 80 and 100 levels. The evaluation team found it much more difficult to accomplish the same task for Principle 2. The Criteria under Principle 2 state that a fishery a) maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes, and b) does not threaten biological diversity at the genetic, species or population levels. These are important objectives; however, these criteria are difficult to measure and evaluate in an ecosystem making it difficult to determine the proper measures of adequate performance. The performance required by Principle 2 and its associated criteria have only recently become requirements for fisheries to work toward, and so the scoring guides for Principle 2 reflect this fact. Throughout the coming years, the performance indicators chosen and the scoring guides used by evaluation teams will need to evolve to reflect the fact that fisheries should be further along in achieving these goals.

4.2.2 Performance indicators and scoring guideposts for the evaluation of Alaska's commercial salmon fisheries

For the purposes of keeping nomenclature clear, we use the word Elements in place of Principles when referring to the interpretation of the MSC's Principles and Criteria into performance measures. Similarly, we do not use the word Criteria, but instead refer to the translation of the MSC Criteria in Performance Indicators.

It is also important to note here that the Evaluation Team decided to interpret and score Principle 3A and 3B separately. The reasoning behind this split is the inherent difference in the issues outlined in these two sections of Principle 3. In the Criteria outlined under 3A, the focus is on the management principles, processes, and outcomes. In contrast, the focus of the Criteria under 3B is the sustainability of fishing operations. The Evaluation Team felt is was better to score these as separate Elements to ensure the most prudent and focused evaluation of the different issues.

Performance Indicators for Element 1 - Resource Management

<u>Performance Indicator 1A:</u>

- Has the entire geographic distribution (range) of each managed stock been established where it is exploited?
- Is there general scientific agreement about the populations(s) that comprise each managed stock and their range?

100% Scoring Guidepost

- The complete range of all managed stocks are estimated and documented each year.
- The complete range for significant populations within managed stocks are estimated and documented each year ('significant' refers to populations known to be experiencing critical concerns for sustainability).

80% Scoring Guidepost

- There is adequate historical information from the past 10 years on the catch of managed stocks throughout their range of distribution/migration (e.g. CWT or equivalent measures)

Performance Indicator 1B:

- Do reliable estimates exist of removals in managed stocks?
- Have all the biological characteristics of removals been considered, especially for significant populations within each stock?

100% Scoring Guidepost

- All removals from significant populations within the managed stocks are estimated and used in management decisions.
- There are reliable estimates of all significant removals from managed stocks throughout Alaska (e.g. hooking mortality as an example of unidentified mortality)
- The biological characteristics of the removals from managed stocks are known and considered in management decisions.

80% Scoring Guidepost

- There are reliable estimates of removals from managed stocks.

- There is a rough estimate of removals from significant populations.
- There is evidence that undocumented removals (e.g. dropouts, unrecorded catch, etc.) are not significant.

Performance Indicator 1C:

- Are there reliable estimates for escapements in managed stocks?

100% Scoring Guidepost

- There is a reliable estimate made each year of escapements for managed stocks and significant populations within the stocks.

80% Scoring Guidepost

- There are rough estimates of escapement on a yearly basis for managed stocks.
- There is a rough estimate of the escapement to significant populations within the managed stocks.

Performance Indicator 1D:

- Are there reliable and scientifically accepted estimates (and confidence range) of the potential productivity of managed stock(s)?
- Is there information correlating variability in productivity to changes in environmental factors or fishing pressure?

100% Scoring Guidepost

- There exists adequate data from sequential returns to develop a scientifically reliable stock/recruitment relationship for managed stocks accounting for significant populations where appropriate.

80% Scoring Guidepost

- There is adequate information to identify sustainable production strategies for each managed stock (e.g. 10 years of historical information on catch, escapement, and recruitment).
- There exists some level of assessment regarding the potential impacts from long-term variability (i.e. decadal scale).

Performance Indicator 1E:

- Have target reference points been set?
- Are the target reference points appropriate (i.e. for managed stocks)?
- Are the target reference points scientifically disputed?

100% Scoring Guidepost

- There are target reference points for each managed stock and for significant populations within the managed stock.
- The established escapement levels are known to be equal to or greater than those needed to produce maximum sustainable yields.

80% Scoring Guidepost

- There are target reference points for each managed stock.
- The target reference point being used can be demonstrated to provide yields or sustainable levels of catch over time.
- Uncertainty has been taken into account in establishing target species catch levels.

Performance Indicator 1F:

- Have limit reference points been set for each managed stock?
- Do the limit reference points protect all significant populations within the managed stock from decline to unsustainable levels?
- Are the limit reference points scientifically disputed?

100% Scoring Guidepost

- The limit reference points for each managed stock maintain adequate populations abundance and average population growth rate $\geq$ 1 for all significant populations.

80% Scoring Guidepost

- The limit reference points for each managed stock maintain escapements above 20% of the long-term average.
- There is some estimate of escapements to significant populations within each managed stock.

Performance Indicator 1G:

- When exploited stocks or their significant component populations are depleted below the limit reference point, are the fisheries curtailed such that recovery and rebuilding is allowed to occur to return the fishery to sustainable levels?

100% Scoring Guidepost

- There must be an operational strategy in place to reduce fishing harvest rates when managed stocks or their significant populations fall below limit reference points.

80% Scoring Guidepost

- There must be an operational strategy in place to reduce fishing harvest rates when managed stocks or their significant populations fall below limit reference points.

Performance Indicator 1H:

- Is fishing conducted in a manner that does not allow alterations of the genetic structure or sex composition in managed stocks to the degree that it impairs reproductive capacity?

100% Scoring Guidepost

- Using appropriate scientific measures, the management authority has ruled out genetic changes in the stock(s) due to fishing pressure.

80% Scoring Guidepost

- The fishery is operated such that early or late run times are not purposely selected to the point that they alter the sex composition or genetic structure of managed populations.

- There is evidence that the management authority has programs for investigating alterations in the genetic composition of managed populations caused by fishing.

Performance Indicators for Element 2 - Ecosystem Management

Performance Indicator 2A:

- Are the non-target discard species in the fishery known?
- Are the levels of catch/mortality for discards known?

100% Scoring Guidepost

- All significant discard species, including salmon, are known and estimates of the quantity caught/removed are available.
- Estimates of discard mortalities available

80% Scoring Guidepost

- Identity of all significant discards are known and some information is collected and available on the numbers caught and removed from the fishery.

Performance Indicator 2B

- Can it be concluded that changes to the associated community (biological diversity) have been sufficiently small to be acceptable?
- Are there indications that functional relationships in the natural ecosystem have been altered by the fishery beyond observed natural variability and to the extent that the potential productivity of the fishery is affected?

100% Scoring Guidepost

- All the predator and prey species of the target species are known
- The effect of target species removal on predators and prey of the target species are known and are accounted for in the management process.

80% Scoring Guidepost

- There is knowledge of dominant predators and prey of the target species.
- There is adequate knowledge of the functional relationships between predators and prey of the target species such that changes due to fishing pressure can be detected.

Performance Indicator 2C:

- Are there any endangered, threatened or protected species amongst non-target species effected by fishing?
- Are acceptable measures applied to avoid mortality amongst non-target species that are endangered, threatened or protected?

100% Scoring Guidepost

- There is knowledge of all T&E species in fishing areas throughout Alaska.
- All management plans require effective mitigation that takes removals of T&E species to zero.

80% Scoring Guidepost

- There is a program in place to identify all protected, threatened and endangered species in fishing areas throughout Alaska.
- Appropriate permits are in place for all removals.
- Existing management plans require efforts to minimize mortality of T&E species due to fishing.

Performance Indicator 2D:

- Exogenous anthropogenic factors are significant enough to affect exploited species and are taken into account by the management system.

100% Scoring Guidepost

- The management authority has collected evidence to rule out negative effects due to exogenous anthropogenic factors.

80% Scoring Guidepost

- Knowledge of exogenous factors
- Some quantification of effects due to exogenous factors
- Efforts being made to reduce possible effects from exogenous factors.

Performance Indicators for Element 3 - Management System

Performance Indicator 3A:

- The management system demonstrates:
  - clear long-term objectives consistent with sustainable fishing.
  - a consultative process that is transparent and open to all interested and affected parties an appropriate mechanism for the resolution of disputes arising within the system.

100% Scoring Guidepost

- There is a codified and formal system to:
  - resolve disputes
  - consult stakeholders
  - identify and adopt long-term objectives

80% Scoring Guidepost

- The management system reflects the principles and criteria expressed by the MSC but may not have a formal codified system for:
  - dispute resolution
  - stakeholder consultations
  - identifying and adopting long-term objectives.

Performance Indicator 3B:

- The management system considers:
  - its effects on the cultural context, scale and intensity of the fishery

- the legal and customary rights and long-term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.

100% Scoring Guidepost

- There is a codified and formal system to take into account the views and customs of local/indigenous peoples dependent on fishing for food and livelihood.

80% Scoring Guidepost

- The management system reflects the principles and criteria expressed by the MSC but may not have a formal codified system.

Performance Indicator 3C:

- The management system provides economic and social incentives that contribute to sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.

100% Scoring Guidepost

- There are programs that provide economic or resource access benefits are authorized for deploying fishing gear that have low discard rates or mortalities
- There are government/industry buy-back programs offered for over-capitalized fisheries.
- No subsidies are offered for purchase of vessels or fishing vessel modifications targeting fully exploited and or depleted resources. (see FAO definitions for fully exploited and overexploited).

80% Scoring Guidepost

- There are government programs in place to limit effort
- There are government or industry buyback programs for over capitalized or over-fished fisheries

Performance Indicator 3D:

- The management system acts in a timely and adaptive fashion on the basis of the best available information using a precautionary approach when dealing with scientific uncertainty.

100% Scoring Guidepost

- The management system contains provisions for immediate in-season adjustments to established rules thus allowing for timely and adaptive management throughout the fishery

80% Scoring Guidepost

- The management process responds to unexpected changes.
- Unexpected changes are identified and dealt with using adjustments to management plans in following years.

Performance Indicator 3 E:

- The management system requires that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted

100% Scoring Guidepost

- There is a formal status update on a yearly basis for all stocks.

80% Scoring Guidepost

- The management process responds to unexpected changes.
- Unexpected changes are identified and dealt with using adjustments to management plans in following years.

Indicator 3F:

- The management system incorporates and implement a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.

100% Scoring Guidepost

- The management process contains a research plan that addresses all current/relevant information needs for management and is *sufficiently flexible that it can address any unanticipated biological changes or changes in the fishery.*

80% Scoring Guidepost

- The management process contains a research plan that provides for the collection and analysis of information vital to short- and long-term management needs.

Performance Indicator 3G:

- The management system specifies measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
    - setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
    - identifying appropriate fishing methods that minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
    - providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
    - mechanisms in place to limit or close fisheries when designated catch limits are reached;
    - establishing no-take zones where appropriate.

100% Scoring Guidepost

- The management system has adequate measures and strategies available to effectively control exploitation of the resources.

80% Scoring Guidepost

- The management system contains all the measures noted in Criteria 3G and has demonstrated their availability in actual practice.

Performance Indicator 3H:

- The management system contains appropriate procedures for effective:
    - compliance,

- monitoring,
- control,
- surveillance,
- and enforcement.

- These measures ensure that established limits to exploitation are not exceeded and that corrective actions are taken when it is.

100% Scoring Guidepost

- The management enforcement system has the resources and strategies to insure that illegal fishing is non-existent.

80% Scoring Guidepost

- The management system has adequate resources to ensure compliance of the regulatory regime at a level that does not jeopardize its ability to adhere to the conservation principles of the MSC.

Performance Indicators for Element 4 - Fishing Operations (MSC Principle 3B)

Performance Indicator 4A:

- Fishing operations make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimize mortality of this catch where it can be avoided, and reduce discards of what cannot be released alive.

100% Scoring Guidepost

- There are requirements in the management system such that any incidental catch of non-target species are released alive and in good condition.

80% Scoring Guidepost

- Fishing operations are conducted in a manner that consistently minimizes capture of non-target fish (age/sex/size/species).
- Non-target fish that are released have a high survival rate.

- Loss of non-target fish has no known impact on the community structure of marine resources in the are within which the fishery operates.
- Non-target fish are harvested only when permitted by the management authority.

Performance Indicator 4B:

- Fishing operations implement appropriate fishing methods designed to minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.

100% Scoring Guidepost

- All fishers:
  -- utilize legal gear,
  -- employ capture techniques that completely avoid adverse impacts on habitat, and
  -- avoid operating in critical habitat.

80% Scoring Guidepost

- Fishing operations minimize habitat impact and there are no demonstrated impacts on ecosystem productivity.

Performance Indicator 4C:

- Fishing operations do not use destructive fishing practices such as fishing with poisons or explosives.

100% Scoring Guidepost

- The management authority can provide evidence showing that there are no destructive practices utilized within the fishery.

80% Scoring Guidepost

- Destructive fishing practices are not permitted and the management authority enforces any pertinent laws regarding such practices (i.e. use of poisons, explosives, etc.).
- Processors do not buy fish from fishing operations that engage in destructive fishing practices.

- Fisher's organizations actively discourage destructive practices.

Performance Indicator 4D:

- Fishing operations minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.

100% Scoring Guidepost

- The management authority can provide evidence that fishing operations are conducted without gear loss or environmental contamination.
- The catch is handled according to high industry standards such as HACCP.

80% Scoring Guidepost

- The management authority can provide evidence that gear and environmental contamination occur infrequently.
- Fishing organizations promote proper catch handling.
- Processors enforce high quality standards for purchase of product.

Performance Indicator 4E:

- Fishing operations are conducted in compliance with the fishery management system and all legal and administrative requirements.

100% Scoring Guidepost

- The management authority can provide evidence that there is no illegal fishing occurring within the fishery.
- All fishing operations are conducted as prescribed by law and by industry standards for sound fishing practices.
- All harvest is reported as required by law.

80% Scoring Guidepost

- The enforcement and management authorities estimate that less than 5% of the catch is unreported results from illegal fishing.

Performance Indicator 4F:

- Fishing operations assist and cooperate with management authorities in the collection of catch, discard and other information important and necessary for the effective management of the resources and the fishery.

100% Scoring Guidepost

- All fishermen and processors comply with agency requests for logbook programs or other data gathering methods that provide the types of information necessary for timely and adaptive management.

80% Scoring Guidepost

- Sufficient numbers of fishermen comply with requests for information through voluntary logbook programs or other such data gathering methods such that the data are adequate and reliable enough to support necessary management activities.

4.3 Comments of stakeholders

In general, official stakeholder comments submitted in writing to the evaluation team regarding Alaska's ability to meet the MSC Principles and Criteria for commercial salmon management were minimal. However, there were a number of concerns raised unofficially regarding the interception of salmon destined for Canadian and Pacific Northwest waters. A few discussions ensued regarding Principle 2, and the difficulty for providing evidence regarding environmental impacts and ecosystem management. Few agencies or organizations that provided information to the evaluation team ever provided any significant comments about dissatisfaction with the MSC Principles and Criteria; however, a small number of people contacted did express some concern about the MSC initiative in general, and the certification process in specific.

During the 'test case' phase of this project, the evaluation team solicited comments from stakeholders in Alaska, the Pacific Northwest, and Canada. This was accomplished in Alaska and the Pacific Northwest by direct contact, telephone, fax, or email. In Canada, SCS provided an explanation of the project at an open seminar at Simon Fraser University in downtown Vancouver specifically organized by Ecotrust Canada to learn about and better understand the MSC process and the Alaska certification project. At this seminar Dr. Chet Chaffee provided an overview of the project and openly solicited members of the audience to submit comments about significant issues and concerns to the evaluation team.

After reviewing the responses obtained during the 'test case' phase of the evaluation process (July 1999 - February 2000), SCS in consultation with the MSC determined that additional efforts were needed to ensure adequate opportunity for stakeholder input, especially by Canadian stakeholders. To accomplish this, a number of steps were taken from May 2000 - September 2000 to engage stakeholders and to publicly disseminate information about the ongoing evaluation process:

1. The Performance Indicators and Scoring Guideposts approved by the MSC were posted on the MSC web site for more several months prior to this report.
2. SCS had the MSC post a notice of the project and the request for stakeholder consultation on the MSC web site to alert interested parties about the process.
3. SCS paid for an advertisement in the April/May issue of 'The Fisherman' to encourage stakeholder participation. 'The Fisherman' was chosen based on its wide distribution throughout the Canadian fishing industry and fisheries management organizations.
4. SCS reserved a meeting room in Vancouver, B.C. and openly solicited for interested parties to come and meet with the evaluation team. Solicitations were sent via email and fax to over 30 persons representing from the conservation community, government, and industry. Follow-up phone calls, faxes, and emails were also sent after the date of the meeting to alert interested parties that information was still be sought by evaluation team.
5. The deadline for submission of stakeholder information to the evaluation team was extended twice (each time for one week) in an attempt to ensure that stakeholder were provided ample opportunity

for input. At each extension, specific stakeholder organizations were re-contacted and notified of the additional time allotted for input.

4.4 List of relevant state and federal laws and regulations

The Statehood Act (1959) granted the State of Alaska the right to manage the fisheries resources in fresh water and the territorial sea to within three miles of the Alaska coast. The Alaska State Legislature has enacted laws that govern the conservation and harvest of those fishery resources and other related laws that control related resources. These include:

- Alaska Statutes Title 16: The Fish and Game Code
- Alaska Statute Title 18: The Alaska Water Quality Standards
- Alaska Statute Title 41: Forest Practices
- Under AS Title 16, the Alaska Board of Fisheries was created to promulgate regulations under Title 5 of the Alaska Administrative Code (5 AAC) for the conservation and management of fish and game and the allocation of harvest. The state endangered species regulations are codified at 5 AAC 93.
- Under AS Title 20, Miscellaneous Boards and Commissions, the legislature has created the Commercial Fisheries Entry Commission which has regulatory authority under Title 20 of the Alaska Administrative Code (20 AAC).
- Federal legislation that affects Alaska salmon fishery management includes:
- Alaska National Interest Lands Conservation Act (ANILCA)
- Magnusen-Stevens Fisheries Management Act
- Endangered Species Act
- The Pacific Salmon Treaty (US – Canada) created the Pacific Salmon Commission, which regulates the conservation and harvest of salmon stocks from the western states and provinces.

5.0 ASSESSMENT TEAM SITE VISITS

5.1 Identification of main groups visited

All visits, interviews, and inspections were conducted between July 1, 1999 and December 1, 1999. The assessment team identified the following organizations and or people to contact and meet in order to properly evaluate the management activities associated with the commercial salmon fisheries in Alaska:

- Alaska Department of Fish and Game
    1) Commercial Fisheries Division
        a) Regional managers
        b) Area biologists
        c) Geneticists
        d) Stock Assessment
        e) Database management
    2) Division of Sport Fish
        a) Regional managers
        b) Area biologists
    3) Habitat and Restoration Division
    4) Commissioner's Office
        a) Commissioner
        b) Pacific Salmon Commission Special Assistant
- Processors (Pacific Seafood Processors Association, At-Sea Processors Assoc.)
- National Marine Fisheries Service

Alaska Department of Environmental Conservation

5.2 Justification for selection of items/persons inspected.

The sites and people chosen for visits and interviews were based on the assessment team's need to acquire information about the management operations of the fisheries under evaluation. As all fishery

resources are a public resource, they are managed by government agencies. Using the expertise of the team, agencies and their respective personnel responsible for fishery management, fisheries research, fisheries compliance, and habitat protection were identified. In addition, professional fisher's associations and industry associations were identified and contacted. Likewise, other government agencies with any probable input into the management or operations of the fisheries or management of the general environment in which the fisheries operate were contacted.

ADF&G provided the bulk of all the documentation required in understanding the management system, including the management plans and all the affiliated documents. ADF&G also provided information on compliance measures required in the fisheries to ensure legal fishing within the bounds of its management.

Researchers within ADF&G were also chosen for audits and interviews as the people charged with all research and data collection necessary for proper understanding and management of the salmon stocks and fishing operations, including ecosystem impacts. Fisheries researchers responsibilities include but are not limited to stock assessments; ecological monitoring; data collection on catch and effort; bycatch data collection; and observations and data collection on interactions with protected, threatened, and endangered species.

ADF&G's Habitat & Restoration Division was identified for interviews as the management authority charged with conservation measures in the coastal zone. If and when significant impacts occur in areas of salmon habitat, this division would take the lead in identifying and addressing the problems.

ADF&G's Pacific Salmon Commission Special Assistant in the Commissioner's Office was identified for interviews as the key person knowledgeable about the data and information used to negotiate the treaty on salmon between the United States and Canada.

Alaska Department of Environmental Conservation was identified and contacted because of its responsibilities in habitat management. While the bulk of habitat management related to salmon is the responsibility of ADF&G, the DEC handles all water quality permits, coastal zone development

permits, permits for industrial activities (i.e. mining, shipping, etc.), etc; therefore, working closely in conjunction with ADF&G.

Alaska Department of Forestry was identified and contacted as the agency responsible for managing all Alaska's forest lands which includes many inland salmon habitats.

The professional fisher's associations were identified as important to interview not only because they are stakeholders in the fishery, but as resources for information/data pertinent to fishing operations (gear development, gear deployment) catch statistics, and bycatch.

Processors were identified as an important contingent to interview as they are integral to two important aspects: a) the effort to monitor the catch taken from the fishery, and b) the chain of custody for all landed salmon. As part of the compliance program, processors are regularly checked by ADF&G personnel for illegal landings.

6.0 STAKEHOLDER CONSULTATION

6.1 Identification of significant stakeholders

Alaska salmon fisheries run the entire length and breadth of the state of Alaska. As such, they effect or are effected by an incredibly large group of potential stakeholders. Within the budget and scope of the project, it was impossible for the evaluation team to contact and interview every single group individually. And no doubt, there will be some individuals or groups that feel they did not have sufficient access to the evaluation team or sufficient time in which to respond.

To the best of the evaluation team's ability, we tried to allow for and foster the widest possible stakeholder participation and viewpoint. We chose a course of action that embodied a number of approaches to getting the word out to stakeholders so they would be aware we were conducting an evaluation and would value any and all input. The approaches were:

1. Attend ADF&G convened meetings intended to include a wide variety of stakeholders. The meetings were set up by ADF&G by sending out invitations to a variety of potentially interested and affected parties. Meetings often included participants from industry, environmental organizations, and government agencies. At these meetings, both MSC personnel and Evaluation Team personnel provided oral and written information up to 2 years prior to starting the project, so that all meeting participants would know exactly how they could provide input and to whom.

2. The evaluation team convened individual meetings (in person or by phone and e-mail) to discuss the project with groups that were unable to attend the ADF&G convened meetings, or who specifically showed interest in the project. These phone, email, and face-to-face meetings included NGOs (Audubon, EDF, WWF, AMCC, SEACC, and CMC) as well as fishers, and processors.

3. An evaluation team member (Dr. Chet Chaffee) attended a meeting in Vancouver, Canada convened by Ecotrust Canada and the MSC. Representatives of the fishing industry, the government, academia, the environmental community, and First Nations were all in attendance. This meeting, specifically convened to assemble a wide variety of interested parties to hear an explanation about the project and the MSC, was used as a forum to explain the project and ask directly for stakeholder participation and input where desirable. No specific follow-up ever became available from meeting attendees, even after numerous phone calls and e-mails.

4. An announcement of the project and a request for stakeholder participation was placed on the MSC web-site instructing all interested parties to contact Chet Chaffee. This step also yielded zero results.

5. Personal invitations to participate in the stakeholder consultation process were sent via fax, email, and phone calls to a number of organizations and people identified by SCS and the MSC as potentially important stakeholders in the fisheries under evaluation.

The evaluation team does not claim to have accomplished full coverage of all stakeholder groups. However, an earnest attempt through multiple channels was conducted to attempt to obtain the best

possible input into the evaluation process. Lack of response by contacted persons and agencies is not construed in this report as either lack of concern or approval of Alaska salmon management; however, the evaluation believes strongly that any stakeholders with significant concerns had ample opportunity to express those concerns and provide supporting data.

The significant stakeholder groups in the Alaska commercial salmon fisheries that were identified are:

- Commercial Fishers in Alaska and Canada
- Recreational Fishers in Alaska
- Non-governmental environmental groups in Alaska and Canada
- Government Agencies (non-fisheries) in Alaska
- Fish processing businesses in Alaska and Canada
- Native and Subsistence Fisherman in Alaska and Canada

6.2 Summary of use-rights (both legal and customary)

At statehood (1959), management of the fishery resources in Alaska passed from the US government to the state legislature. The constitution of Alaska specifies at Section 3 that: " Wherever occurring in the natural state, fish, wildlife and waters are reserved to the people for common use." Other sections (1, 2, 4) direct that the legislature assure that management of the natural resources of the state are based on the sustained yield principle, for the maximum benefit of the people. Another section (15) which precluded exclusive right or special privilege of fishery was amended in 1974 to allow passage of commercial fishery limited entry legislation.

State fisheries law is codified in Alaska Statute Title 16 (AS 16) that includes provisions for creation and operation of the Alaska Board of Fisheries. The Board in turn promulgates regulations for the conservation, management, allocation and resource development of the fisheries resources under the Alaska Administrative Code Title 5 (5 AAC). These regulations address commercial, recreational, personal use and subsistence harvest. The Commercial Fisheries Entry Commission (CFEC) administers the commercial fishery entry permit system. CFEC permits were awarded on the basis of

documented historical participation. They are designated for a specific gear type in a specific area of the state (e.g. Bristol Bay set gill net). They are a property right of the holder and may be sold, bought and are heritable.

State law accords a harvest priority to subsistence users. Subsistence is defined as the customary and traditional use of wild natural resources by Alaska residents for food, clothing, fuel, transportation, construction, arts, crafts, sharing and trade. There are no provisions for specific priority use by Alaska natives due to the "common use" clause of the state constitution. Allocation of the harvest of limited fishery resources among beneficial users is the responsibility of the Board. After assuring that subsistence needs are met, the Board adopts regulations including management plans that direct the Alaska Department of Fish and Game in managing the salmon returns for commercial, sport and personal use. Commercial fishing is open to all holders of CFEC permits, many of whom are non-residents. Sport fishing is available to both residents and non-residents. Personal use fishing is a privilege for residents only and provides fish for food in some areas where subsistence is not allowed.

As discussed in more detail later in this report, there exists a conflict between state and federal laws regarding the manner in which subsistence users are identified. In brief, federal law requires that the subsistence use priority be accorded to Alaskans in "rural" areas. After numerous lawsuits in state and federal court the Alaska Supreme Court found that the state constitution precludes the assignment of priority based on geography or demographics. As a result, the agencies that manage the federal lands in Alaska (about 70 percent of the landmass) are taking over the management of subsistence fishing in Alaska. The likelihood exists that those agencies will, in some cases, preempt state management in coastal areas and fresh water outside the federal lands in order to meet their subsistence mandate within their land management unit. On the one hand this has the potential to be confusing to user groups. On the other hand subsistence users of fishery resources are more likely to have their subsistence use demands fulfilled by the federal managers.

The Pacific Salmon Treaty impacts harvest particularly in southeast Alaska and to some extent in the Yukon River fisheries. The Pacific Salmon Commission sets limits for various species, areas and seasons which may cause certain fisheries to change the manner in which they have operated

historically. The federal Endangered Species Act has a similar impact. Although there are no endemic species listed under either the state or federal ESA, there are numerous stocks that are listed that are known to transit Alaska waters during some part of their migration. The state manages the southeast Alaska troll fishery through an agreement with the North Pacific Fisheries Management Council (under the Magnusen-Stevens Fishery Conservation and Management Act). It is in this segment of the Alaska salmon fishery that stocks listed under the ESA are most likely to be caught. This requires negotiation with the National Marine Fisheries Service to obtain an annual "Section 7" permit. This permit allows the fishery to be conducted in a manner that minimizes the likelihood of impact on listed stocks. These regulations may be significantly different from the manner in which the fishery was historically managed.

6.3 Names of people or organizations consulted

6.3.1 Endorsed MSC Contact Persons

At the time of the assessment and report, there were no endorsed MSC contact persons in Alaska or surrounding areas.

6.3.2 Alaska government agencies involved in management

1. Alaska Department of Fish and Game
    - Frank Rue, Commissioner
    - Rob Bosworth, Deputy Commissioner
    - Doug Mecum, Director, Division of Commercial Fisheries (CF)
    - Kevin Duffy, Deputy Director, Division of Commercial Fisheries (CF)
    - Kevin Delaney, Director, Division of Sport Fisheries (SF) – by conference phone
    - Doug Eggers, Chief Fisheries Scientist, CF
    - Scott Johnson, Analyst/Programmer, Region I (southeast), CF
    - Larry Talley, Analyst/Programmer, Region I, CF

- Hal Geiger, Biometrician, CF
- Carmine DiCostanzo, Chief, Computer Services, CF
- Dave Gaudet, Pacific Salmon Commission Special Assistant
- Ken Tarbox, Research Project Leader, Upper Cook Inlet, CF
- Jeff Fox, Area Mgt Biologist, Upper Cook Inlet, CF
- Doug McBride, Regional Supervisor, Region II, SF
- Bob Clark, Regional Research Coordinator, SF
- Mike Bethe, Area Mgt Biologist, Upper Cook Inlet, SF
- Tim McKinley, Research Project Leader, Upper Cook Inlet, SF
- Mary King, Research Biologist, Upper Cook Inlet, SF
- Dan Bosch, Research Biologist, Upper Cook Inlet, SF
- Larry Buklis, Regional Research Supervisor, Region III (AYK), CF
- Rich Cannon, Regional Mgt Coordinator, Region III, CF
- Steve Fried, Regional Research Supervisor, Region II, CF
- Jim Seeb, Principal Geneticist, CF
- Lisa Seeb, Geneticist, CF
- Ellen Fritts, Deputy Director, Habitat Division
- James Brady, Regional Supervisor, Region II (south-central) CF

2. Alaska Department of Commerce & Economic Development
   - Kate Troll

3. Alaska Seafood Marketing Institute
   - Barbara Bellknap

4. Board of Fisheries
   - Dr John White, Chairman, Alaska Board of Fisheries
   - Dan Coffey, Vice-Chairman, Alaska Board of Fisheries
   - Diana Cote, Executive Director, Alaska Board of Fisheries

5. Dept of Environmental Quality, Div. Of Air and Water Quality
    - Susan Braley, Section Chief

6.3.3 Non-governmental organizations solicited for input

NAME	RESPONSE RECIEVED
1) Audubon Society	Yes, phone and email
2) Southeast Alaska Conservation Council	Yes, in person
3) Center for Marine Conservation	Yes, phone
4) Alaska Marine Conservation Council	Yes, by phone and email
5) World Wildlife Fund	Yes, by phone
6) Environmental Defense Fund	Yes, by phone
7) UFAWU - United Fishermen and Allied Workers Union.	No
8) T. Buck Suzuki Foundation	Verbal only, no written submission
9) David Suzuki Foundation	Yes, but only to acknowledge receipt of SCS's requests.
10) Sierra Club of British Columbia	Yes, written
11) Simon Fraser University Institute of Fisheries Analysis	Yes, email
12) WCWC	No
13) FINS	No
14) Living Oceans Society	No by original deadline, but a late submission by email
15) Pacific Fisheries Resource Conservation Council	No

6.3.4 Other stakeholders solicited for input

1. United Fisherman of Alaska
2. United Southeastern Alaska Gillnetters

3. At-Sea Processors
4. BBEDC/FDI
5. Taku Smokeries
6. Icicle Seafoods, Inc.
7. Peter Pan Seafoods
8. Trident Seafoods
9. North Pacific Processors, Inc.
10. Wards Cove Packing Company
11. Bering Sea Fisherman's Association
12. Cordova District Fishermen United
13. Pacific Seafood Processors Association
14. B.C. Ministry of Agriculture, Fisheries, and Food
    - Corky Evans
    - Bill Valentine
15. B.C. Salmon Marketing Council
    - Christina Burridge
16. B.C. Seafood Sector Council
    - Charles Minns
17. Department of Fisheries and Oceans Canada
    - Dave Peacock
    - Brent Hargreaves
    - David Einarson
    - Greg Savard
    - Paul Ryall
18. Alaska Native Brotherhood
    - Dennis Demmert

6.4 Information obtained and conclusions drawn.

At least one evaluation team member attempted to talk with members of each group listed above to solicit their views on Alaska's commercial salmon fisheries as well as any concerns they had with the idea of certification.

Comments from stakeholders in Alaska were minimal. Mostly, the comments were on the positive side. Industry stakeholders were quite supportive of ADF&G's management of salmon and provided positive examples of how management has worked to both bring back salmon populations as well as maximize the catch. If anything, industry's main concerns seemed to center around how an independent evaluation team would consider mixed stock fisheries and hatchery augmented harvests. Government agencies were quick to point out that they believed ADF&G is doing a good job at interfacing with all the necessary agencies to protect and conserve salmon populations and habitat. And interestingly, the NGO sector 's most common comments were that they are not really following Alaska's management of salmon because there is little of concern. They are focused on issues of far greater concern.

The only NGOs in Alaska that did provide some specific concerns was the Audubon Society. The comments were:

- The influence of Salmon hatcheries on the genetic integrity of wild salmon stocks.
- Concern about the ecological effect from adding thousands of additional salmon fry into specific areas and their effect through competition for the plankton food source. Technical paper done (Cooney/Thomas about 4-5 years ago). Looked at the effect of hatchery salmon on plankton populations.
- The concern that inadequate marking of hatchery salmon is being undertaken to understand their influence in Prince William Sound and other areas.
- Interception of Pacific salmon destined for Canada and other coastal areas. They have heard rumors that there are statistics that show Alaska fishermen are taking as much as 6-7%. They were concerned about whether this was true and if so, if it is important.

  Audubon is concerned that the state budget for salmon management has been cut to the point that there is little to no room for research and development into new management strategies and

techniques. Since it was funding for research and development that led the effort to identify and implement successful fisheries management strategies in Alaska, Audubon is concerned that losing this ability will diminish the management capacity of ADF&G in the long term.

Stakeholder opinions in Canada were mixed with respect to Alaska's management of salmon. In general, Canadians responding to our stakeholder consultation process said the management for most species and stocks are adequate. However, for those species and stocks that migrate to Canadian waters, the Canadian NGOs, organizations representing Canadian Fishers, and Canadian academicians all voiced concern about the stocks of salmon impacted by Alaska's interception fisheries. The issue of interception fisheries was not new to the evaluation team. As in all stakeholder consultations, the evaluation team was seeking not only opinion but some supporting evidence or data that would confirm the issues. One of the key components of the stakeholder consultation process is to help extend the evaluation team's discovery capabilities. This helps ensure that the evaluation team gets acess to all available data/information about a fishery. Often stakeholders in a fishery will be able to shed light on controversial issues beyond what is readily or publicly available to the evaluation team. Unfortunately, while the Canadians we were able to speak to were quick to voice concern, none of the Canadian stakeholders presented evidence that the often identified suspicions about problems in Alaska's interceptions fisheries were correct or founded. Even after numerous attempts to obtain data on the issues, the only Canadian stakeholder to actually voice its concerns in writing was the Sierra Club of British Columbia. The Sierra Club of BC concerns were divided into two parts: a) concern about the certification process, and b) concern about Alaska's interception of threatened salmon stocks. The evaluation team took the concerns identified about intercepted salmon stocks into consideration in its evaluation. The concerns expressed about the certification process were less convincing, as they were based on false information, unfounded accusations, and misrepresentations of the facts.

Given the information gained during the stakeholder consultation processes, the evaluation team felt that it had reasonable knowledge of the major concerns facing Alaska's management authority. The team based this assumption on the fact that the same issues were raised on numerous occasions with little added information or new concerns. The team concluded from all this information that its original concerns and continued work to review information in several key sectors was important:

- Interception fisheries,
- Pacific Salmon Treaty,
- Native and Subsistence Fisheries,
- Hatchery augmentation of harvests.

7.0 OBSERVATIONS AND PERFORMANCE EVALUATIONS

7.1 ELEMENT 1 - RESOURCE MANAGEMENT

This part of the assessment of sustainability will be unique among fisheries currently assessed under the Marine Stewardship Council for three reasons: (1) it is an assessment of an aggregate of all Alaska salmon, (2) most of the species involved have experienced higher ocean survivals over the past 25 years than prior to the mid 1970s, a situation that could reverse itself at any time, and (3) some of the fisheries being assessed intercept fish from populations in other jurisdictions.

7.1.1 Aggregation of species and populations

As stated above, this evaluation includes more than one species, and among each species, a large number of almost independent populations exists. Each of the five species of salmon in Alaska is not a single interbreeding population, but rather is a metapopulation of individual spawning stocks, each stock returning to spawn in the same river each year. The straying rate is typically very low (< 5-10 percent), making these populations functionally independent. Because of the unique homing ability of salmon and the ubiquitous number of spawning locations in the rivers and streams of the state of Alaska, tens of thousands of individual spawning populations prevail. Since most methods in fisheries management are based on management of a single, inter-breeding population, managing tens of thousands of spawning stocks would be a daunting task and prohibitively expensive. As a consequence most of the different populations of different species are managed as geographic or regional groups, typically of species and populations on which a commercial fishery has historically been targeted. While the strategy employed to manage these aggregates is uniform across the state,

the differing characteristics of the runs, their size and value, results in differing effort in data gathering and analyses of those data throughout the state of Alaska.

The large number of populations from each of the five species and the variety of harvesting modes made Alaska salmon fisheries difficult to assess for sustainability and conformance to the MSC principles. On the one hand, salmon are inherently easier to manage on a sustainable basis than many other species; each individual population spawns only in a specific area each year, and does so in a way that makes monitoring of the spawning population much easier than estimating spawning abundance in other fisheries. Indeed the State presented many examples of management of specific salmon populations that were immediately judged sustainable by the panel. However, it is well known that when several spawning populations are managed as a unit, it is possible for less productive populations to be lost (e.g., Hilborn and Walters 1992). If abundances of all populations in the group are not monitored, managing a group of populations increases uncertainty regarding sustainability of individual populations. In Alaska, both the amount of data that is gathered on each individual population and analyses of these data to determine management vary from population to population.

The assessment team concluded that the best approach to the difficulties of assessing the many populations of Alaska salmon was that: (1) while it is an outcome of evolutionary history that salmon species are clearly divided into individual populations, (2) the Alaska salmon fishery should be held to neither a higher, nor a lower standard than other fisheries, but (3) we needed to account for the many individual populations by at least assessing the distribution of different kinds of management over these populations.

The heterogeneity of management implementation over tens of thousands of populations from five species presented difficulties in assessing this "fishery" according to MSC principles because MSC principles and criteria for sustainability are largely based on management at the (single) population level. This difficulty is essentially a mismatch of scale, or more accurately, of level of organization. We could have required that Alaska demonstrate that all individual-fished salmon populations in Alaska were individually monitored and well managed. We did not take this approach because it would essentially be holding Alaska to a higher standard than others. Many other fisheries (e.g., the

Australian western rock lobster fishery) target populations that are also really metapopulations of individual benthic subpopulations linked by a dispersing larval phase. The difference is that the coupling between subpopulations is substantially greater, resulting in an almost completely mixed, interbreeding population.

Instead we decided to tailor our assessment of sustainability to the level of aggregation used by the State of Alaska, but to maintain a concern for the populations within each aggregation. Where individual populations are managed directly, we applied the MSC population criteria directly. Where populations are managed in-groups, we asked how individual populations are accounted for. We do not require that abundance of each be monitored and used in management, but we do require that the number and average abundance of each population be roughly known, and that information be available on the number and abundance of populations that are assessed and managed in each different way. The difference between this and other assessments is that: whereas in most fisheries, the assessment of sustainability consists of judging how close all of the data gathering, estimation and stock assessment come to making *the* population sustainable, assessment of Alaska salmon for sustainability involves judging how many of the individual populations on which data gathering, estimation and stock assessment efforts are focussed in the aggregate, are managed safely enough to make this "fishery" on five species and tens of thousands of populations sustainable.

7.1.2 Current Status of Alaska Salmon and Decadal Change in Ocean Environment

While an assessment of the sustainability of a fishery is, of course, not an assessment of current status of the stocks, most peoples' impression of whether a fishery is well managed will be based in large part on that status. We therefore describe the current status of Alaska salmon fisheries in the context of recent history. While catch records go back into the 1800s, for reasons of consistency we begin at the time of statehood in 1959. As described above in this document and elsewhere (e.g., Holmes and Burkett 1996), fishery resources were considered very important to the framers of Alaska's constitution, and they formulated a new approach to salmon management. During the period from 1959 to 1970 commercial salmon catches remained reasonably constant, (Figure 1). Catches declined over 3 years in the early 1970s (most dramatically in pinks and sockeye), and then catches of sockeye,

pink and coho salmon began an increase that has essentially continued until the present. Chum salmon catches increased slightly and chinook salmon catches remained constant. It is also important to note that catches of the three species do not covary on annual time scales (except for 1997).

A number of possible causes for this increase have been proposed, and of those the proposed effect of a dramatic change in ocean conditions in the Gulf of Alaska is of the most concern here. Other proposed contributors include better management, removal of high seas drift nets and hatchery production (Thomas and Mathieson 1993, van Alen 1999, Baker, et al. 1996, Holmes and Burkett 1996, Wertheimer 1997). In some cases these other proposed contributors have been discounted. For example, Hilborn and Eggers (2000) conclude that it is likely that recent hatchery production in Prince William Sound simply replaced what would have been increasing wild production. In a few cases the source of the increase in abundance has been identified. For example, it is known from tagging studies that ocean survival of coho stocks in southeast Alaska more than doubled between the early 1980s and the mid-1990s, and that the increase has been a major determinant of increased catch (Shaul 1998). There have been dramatic changes in the Gulf of Alaska ecosystem (Anderson and Piatt1999). Changes in physical and biological ocean conditions in the Gulf of Alaska that could affect salmon survival have been demonstrated. Changes in wind patterns and associated changes in mixed layer depth were likely responsible for associated changes in both primary production (Venrick 1987) and secondary production (Brodeur and Ware 1992) (reviewed in Pearcy 1992, 1997, Francis, et al. 1998). The cause for concern is the increasing awareness that such large-scale changes occur repetitively on decadal time scales, and that a reversal of this increase in conditions beneficial to Alaska salmon could occur at any time. <u>The most significant question regarding sustainability of Alaska salmon fisheries, therefore, is not how much has catch increased over the past twenty years, but rather how well would the management system respond to a downturn in ocean conditions?</u>

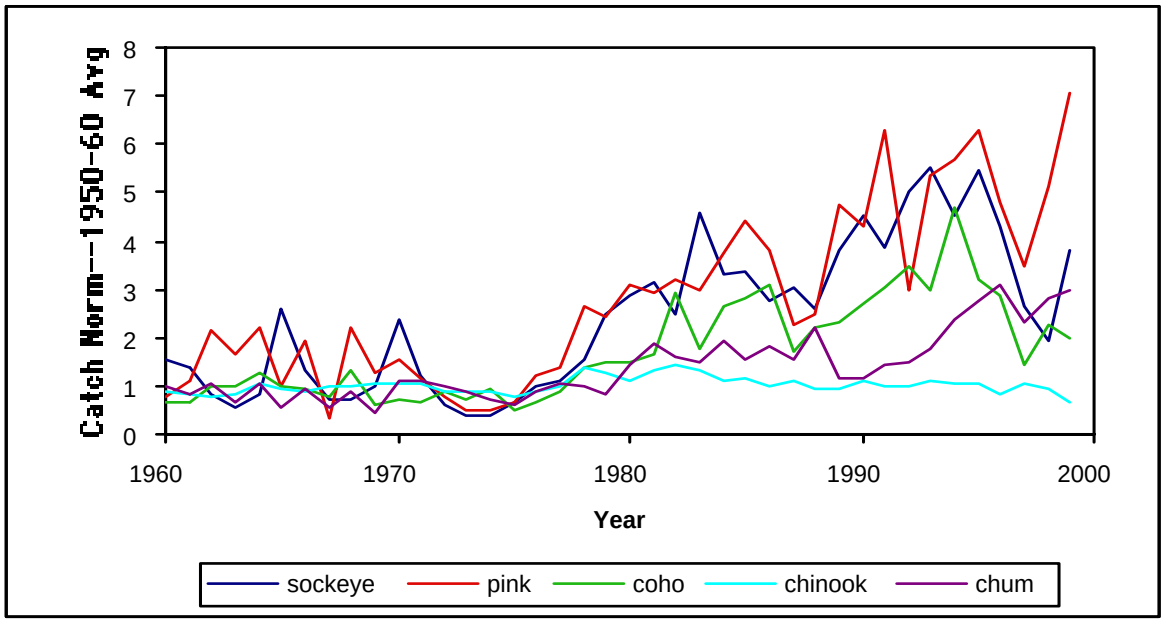

Figure 1. Alaska salmon catch by species, each normalized to their average catch over 1950-1960.

7.1.3 Interceptions from other jurisdictions

Some of the salmon caught in Alaskan waters originate in other jurisdictions; hence they require special consideration in assessing sustainability. These include: (1) several species, particularly chinook and coho taken in the troll fishery in Southeast Alaska (SEAK) that originate in Canadian rivers, (2) chinook salmon also taken in the SEAK troll fishery that originate in the contiguous U.S. and are listed under the U.S. Endangered Species Act, and (3) several species taken in fisheries on the Yukon River which spawn in Canadian Rivers. While these stocks originate outside Alaskan waters, and primary management responsibility lies in the hands of others, the assessment team's interpretation of the MSC guidelines is that for the state of Alaska to have their salmon fisheries certified as sustainable, it is their responsibility to fish only in sustainable fisheries regardless of the origin of the stock. We thus apply the same standards to these fisheries as the fisheries on Alaskan populations. The difference is that since these fisheries are managed by agreements (i.e., treaties, consultations under the U.S. ESA), we focus on whether the terms of those agreements lead to sustainable fishing, and whether Alaska is living up to the agreements.

The U.S. ESA allows take of species listed as endangered or threatened. Through a process known as a Section 7 consultation, the National Marine Fisheries Service (NMFS) an agency of the U.S. government responsible for administration of the ESA when it involves salmon, determines the number of fish of each endangered stock that can be taken by each permit applicant and still allow for recovery of the stock. For example, a certain number of winter run chinook salmon are allowed to be killed by pumps in the Sacramento/San Joaquin Delta each year, under a Section 7 agreement. In Alaska, the fisheries that will catch fish from endangered stocks cannot open each year unless the State of Alaska has in hand a permit for the take of a specified number of those stocks. The permit specifies the length and timing of the fishing season and sets an overall harvest quota based upon current stock status and analyses of previous years' interception as determined from recoveries of coded wire tags in the Alaska fisheries. Monitoring programs and content of federal Section 7 permits are also reviewed in the post season meetings of the principals of the Pacific Salmon Treaty.

7.1.4 Definitions

As stated above, management of Alaska salmon does not always differentiate fish down to their individual, interbreeding populations. Some salmon management in Alaska is based on individual populations, but in other cases, for historical and logistical reasons, management is based on a larger units comprising several, or at times many, individual populations. Here we refer to an individual, interbreeding population, such as would spawn in a single stream, as a population, and we refer to an aggregations of these as a managed stock.

7.1.5 Performance Indicator 1A

- Has the entire geographic distribution (range) of each managed stock been established where it is exploited?

- Is there general scientific agreement about the populations(s) that comprise each managed stock and their range?

Score = 83

Intent

The general intent of this indicator is to assure that the spatial distribution and structure of the population at issue is known well enough to manage on a sustainable basis. It requires that the spatial extent of the population be known so that: (1) the effects of harvest on the ecosystem can be assessed and (2) the effects of all harvest on the population can be assessed. The critical effects of harvest on the population, as regards sustainability, are the effects on spawning. Hence for management of salmon, one would ideally be interested in knowing the ocean distribution of each individual population.

Elements considered in scoring include:

1. Knowledge of the ocean and freshwater distribution of Alaska salmon by species.
2. Knowledge of the ocean and freshwater distribution of Alaska salmon by managed stock.
3. Knowledge of the ocean and freshwater distribution of Alaska salmon by individual population.

100% Scoring Guidepost

The complete range of all managed stocks are estimated and documented each year.

The complete range for significant populations within managed stocks are estimated and documented each year ('significant' refers to populations known to be experiencing critical concerns for sustainability).

80% Scoring Guidepost

There is adequate historical information from the past 10 years on the catch of managed stocks throughout their range of distribution/migration (e.g. CWT or equivalent measures)

Assessment of Performance

The ocean distributions of the five species of Alaska salmon are reasonably well known in general based on past tagging studies by the International Pacific Salmon Commission (Pearcy 1992, Groot and Margolis 1991). However, ocean tag returns have depended on high seas fishing activities, and drift nets were removed in the early 1990s. There is little knowledge of how migration patterns change from year-to-year (Pearcy 1992).

There is some knowledge of where fish from specific nearshore tagging locations go in the ocean, for hatchery fish and, to a lesser extent, for wild fish (see examples in Groot and Margolis 1991). In one example of a tagging study using wild juveniles and smolts in mixed stock fisheries in Alaska, Shaul, et al. (1991) found that northern stocks were harvested primarily in northern Southeast Alaska (SEAK), while southern stocks were harvested from northern SEAK and Yakutat to northern British Columbia. Information on the origins of both wild and hatchery fish has also been obtained from scale pattern analysis and genetic stock identification. In 1992, ADF&G began a program to develop a genetic baseline for Alaska salmon, and the state has since conducted a number of GSI studies (e.g., Crane and Seeb 2000, Crane, et al. 2000). These studies typically identify spawning to sub-regional or large river scale of resolution (e.g., West Vancouver Island, Thompson River, Upper Columbia Summer and Fall/Snake Fall, Mid and North Oregon Coastal).

Another issue related to distribution is the interception of stocks spawning in other jurisdictions. This includes the interception in the Alaskan fishery of salmon populations spawning in Canada as well as the interception by Alaska fisheries of salmon spawning in the lower 48 states of the US including some which are listed as threatened or endangered.

The US and Canada signed a new treaty in 1999 which governs the harvest of transboundary stocks. It includes specific management strategies that must be employed by both jurisdictions. There are some Canadian salmon stocks, particularly in northern British Columbia, which are currently at low levels. There is disagreement between scientists of the two nations as to the causes and best management approach. The treaty requires a joint panel produce a stock status report on these populations. That task has not been completed and may be key to understanding the management regime required for sustainability of these stocks.

Strengths relative to performance indicator

- The ocean distribution of each species is generally known. Spawning origin of fish caught is known to the sub-regional/ large river scale.

Weaknesses relative to performance indicator

- The ocean distributions are not specific to individual populations.
- There is no knowledge of how distributions change over time.

7.1.6 Performance Indicator 1B

- Do reliable estimates exist of removals in managed stocks?
- Have all the biological characteristics of removals been considered, especially for significant populations within each stock?

Score = 82

Intent

The general intent of this performance indicator is to determine whether removals from the population being assessed are known well enough to manage the population sustainably. Managing for

sustainability requires knowing the effect on reproduction. For the case of salmon, one ideally would want to know how each removal affected the specific individual population from which it was removed.

Elements considered in scoring include:

1. Reliability of catch data.
2. Whether there are significant unreported landings.
3. How well catch data can be assigned to individual populations.
4. The fraction of populations for which catch is unknown.

100% Scoring Guidepost

- All removals from significant populations within the managed stocks are estimated and used in management decisions.
- There are reliable estimates of all significant removals from managed stocks throughout Alaska (e.g. hooking mortality as an example of unidentified mortality)
- The biological characteristics of the removals from managed stocks are known and considered in management decisions.

80% Scoring Guidepost

- There are reliable estimates of removals from managed stocks.
- There is a rough estimate of removals from significant populations.
- There is evidence that undocumented removals (e.g. dropouts, unrecorded catch, etc.) are not significant.

Assessment of Performance

Salmon catches in Alaska appear to be reliably reported, and there is little incentive for not reporting them. While catches in mixed stock fisheries are known, they cannot be accurately attributed to spawning stocks, hence they are of limited usefulness in determining productivity to manage for sustainability of specific spawning stocks. In some cases tagging studies to establish the composition of mixed stock fisheries (e.g., Shaul, et al. 1991) have found that harvest rates varied substantially among stocks (i.e., between 20.4 percent and 89.6 percent removed each year).

Strengths relative to performance indicator

- Virtually all catches are known.

Weaknesses relative to performance indicator

- In many cases, catches cannot be assigned to individual population, hence their effect on future spawning is uncertain.

7.1.7 Performance Indicator 1C

Are there reliable estimates for escapements in managed stocks?

Score = 89

Intent

The general intent of this indicator is to reflect how well managers know what is left after the effects of the fishery to provide for future spawning in the population being assessed. In the case of salmon, one would ideally want to know the escapement to each interbreeding population. The accuracy of each estimate is important. Escapement estimates are used for both in-season management and construction of production functions, and the accuracy required is different.

Elements considered in scoring include:

1. The accuracy and precision of methods used to estimate escapement.
2. The fraction of individual populations for which each kind of estimation method is employed.
3. The fraction of populations for which escapement is unknown.

100% Scoring Guidepost

There is a reliable estimate made each year of escapements for managed stocks and significant populations within the stocks.

80%Scoring Guidepost

- There are rough estimates of escapement on a yearly basis for managed stocks.
- There is a rough estimate of the escapement to significant populations within the managed stocks.

Assessment of Performance

Escapement is estimated on some streams and rivers by a variety of methods including sonar, tower counts, weirs, and aerial methods. Two aerial methods are used: a peak-count method and an area-under-the-curve (AUC) method. There have been some efforts to estimate accuracy and precision of some of these methods. For example, for Prince William Sound pink salmon, a comparison of the AUC estimates with weir counts indicated they were within 10% of the weir values if observer efficiency and stream life were estimated each year, but they were less than 50% of the weir counts if standard values were used. Accuracy deteriorated when survey intervals exceeded 7 days. Another study of AUC methods in British Columbia obtained similar results, that intensive efforts were required for accurate AUC estimates (English, et al. 1992). There have been some efforts to calibrate observer counts to account for differences (Jones, et al. 1998).

Generally if the threshold escapement is set high enough, the accuracy required for in-season management will be lower than that required to determine the dependence of production on spawning abundance. Based on the information presented, it appears that weir counts (without washouts), hydroacoustic counts and tower counts are reasonably accurate, but that aerial (and foot) surveys have much lower accuracy and precision unless residence times and observer biases are accounted for annually. These methods typically underestimate escapement by an unknown fraction. The former would be adequate for both in-season management and computing productivity, while the latter would at best be suitable only as a rough index of spawning abundance, suitable for use in in-season management-.

The way in which knowledge of escapement influences sustainability depends on the relative number of stocks for which escapement is estimated in each way. For example, for Prince William Sound pink salmon, escapement is estimated in 208 of the over 1,000 streams (Bue, et al. 1998). This information apparently has not been assembled for the whole state, but is summarized for stocks in the southeast in Baker, et al. (1996). Table 1 indicates the number of spawning populations of each species and the percentage of each of these for which escapements have been estimated. Of the 928 streams for which escapement estimates had been made, aerial surveys with fixed wing aircraft were the method used for 888 of them (96 percent).

Table 1. In Southeast Alaska, the number of spawning populations of each species of salmon, the percentage of each for which escapement has been estimated and the percentage for which there were adequate data to estimate trends (from Baker, et al. 1996).

Species	Number Present	Percent Escapement Estimated	Percent Trend Evaluated
Chinook	63	60	49
Chum	1,516	50	3
Coho	2,371	29	3
Pink (odd years)	2,402	51	16
Pink (even years)	2,402	52	15
Sockeye	206	20	13

There appears to be a rough estimate of escapement each year for each managed unit, though there is a large number of streams that are not monitored. Within each managed unit the spawning streams that contribute to it are at least subsampled. The assumption is made that the streams sampled are representative of the unsampled streams, but they do not always covary strongly. For example, correlations between Auke Creek coho escapement and escapements to nearby Montana, Steep, Jordan, Switzer and Petersen Creeks are 0.672, 0.408, 0.355, 0.309, 0.109 and 0.660 (Clark 1994).

Strengths relative to performance indicator

- There are numerous escapement monitoring sites for the managed stocks.
- There is some form of escapement monitoring for many streams.

Weaknesses relative to performance indicator

- The estimates of escapement using aerial or foot counts are much lower accuracy and precision, making them essentially a rough index of escapement rather than the more precise measures of escapement (i.e., weirs, towers and hydroacoustics) used elsewhere in Alaska.
- Escapement is not monitored for most individual populations.

7.1.8 Performance Indicator 1D

- Are there reliable and scientifically accepted estimates (and confidence range) of the potential productivity of managed stock(s)?
- Is there information correlating variability in productivity to changes in environmental factors or fishing pressure?

Score = 82.5

Intent

The general intent of this indicator is to describe how well the information from catch and escapement data (as well as other sources) have been used to determine how production varies with spawner abundance. For salmon, since productivity varies with density and stream characteristics, it would ideally be determined for each individual population. Since ocean survival affects the number of spawners produced by each spawning population, ideally one would want to know how adult survival varied with ocean conditions on decadal time scales.

Elements considered in scoring include:

1. Analyses of stock and recruitment data to formulate stock-recruitment relationships.
2. Assessment of how stock-recruitment relationships vary over decadal time scales.
3. Variability in ocean survival over decadal time scales.

4. The fraction of populations for which some assessment of the dependence of productivity on spawning abundance was done.

100% Scoring Guidepost

There exists adequate data from sequential returns to develop a scientifically reliable stock/recruitment relationship for managed stocks accounting for significant populations where appropriate.

80% Scoring Guidepost

There is adequate information to identify sustainable production strategies for each managed stock (e.g., 10 years of historical information on catch, escapement, and recruitment).

There exists some level of assessment regarding the potential impacts from long-term variability (i.e., decadal scale).

Assessment of Performance

An analysis of how productivity varies with escapement has been done for about 10-20 percent of managed units. The analysis typically consists of plotting catch plus escapement versus escapement, fitting of a Ricker stock-recruitment function, then identifying a range of escapement that provided a high fraction of the optimal catch. Examples presented include sockeye on 5 rivers in the Yakutat area (Clark, et al. 1995), 4 populations of coho in southeast Alaska (Clark, et al. 1994), 28 populations of coho salmon in the Yakutat area (Clark and Clark 1994). Fried (1994) reviewed the basis for management on rivers in Prince William Sound, Cook Inlet and Bristol Bay. Of the 172 managed units reviewed, less than 20 percent had done an analysis of productivity using a Ricker model. Cross, et al. 1997) provided an update of management of Bristol Bay stocks. Buklis (1993) reviewed the basis for management of 50 managed units in the Arctic-Yukon-Kuskokwim area and about 10 percent appeared to have some sort of analysis of the dependence of productivity on spawning abundance. Fair, et al. 1999 updated those for Norton Sound and Kotzebue Sound.

In many cases determination of productivity is much more uncertain than others because although reliable estimates of catch are available, only poor estimates (aerial surveys, which are an index of abundance at best) are used. The resulting uncertainty has been accounted for in some of these by evaluating several possible assumptions regarding the fraction of true escapement represented by the escapement estimate. However, these analyses would still have to be considered much more uncertain than analyses using more accurate estimates of escapement. Of the 20 percent of the managed units reviewed in Fried (1994) about half used data from aerial or foot surveys that would be considered an index.

There does not seem to be much effort to determine the impact of varying ocean survival on productivity. Some consider it to have had little effect on the recent increase in abundance (e.g., Van Alen 2000). The analyses of coho populations in southeast Alaska by Clark, et al. (1994), which included the effects of variability in marine survival in the resulting stock-recruitment relationship, is an exception.

There appears to be adequate information to identify a sustainable production strategy for the managed units, though this requires the assumption that unmonitored streams behave similarly to the monitored streams. In most managed units, there has not been an analysis of productivity versus escapement; rather the sustainable strategy is based on a long-term average of past escapements. The escapements derived on this basis will probably sustain these populations even if the ocean survival declines to pre-1975 values, as long as the escapement goals are maintained.

Strengths relative to performance indicator

- There are analyses of productivity for 10-20 percent of the managed stocks.

Weaknesses relative to performance indicator

- The results of analyses of productivity versus spawning abundance are highly uncertain when they use poor estimates of escapement.
- Analyses of productivity for mixed stocks are less precise and therefore more difficult to interpret.
- We are aware of only one assessment of the effects of ocean environment on production.

7.1.9 Performance Indicator 1E

- Have target reference points been set?
- Are the target reference points appropriate (i.e. for managed stocks)?
- Are the target reference points scientifically disputed?

Score = 78.5

Intent

The general intent of this indicator is to determine whether the point of optimal harvest has been identified. In most fisheries this would be identification of the maximum sustained yield. In the case of salmon, it involves determining the escapement to each managed unit that provides the maximum long-term catch.

Elements considered in scoring include:

1. The fraction of individual populations for which the escapement producing the maximal harvest have been identified.
2. The methods used to establish the point(s) of optimal harvest.

100% Scoring Guidepost

- There are target reference points for each managed stock and for significant populations within the managed stock.
- The target reference point being used can be demonstrated to provide sustainable levels of catch over time.
- Uncertainty has been taken into account in establishing target species catch levels.

80% Scoring Guidepost

- There are target reference points for each managed stock.
- The target reference point being used can be demonstrated to provide sustainable levels of catch over time.
- Uncertainty has been taken into account in establishing target species catch levels.

Assessment of Performance

Relatively few Alaska salmon populations are managed on the basis of Ricker stock-recruitment curves obtained from the productivity analyses discussed above (Performance Indicator 1D). Historically, the issues involved in this kind of analysis are whether to harvest by specifying escapement or by specifying harvest rate. These have different effects on variability in catch and escapement, and whether one or the other is better depends on the catch criterion, variability within the model, whether several populations are involved, and other characteristics (Hilborn and Walters 1992,Walters and Parma 1996). A characteristic of management of several populations as a single unit that is important here is the fact that optimal management can lead to smaller, less productive populations going extinct. While it appears to the assessment team that smaller populations could go extinct, especially if ocean survivals were to decline, the State of Alaska has expressed the view that risk of extinction of a salmon population in Alaska is so low that it would not apply to this certification, especially not as a result of mixed stock fishing (Bosworth memo 4/6/00). The rationale

underlying that statement is that fishery exploitation by itself has not been known to cause extinction of a salmon population.

Eggers (1993) examined the sensitivity of yield to management error due to imperfect in-season management. He evaluated both fixed escapement and fixed harvest rate approaches using empirically determined levels of error. He showed that managing with a specified escapement was optimal, and further that a range of escapement, from 0.8 to 1.6 times the true optimal escapement, produced a catch that was always 90 percent of the optimal catch. For the stocks managed on the basis of stock-recruitment data, optimal escapement is either specified to be that which maximizes yield or to be in the range for which yield from the deterministic Ricker curve would be 90 percent of the maximum.

However, the vast majority of salmon populations are not managed for maximum sustained yield. For example, Bergstrom, et al. (1999) notes that "in the Yukon area, ADF&G lacks the necessary management program and scientific information to manage for maximum sustained yield." Most Alaska salmon populations are managed on the basis of a target escapement that is some form of long-term average (mean or median of past escapements with various points removed). It is sometimes argued that the arbitrary choice of an average of past escapement is close to optimal because it is probably within the range of 0.8 to 1.6 of the true optimal escapement. However, the true optimal is not known for these stocks because no stock-recruitment analysis was done (e.g., see Barton 1999).

Whether and how a target reference point could be achieved would depend on the way in which the in-season management is conducted. Adjusting management within the season based on ongoing estimates of escapement is a difficult problem (see Walters 1997 for an explanation), and several investigators have developed approaches to using multiple sources of data to best adjust effort (McPherson 1990, Fried and Hilborn 1988). ADF&G presented a demonstration of the general, centralized software they are developing to allow local managers to better approach this problem.

A critical aspect of setting the target reference point as it affects sustainability of Alaska salmon fisheries is the number of fisheries that are managed in each way. That information has apparently not been collected and organized in a single report.

Strengths relative to performance indicator

- Target reference points have been set for the 10-20 percent of populations for which analyses of productivity have been done.

Weaknesses relative to performance indicator

- For most populations the "target" of management is the long-term mean of past escapement.

The relative number of populations managed to maximize productivity, as opposed to being managed on the basis of a long-term mean needs to be quantified.

Requirements for continued certification:

Within 3 years of certification the Alaska Department of Fish & Game must:

1. Determine the number of salmon spawning stocks or spawning stock aggregates in the state that are managed on the basis of (1) escapement goals determined by stock-recruitment analysis, (2) escapement goals determined by average escapements, and (3) no established escapement goals.

2. Categorize each spawning stock or spawning stock aggregate according to relevant characteristics such as: whether it is a mixed stock fishery, the number of individual stocks exploited, methods used to estimate escapement, whether escapement goals were based on data before or after the mid-1970s, and whether the monitored stocks exploited in the mixed stock fisheries are representative of unmonitored stocks exploited.

3. Present the distributions in terms of the number of spawning populations, the number of fish, and the economic value of the fishery.

7.1.10 Performance Indicator 1F

- Have limit reference points been set for each managed stock?
- Do the limit reference points protect all significant populations within the managed stock from decline to unsustainable levels?
- Are the limit reference points scientifically disputed?

Score = 73

Intent

The general intent of this indicator is to determine whether a point has been identified that indicates that a stock is so low as to be considered in jeopardy, so that steps to severely curtail fishing and recover the population can be taken. To be most effective, a limit reference point should be different than a target reference point. With regard to Alaska salmon, a limit reference point that is probably greater than the point at which a population would be in jeopardy would fulfill the requirements of this estimator, even though the exact point is not known.

Elements considered in scoring include:

1. The fraction of managed stocks for which a threshold of overfishing has actually been identified.
2. The fraction of individual populations, for which a threshold could be identified, based on escapement data.
3. The fraction of individual populations for which there is a threshold in place below which fishing is curtailed.

100% Scoring Guidepost

The limit reference points for each managed stock maintain adequate populations abundance and average population growth rate $\geq$ 1 for all significant populations.

80% Scoring Guidepost

- The limit reference points for each managed stock maintain escapements above 20% of the long-term average.
- There is some estimate of escapements to significant populations within each managed stock.

Assessment of Performance

Salmon managers in Alaska have had had little reason to be concerned with populations at low abundance, or overfishing in recent years, hence their analyses do not reflect the recently developed concepts of fishery management embodied in the MSC criteria. For example, analyses of stock-recruitment relationships for Alaska salmon have not focussed on behavior at low abundance, and the conditions that would be considered dangerous. They do not have separate target reference points (describing optimal yield) and limit reference points (describing an overfished or perilous state).

However, because they attempt to obtain optimal yield by specifying an escapement level below which the fishery is curtailed, their target reference point is in some ways the functional equivalent of the limit reference point in other fisheries. The similarity is that the fishery is curtailed below the specified escapement level. The importance differences are: (1) the level is higher than a limit reference point would be, hence is not viewed as a perilous or overfished state and (2) in many cases the specified level of escapement applies to the sum of escapement over several individual populations. As a consequence of the former, the point could be relatively easily changed. This subverts the original motivation behind having two separate reference points: that the target reference point is a state that managers can continuously try to achieve by tinkering with management, but the limit reference point is the state where further tinkering is not allowed, rather draconian measures must be taken to shut down the fishery. The consequence of the latter is that management of aggregates of populations that

do not vary coherently, even if managed by specifying escapement can allow some low productivity populations to go extinct.

The characteristics of Alaska's escapement goals are outlined in the Department of Fish and Game's Alaska Escapement Goal Policy. Aspects that are relevant here include the fact that there can be a progressive sequence of increasingly prohibitive stipulations of the allowed fishing; as escapement declines more of the target fishery is closed (e.g., Clark 1998). A second important point is that the biological escapement goal is determined by the Department of Fish and Game. Biological escapement goals can be changed whenever new information suggests that future sustained harvest levels can be increased by a change, and it requires a scientific analysis.

In addition, as noted above under Performance Indicator 1D, most managed units in Alaska are not managed on the basis of stock-recruitment analysis, but rather with the goal of maintaining a certain average of past escapement. Because they have not been shown to be optimal, they are vulnerable to arguments that they should be reduced to "optimal" levels. Such arguments would likely be put forth by fishers if ocean survivals dropped to low levels and meeting escapement goals precluded harvest for a number of years.

Ruggerone, et al. (1999) have examined the harvest implications of stock recruitment curves for sockeye during periods of different productivity. Optimal escapements for data from the period 1946-1964 (which may be the survival level to which the ocean returns) are lower than optimal escapements for 1965-1992 and 1922-1945 (current survival levels). Harvests at low productivity were about 1/3 of their value at current productivity. Two implications of these analyses are: (1) it is likely that data will be re-analyzed and escapements will be changed to lower levels if productivity declines, and (2) the salmon industry will be one-third of its current size. The former increases the risk of populations being driven extinct, especially within mixed-stock fisheries. The latter implies there will be unprecedented pressure for greater harvests. Fisheries are usually better able to increase in capacity than to decrease.

Another point that is relevant to the issue of the effectiveness of current management by escapement is that in spite of this management, some stocks appear to be declining (Baker, et al. 1996). Shaul, et al.

(1998) notes a decline in coho escapement after 1970 in several boundary rivers. Some chinook populations that do not seem to be responding to recovery efforts with 50% of the 36 stocks listed as probably not rebuilding or not rebuilding, well into the recovery period (Joint Chinook Technical Committee 1993). Also, chum salmon populations on the Taku River are declining (Jensen 2000).

The overall effectiveness of these various aspects of Alaska salmon management must be considered in light of the additional fact that Alaska salmon fisheries have enjoyed a 25 year period of high ocean survivals, consequently the response of the current management system to widespread decline in abundance has not been tested. Since survivals of at least some species have increased by a factor of two, it is reasonable to expect that recruitment per spawner will be reduced by half. To a first approximation, fisheries with current harvest rates greater than 0.5 would then require zero harvest to meet escapement goals. This would be a substantial economic burden for many Alaskans, and there would be extreme pressure for lowering escapement goals. We do not know what the response will be to the eventual downturn in ocean survivals. Alaska has a very good track record in shutting down fisheries when escapement is below the specified requirement, but it has not been faced with having to shut down a large number at once for an extended period. The possible exception to this would be the brief decline in returns in the early 1970s.

The first question might be whether Alaska has the information that they would need to respond to such a downturn in ocean survival. Here again the distribution of different levels of information over the tens of thousands of spawning stocks is important. The information we do have (i.e., Table 1) is not very reassuring on this point, indicating that for only 3 percent of the spawning populations of two species, and 15 percent of the spawning populations of two other species in southeast Alaska does the state of Alaska have good enough escapement information to assess trends in escapement.

A second question regards the sustainability of Canadian stocks intercepted in Alaskan fisheries. These interceptions are closely scrutinized, and there seems to be enough agreement to sign a treaty (see NRC 1996, Jensen 2000, Joint Chinook Technical Committee 1993), however questions remain with regard to the sustainability of those Canadian stocks in that some have not recovered as planned. However, we know of only one critical assessment of the consequences of the management scheme

embodied in the recent treaty (Peterman and Pyper 2000). They note that the agreed upon management is a substantial improvement; however, they then compare it to an ideal management scheme, with elements from US ESA management as well as FAO precautionary guidelines. It is not up to those standards, but that is not the question that concerns us here; we are interested in whether it is sustainable. The multiple stock management in the treaty involves declining harvest rates as abundance declines (except in one case), which is not as safe as with fixed escapements. Managing by fixed escapement, as Alaska does in other fisheries, requires that harvest goes to zero at a nonzero abundance. The harvest rates in the treaty do not, except under extraordinary conditions. This means that clearly some of the populations in each mixed stock fishery would be sustainable, but this probably does not provide the assurances of sustainability for all populations as well as Alaska management does in general.

Strengths relative to performance indicator

- The stocks and populations that are managed individually are managed to maintain a specified escapement, an inherently safe, sustainable strategy.

Weaknesses relative to performance indicator

- The target escapement is both a limit reference point and a target reference point.
- There has been little concern with or analysis of specific populations at low levels.
- There has not been a thorough analysis of how fishery management (e.g., escapement targets) will change when ocean survivals decline.
- Managed units consist of several individual populations, not necessarily varying coherently.

Requirements for further certification:

1. Within 3 years after certification ADF&G must provide an explanation to the certification body about how Alaska salmon fisheries will continue to be sustainably managed even if there is an event that changes ocean survivals back to rates equivalent to those seen in the 1950s, 1960s, and 1970s. The explanation provided should at a minimum include:

a. What types of analyses are being conducted to understand how potentially lower ocean survival rates effect population abundance and commercial catches (use stock recruitment data where available).
b. An assessment of the projected distribution of catches over spawning populations, the distribution of fisheries that would be shut down, and the socio-economic impact.
c. A description of how ADF&G would respond to these conditions and to well-reasoned arguments that most escapement goals are arbitrarily set at an average level, therefore are not based on population dynamics and should be lowered.
d. A description of the department's response to poor salmon survival conditions experienced historically including the 3 years in the early 1970s.

2. Within 1 year after certification ADF&G must provide evidence to the certification body that the joint stock status report for northern coho required by the Pacific Salmon Treaty is being undertaken in a timely and cooperative manner. This can take the form of presenting the certification body with ADF&G's portion of the report, or presenting copies of the correspondence from ADF&G to the appropriate PST representatives regarding progress being made.

3. Within 2 years after certification ADF&G must present to the certification body an explanation of why ADF&G believes the stocks being co-managed under the PST are considered sustainable based on the current management paradigm.

7.1.11 Performance Indicator 1G

When exploited stocks or their significant component populations are depleted below the limit reference point, are the fisheries curtailed such that recovery and rebuilding is allowed to occur to return the fishery to sustainable levels?

Score = 92

Intent

The general intent of this indicator is to ascertain whether there are documented, severely restrictive measures that will be taken to curtail the fishery and recover the population once the limit reference point has been reached.

Elements considered in scoring include:

1. The fraction of fisheries for which recovery measures for overfishing has been identified.
2. The fraction of fisheries for which fishing is stopped below an escapement level.

100% Scoring Guidepost

There must be an agreed operational management plan to reduce fishing harvest rates when any managed stocks or any of the significant component significant populations fall below limit reference points.

80% Scoring Guidepost

There must be an operational strategy in place to reduce fishing harvest rates when managed stocks or their significant populations fall below limit reference points.

Assessment of Performance

The State of Alaska has a uniform policy of local mangers being able to open and close fisheries based on in-season assessment of performance. This policy is remarkable for its toughness and the fact that it is accepted among fishers and fishing communities. It is unique in world fisheries.

Given that escapements are not monitored in many spawning populations, often an index escapement from a representative stock must be used as a basis for in-season management action. There is a presumption that declines in unmonitored rivers would be inferred from declines in the monitored rivers, but stocks are not always highly correlated. A second bothersome point is the fact that even with the current high ocean survivals, there seem to be populations for which escapement levels have been declining (see previous Performance Indicator, 1G).

Strengths relative to performance indicator

- The state of Alaska has a demonstrated record of shutting down fisheries when escapement goals are not being met.

Weaknesses relative to performance indicator

- It is uncertain how this management system will react if ocean survivals decline and fisheries fall below current escapement goals.

7.1.12 Performance Indicator 1H

Is fishing conducted in a manner that does not allow alterations of the genetic structure or sex composition in managed stocks to the degree that it impairs reproductive capacity?

Score = 83

Intent

The general intent of this indicator is to reflect the permanent, indirect effects of fishing on the population. For salmon it would include genetic selection for fecundity, growth rate, maturity or spawning time or other behavioral characteristics that affect production and survival.

Elements considered in scoring include:

1. The degree to which fishing is spread throughout the spawning season to avoid selecting for early or late spawning.
2. The design of fishing districts and the actual location of harvest as it affects the harvest of individual stocks in mixed stock fisheries.
3. The location and operation of aquaculture operations as they affect the production, survival and harvest of wild salmon stocks.
4. The degree to which size limits could select for slower growth and earlier maturity.

100% Scoring Guidepost

- Using appropriate scientific measures, the management authority has ruled out genetic changes in the stock(s) due to fishing pressure and aquaculture operations.

Scoring Guidepost 80%

- The fishery is operated such that early or late run times are not purposely selected to the point that they alter the sex composition or genetic structure of managed populations.
- There is evidence that the management authority has programs for investigating alterations in the genetic composition of managed populations caused by fishing and aquaculture operations.

Assessment of Performance

The State of Alaska appears to be cognizant of potential for problems of genetic selection in their salmon fisheries. While the attempt is made to distribute escapement naturally over a season, there continues to be potential for selection for late or early run times because of the constraints of in-season management. Genetic selection by fishing gear is a complex issue, as it can vary substantially from

season to season (Miller and Kapuscinski 1994), and there is no indication that Alaska salmon fisheries differ substantially from other salmon fisheries in this aspect. The Alaska Dept of Fish and Game adopted a genetics policy in 1985. The department's geneticist exercises regulatory control responsibilities through the review of permits required to hold or transport live fish or eggs. There is a large private, non-profit aquaculture program within the state. For example, more than 500 million juvenile pink salmon are released annually in Prince William Sound. In southeast Alaska the return of adult chum salmon from hatchery releases has exceeded 20 million in recent years. The return of these hatchery-produced fish has altered management in many state waters. Further, there is evidence that substantial numbers of pink salmon released by Prince William Sound stray and spawn in streams throughout the region.

Strengths relative to performance indicator

- An attempt is made to distribute catches over the spawning season.
- Recent years' improvements in mass marking of hatchery fish have allowed improved understanding of the behavior of the returning adults.

Weaknesses relative to performance indicator

- Improvements in in-season run forecasting could improve the ability to distribute catch over the season.
- The potential long-term affects on the fitness of wild salmon from the mixing of hatchery produced fish in spawning areas throughout large geographical areas is not known.
-

Relative weighting of the performance indicators for Element 1

Utilizing the judgement-based weighting protocol described in Sections 6.2.1 and 6.2.2 of this report, the Evaluation Team arrived at cardinal indices of relative importance for the performance indicators associated with MSC Principle 1. These weights of relative importance were derived using AHP's

paired comparisons as to the relative importance of each indicator. The derived weights represent the team's collective judgement as to the extent to which each indicator should contribute to the overall sustainability of Alaska's commercial salmon fisheries. The heaviest weightings were given to the indicators more closely associated with sustainability: limit reference points (1G), which indicate when a population is overfished, and the knowledge of escapement (1C) necessary to evaluate the populations relative to the reference points.

Indicators	**Normalized Weight**
1A -	0.07
1B -	0.07
1C -	0.19
1D -	0.10
1E	0.06
1F	0.16
1G	0.24
1H -	0.09

Importance-weighted aggregate score for Element 1

Multiplying the indicator scores by their respective weights of relative importance and summing the scores across all indicators yields an overall normalized, weighted score for this principle of:

84

This computed score exceeds the 80-point threshold for certification. The general conclusion to be reached is that, over the breadth of issues and considerations included in this Element, ADF&G's fisheries managers are doing a good job of managing the commercial salmon fisheries for the sustainability of the resource. Though the overall performance falls within the certifiable range, there are nevertheless areas for improvement. These are specified in the requirements and recommendations under each indicator.

The specified requirements for continued certification reflect the concerns outlined in the introduction to Section 9.1, management of multiple stocks and decadal changes in ocean survival. With regard to the former, we require under Performance Indicator 1E that Alaska present a better understanding of the variability in management approaches over its many salmon populations. This is a minimal step toward an accurate assessment of the uncertainties involved in their mixed stock management. The State needs to provide a better explanation and support of its understanding and handling of the uncertainty involved in multiple stock management. Specifically, it is necessary to provide better support for the statements made to the certification team that:

(1) populations with low relative escapement would increase relative to the future abundance of a strong population with high escapement,
(2) management of the aggregate is effective because the individual populations fluctuate coherently, and
(3) because of their life history (i.e., large egg size, short life span, very high rate of growth), salmon stocks from unaltered spawning and rearing habitat would recover quickly from a depleted state as they did in the early 1970s (Bosworth memo April 7, 2000; Eggers Review Comments, March 3, 2000).

The assessment team feels that: (1) populations with low productivity can go extinct if managed as part of an aggregate, (2) although there is some regional coherence between individual populations (e.g., in Bristol Bay sockeye, Peterman, et al. 1999), there is little in other examples (e.g., southeast coho, Shaul, et al. 1991, Clark 1994) and (3) life history comparisons do not have the level of accuracy required in assessment of sustainability, and the stocks recovered quickly under what is likely to have been increased ocean survival.

With regard to the second concern, changing ocean survival, we require under performance indicator 1F that Alaska plan and document their response to a reversal in the recent increase in ocean survival. Our certification of sustainability of Alaska salmon here depends critically on having minimum escapements that are rigorously adhered to. If the State begins to change them in response to the

widespread declining catches that will accompany a downturn in ocean survival, the conditions under which the fishery was certified will no longer hold. Facing this issue now, and having plans in place is closer to the spirit of a limit reference point as specified in literature on sustainable fisheries management, and in particular in the MSC principles. This will require a shift from the belief that extinction of salmon in Alaska is unlikely because the freshwater habitat is in good shape (Bosworth memo April 7, 2000). The evaluation team acknowledges the recently adopted Alaska Sustainable Fisheries Policy established the Sustainable Escapement Threshold (SET) concept to ensure sustainability. The State should also provide an explanation about how this concept relates to the limit reference point concept.

7.2 ELEMENT 2 - ECOSYSTEM MANAGEMENT

Fishing operations should allow for maintenance of the structure, productivity, function and diversity of the ecosystem including habitat, and its associated dependent and ecologically related species.

7.2.1 Performance Indicator 2A

Are the non-target species in the fishery known and are catch mortality levels known for discards?

Score = 78

Intent

The intent of this performance indicator is to evaluate whether adequate information is collected, documented and analyzed to understand the potential consequence of the fishing activity on the non-target species which are caught and discarded and or caught and retained, e.g., is the biological community of marine mammals, birds, fish and invertebrates taken during the fishing operations known and their effects considered in making management decisions?

Elements considered in scoring include the availability of:

1. Catch records for all non-target species retained and marketed.
2. Observer, log or other data acquired on non-target species discarded.
3. Bycatch studies undertaken on high profile species (marine mammals, birds and invertebrates) caught, discarded or retained.
4. Anecdotal information available on bycatch species caught and levels of take provided by scientists, fishery managers, fishermen and other interested parties.
5. Information on bycatch mortalities and impacts on non-target species population levels known.
6. Data on bycatch of salmon taken in non-salmon fisheries.

100% Scoring Guidepost

- The mortalities imposed on major non-target species are known.
- Detailed information is available on all bycatch species and information on the community of bycatch species taken in the fishery.
- Bycatch mortalities on high profile species are known and impacts on their populations can be estimated for some fishery areas.
- Bycatch of threatened and endangered species are accounted for and takes are not considered to significantly impact population trends.
- The bycatch of salmon taken in the family of fisheries prosecuted in and off Alaska are known.

80% Scoring Guidepost

- Identities of bycatch species are known.
- Quantitative information on dominant bycatch species is maintained.
- General recognition by managers on the implications of bycatch to region-wide and localized biotic communities.
- Bycatch of threatened and endangered species are within established permit take levels.

Assessment of Performance

The major control of fishing effort is geared to the harvest of dominant salmon species in time and space. Hence, all other salmon species taken in a particular gear/area/time fishery are bycatch species by definition. However, for most fisheries the harvested non-target salmon species must be retained and marketed. As a result, the major bycatch species taken by number and weight are salmon species other than the target species for which specific escapement targets are established. Landing records for these bycatch species are readily available with the exception of a few fisheries where non-target species are required to be returned to the sea. For the latter, species estimates of discards are not generally made.

In addition to the bycatch of salmon species, there have been the National Marine Fisheries Service (NMFS) and non-government organizations' (NGO) studies to provide information on the bycatch and discards of marine mammals. A comprehensive study on marine mammals taken in the Alaskan salmon fisheries has been published by the Center for Marine Conservation (CMC). The CMC study estimates takes of marine mammals in the various permit fisheries of the region. Takes of threatened and endangered species within the salmon fisheries are not considered to be negatively impacting any threatened and endangered species. Further detailed information is available on the bycatch of salmon taken in the marine fisheries constituted within the EEZ.

Although the take of major salmon bycatch species is known and accounted for, and there is general knowledge on the bycatch of marine mammals, birds and other wildlife in some regions of Alaska, no formal program has been implemented to assess bycatch of non-target species of fish or shellfish, other than salmon. Similarly, there is excellent data regarding the bycatch of salmon species in the various non-salmon fisheries operating within the EEZ, but like information does not seem to be available for the fisheries operating within state waters. Further information of an anecdotal character supplied to the certification committee suggests that, bycatch of birds in some drift net fisheries in Alaska may be substantial. However, we have no scientific evidence to suggest that such takes are detrimental to the populations they impact. Regardless, we believe that a more formal accounting of bycatch in the Alaskan salmon fisheries is needed to insure that non-target species takes are not causing population declines, particularly in some bird populations. Thus, our scoring of this performance criterion is below passing.

Strengths relative to performance indicator

- Quantitative measures of dominant bycatch species (non-target salmon species) are known.
- General information on bycatch discard species is known.
- Studies on bycatch of marine mammals and birds have been undertaken in some fisheries.
- Efforts are taken to reduce bycatch of certain species intercepted in international fisheries.

Weakness relative to performance indicator

- Available information on bycatch of non-salmon fish species, invertebrates, and birds is largely anecdotal and undocumented.
- No formal program has been put into place to document the full extent of non-salmon bycatch species and their potential consequences to impacted populations.

Requirements for Continued Certification

1. Within 3 years after certification the state must implement a sampling program to identify major non-salmon fish species, birds and marine mammals taken in the salmon net fisheries of the State. The program should be designed to provide a reasonable understanding of fish, shellfish, birds and marine mammals taken incidentally in the fisheries. This requirement can be met in a number of ways. For example, one solution is that the sampling program may involve collection of bycatch information in the course of the department's test fisheries, and reference to similar data collected by the National Marine Fisheries Service. The certification body is not requiring any specific method, merely evidence that ADF&G is utilizing some process to collect the necessary information to adequately understand bycatch in the net fisheries.

2. Before 5 years pass after certification, ADF&G must provide evidence and a summary regarding its findings on bycatch of non-salmon species taken in the Alaskan salmon fisheries to an accredited certification body.

7.2.2 Performance Indicator 2B

It can be concluded that changes to the associated community (biological diversity) in the region affected by the fishery are sufficiently small and ecologically acceptable. Available information suggests that the natural ecosystem has not been altered beyond levels of observed natural variability. That is to say that the number of salmon in the system today is well within the historical bounds (population highs and lows) of the Alaskan fisheries.

Score = 82

Intent

It is the intent of this performance indicator to evaluate whether or not; the fishery is having significant impacts on associated animal populations that are directly or indirectly dependent on the salmon populations as food at various stages in their life history. The indicator assumes that there is adequate information and knowledge of the general ecosystems involved and to evaluate the consequences of fishing on the ecosystem in general.

Elements considered in scoring

1. Knowledge of the general ecosystem(s) in the region of the species distribution within and adjacent to Alaska.
2. Knowledge of important predator prey relationships.

3. Knowledge of the consequences of the fishery on the abundance of the target and non-target species.
4. Knowledge of the species diversity and relative abundance of important ecosystem biota in the region of the fishery and within the range of the species within and off Alaska.

100% Scoring Guidepost

- There is a good understanding of the general ecosystems inhabited by the five salmon species of concern within the area where the fishery functions and within the regions inhabited by the five species within and off Alaska.
- All of the predator and prey species of the target species are known.
- The effects of target species removals on predators and prey species are known and are accounted for in the management process.

80% Scoring Guidepost

- There is a general understanding of the ecosystems inhabited by the five target species, as well as throughout their ranges within and off Alaska.
- There is knowledge of the dominant predator and prey species of the target species.
- There is adequate knowledge of the functional relationships between predators and prey of target species such that important changes in their abundance can be detected.
- There is adequate knowledge to evaluate risk of the fishery on other aquatic organisms inhabiting the areas where the fishery operates in time and space.

Assessment of Performance

As might be expected the more general descriptive information regarding the North Pacific ecosystems, predator/prey relationships, as well as trophic interactions, are usually generated by authors in local academic institutions, federal government research laboratories or are the product of scientific seminars and or conference proceedings. Although agency scientists are frequently involved

in such publications, the implications of fisheries impacts at the ecological level are only indirectly accounted for in management actions, as they might be identified and brought to public scrutiny. In recent years, a number of comprehensive, topical books and publications on salmon ecology have been published, which provide a good understanding of the ecological systems inhabited by the five species of salmon fished in and adjacent to Alaska, including salmon habitats beyond the range of the fisheries.

Some of the more important publications providing ecological background for salmon targeted by the complex of Alaskan fisheries include, Pacific salmon and their interactions, Strouder et al, 1997; An ecosystem approach to salmon conservation, Spence et al, 1996; Ecology of the Bering Sea, Mathisen and Coyle, 1996; Upstream: Salmon and society in the Pacific Northwest, National Research Council (NRC), 1996; The sockeye salmon, Foerster, 1996; Pacific salmon life histories, Groots and Margolis, 1991; and The Bering Sea ecosystem, NRC, 1996. In aggregate these and other publications available provide a rich heritage of information regarding the ecosystems inhabited by Pacific salmon and their fresh and marine interactions with other biological elements within their adopted habitats. There is also adequate general knowledge of specific predator/prey relationships and information on aquatic and terrestrial wildlife dependent on salmon populations e.g., birds, bears, associated fish life etc. (see Ruggerone 1986, 1992a and 1992b, Ruggerone and Rogers 1984 and 1992 and others).

Although over the past three decades, all five salmon species within Alaska been maintained at relatively high population levels, it is difficult to establish population impacts on dependent species, local or regional that may have been the result of the salmon fisheries. They obviously exist as potential problems but have not been identified to us as significant extant problems by NGOs or other institutions familiar with the Alaskan fisheries. Although ecosystem management does not seem to be an explicit component of the contemporary management process it is nevertheless implicit in the management process. It was the certification committee's view that there are adequate safeguards in the information collection system to protect against major fishery-related disruptions.

Perhaps a more relevant question is how are the non-target salmon species faring while prosecuting the dominant species? We have not seen extensive quantitative assessments of secondary bycatch "target" species and the committee was left to evaluate the question based on escapement levels and production

records of these species, by fishery and area. Baker et al. (1996) examined the status of Pacific salmon and steelhead escapements in Southeastern Alaska. Out of 9,296 spawning aggregates, 928 contained sufficient information to analyze escapement trends. Of these studies, 36% were increasing, 60% were stable, 4% were declining and less than 1% showed precipitous declines. The general conclusion of the authors based on the limited data was that, "Pacific salmon in the region were generally in good health at two levels of salmon population structure, spawning aggregates and management units." Holmes and Burkett (1996) came to a like general conclusion on the runs in Alaska.

Strengths related to performance indicator

- An excellent general body of literature is available describing the general ecology of the region, both fresh and marine, and the interactions between salmon and other species.
- Between the salmon fisheries and other fisheries of the region there is a good understanding of the general diversity of species associated with salmon.
- The target fisheries have been conducted using relatively low rates of exploitation and thus, target populations of the major target species have been high over the past three decades.
- No dependent species problems were identified by ADF&G, the NMFS or other groups to the certification group, as suffering from poor salmon management practices.

Weakness relative to performance indicator

- Specific studies on the impacts of salmon fisheries on non-salmonid species inhabiting the fresh and marine environments do not appear to have been conducted.
- Long-term implications of low salmon populations that may develop if there were significant shifts in ocean and or fresh water environments are largely unknown.

Recommendation

Theoretical studies of the implication of long term climatic changes on the productivity of salmon and dependent species are encouraged.

7.2.3 Performance Indicator 2C

Are there any endangered threatened or protected species amongst non-target species impacted by the fishery?

Score = 89.5

Intent

The intent of this performance indicator is to insure that management is sensitive to, and managing to conserve and restore threatened, endangered and protected species.

Elements considered in scoring

1. Recognition of the intent and requirements of the Endangered Species Act (ESA) and or the MSC principle concerned with issue.
2. Knowledge of the endangered and threatened species within the region fisheries operate and throughout the range of the salmon species inhabiting the waters in and off Alaska.

100% Scoring Guidepost

- There is knowledge of all threatened and endangered species in the fishing areas throughout Alaska.
- All management plans require effective mitigation that takes removal of threatened and endangered species to zero.
- The management agency is cognizant of the federal acts or international agreements that protect endangered and threatened species.

80% Scoring Guidepost

- There is a program in place to identify all protected, threatened and endangered species in fishing areas throughout Alaska
- Appropriate permits are in place for all fisheries requiring take authorization.

Assessment of Performance

Within the United States the Threatened and Endangered Species Act is implemented and enforced by the NMFS, which has a major research and administrative presence in Alaska. Further, the state managers are keenly aware of the law. Nevertheless, the monitoring and enforcement activities fall under federal authority. The extensive area encompassing salmon fishery operations and their complexity make close inspection and evaluation of conformance with the laws difficult to track.

The Alaskan salmon fisheries occasionally impose mortalities on marine mammals, particular Stellar sea lions. They are also known to harvest or have "takes" of some salmonid species listed as threatened or endangered having their origin in streams and rivers in California, Oregon, and Washington. Additionally, salmon species having their origins in British Columbia are frequently intercepted by the Southeastern Alaska salmon fisheries (troll and net). The takes of Stellar sea lions are considered to be at acceptable levels. The team was especially concerned with the troll salmon fisheries in Southeastern Alaska, which target considerable Chinook and silver salmon. A large portion of the Chinook catch of this fleet has its origins in waters off BC or the contiguous West Coast states of the United States.

A number of endangered and threatened stocks from the Columbia River region and Puget Sound are taken in the Alaska troll fishery. However, catch or take levels of these species as reported by the Pacific Salmon Commission based on coded wire tag studies have been relatively low (see Table 2). The fishery is currently permitted under ESA ": Section 7" consultation between ADF&G and NMFS on an annual basis. Moreover, NMFS has written a Biological Opinion, which does not require

ADF&G to take any significant action on any listed salmon species. The fishery harvests mixed stocks and would seem to be more difficult to regulate (in-season) based on in-season information.

Table 2 Interception of Listed Chinook Stock, Including Data for 1997, All Gear Types

Model Stock	**% (S.E. Alaska) Fishery**	**% Stock (all areas)**
Willamettte River Hatchery	1.44	9.14
Lewis River Wild	.58	9.78
Skagit Summer/Fall	.07	3.09
Nooksack Fall	.04	.16
Puget Sound Natural	.05	.37
Snohomish Summer/Fall	.02	1.57
Snake River Fall	.03	7.18
Stillaguamish Summer/Fall	.03	9.18
Nooksack Spring	00	00

Source PSC 1997

This fishery is sanctioned by the NMFS (the NPFMC) and regulated, in part, under terms of the Pacific Salmon Treaty.

It is our understanding that the Alaskan harvest of intercepted stocks are in basic conformance with those established by the PSC to meet conservation goals. With regard to the ESA, the stocks are closely scrutinized, there are recovery plans in place or under development, and the intercepted portions are very small. These facts led the team to conclude that the fishery is in conformance with the MSC Principles and Criteria. With regard to the Canadian stocks being intercepted, they are co-managed under a signed treaty between the United States and Canada and there is evidence that ADF&G is operating in conformance with the Commission's established conservation and quota obligations. However, the approach to co-management is still evolving. Currently, the management involves both mixed stock and single stock management. There is some doubt about whether the former meets sustainability requirements based on concerns about whether management will be able to respond to low returns (see Peterman and Pyper). As a result, we have included an assessment of those fisheries as a requirement for continued certification.

Strengths relative to performance indicator

- Between the NGOs, state and federal government agencies there is a high level of commitment to protect threatened and endangered species.
- The Alaskan salmon fisheries take a variety of birds and marine mammals as incidental catch, but the Steller sea lion, which is identified as endangered, is only occasionally encountered. An exception involves direct takes of these animals by Alaska Natives for subsistence purposes. The subsistence take may currently constitute a significant impact on the Steller sea lion population; however, it is not a component of the Alaskan salmon fishery.

Weakness relative to performance criterion

- The database on marine mammal and bird bycatch in the Alaska salmon fisheries is fragmented and incomplete.

Recommendations

ADF&G should join with the NMFS and PSC and provide salmon "take" levels for listed ESA species on an annual basis.

7.2.4 Performance Indicator 2D

Exogenous anthropogenic factors are significant enough to affect exploited species and are taken into account in the management process

Score =82

Intent

It is the intent of this performance indicator to insure management agencies are aware of, and take into account, human activities other than directed fisheries, that may influence the general productivity of salmon populations inhabiting the fresh and marine environments in and adjacent to Alaska.

Elements considered in scoring

1. Extent of knowledge and understanding of anthropogenic effects on Alaskan fisheries.
2. Legal framework which allows ADF&G to work with other state and federal government agencies to minimize impacts of activities that could or do impact the productivity of the salmon streams or marine environment in the region.
3. Evidence that the effects of forest practices, road building, private construction etc., are controlled to minimize impacts on salmon productivity.
4. Evidence that in cases where natural or human activities have resulted in habitat destruction, measures have been taken to mitigate many impacts.
5. Evidence that fish culture, farming, etc., has not resulted in genetic dilution and declined fitness of the wild salmon stocks in the region.

100% Scoring Guidepost

The management authority has collected information showing exogenous anthropogenic effects are not a factor impacting any of the salmon streams and other habitats occupied by salmon harvested from Alaskan stocks.

80% Scoring Guidepost.

- The management agency is aware of exogenous factors impacting Alaskan salmon habitats.
- Some of the exogenous impacts on salmon streams are known and efforts have, or are being made, to mitigate negative impacts.

- The potential implications of aquaculture activities on wild stocks are known and efforts have been made to eliminate or minimize such impacts.

Assessment of Performance

There is considerable evidence that the management agency is cognizant of the potential impacts of exogenous factors that have, and continue to, impact the productivity of salmon habitats in Alaska. It is also clear that these factors have not always been under the reasonable control of the fisheries agency responsible for fish and wildlife management of the region. It is our opinion that during intense logging activities riparian stream habitats were seriously damaged within Southeast and other areas of Alaska. However, over the past decade these activities have become more closely controlled and improved cooperation exists between the various state and federal agencies in regards to habitat protection. These gains may, in part, reflect the declining economic position of the logging industry in the region. Nevertheless, during the 1990's Alaska has, (a) improved regulations governing development activities such as road building and mining to protect salmon spawning and rearing areas, (b) legislated a Forest Practice Act requiring buffer zones along salmon streams, and (c) improved water discharges to control the quality of water returning to the environment. Within its structure, the ADF&G has a Habitat Division with the goal that, "fish, forest, wildlife and other renewable resources belonging to the state should be utilized, developed and maintained on the sustained yield principle subject to preferences among beneficial uses."

Evidence of management agencies' efforts to mitigate against some habitat deterioration is summarized in the ADF&G report titled, "Restoration and enhancement of aquatic habitats in Alaska, Project Inventory, Case Study Selection, and Bibliography. (Parry et al. 1993). There is compelling evidence that the state's efforts are more than adequate to pass this performance criteria. Additionally, Alaska's salmon streams and rivers benefit from extensive regions of the state where no development has occurred over the past several decades.

A number of scientists are concerned over the potential impacts of pink and chum hatchery salmon on wild stocks of the region. The underlying issues involve alteration of the genetic make of wild stocks

and competition for food. Although the team could not find convincing evidence that the fisheries and relevant stocks were being negatively impacted, these matters, need to be carefully monitored.

Relative performance of the indicators for Element 2

Utilizing the judgement-based weighting protocol described in Section 6.2.1 and 6.2.2 of this report, the Evaluation Team arrived at cardinal indices of relative importance for the performance indicators associated with MSC Principle 2. These weights of relative importance were derived using AHP's paired comparisons as to the relative importance of each indicator. The derived weights represent the team's collective judgement as to the extent to which each indicator should contribute to the overall evaluation of Alaska's commercial salmon fisheries.

Indicators	**Normalized Weight**
2A	0.15
2B	0.14
2C	0.30
2D	0.41

Importance-weighted aggregate score for Element 2

Multiplying the indicator scores by their respective weights of relative importance and summing the scores across all indicators yields an overall normalized, weighted score for this principle of:

84

This computed score exceeds the 80-point threshold for certification. The general conclusion to be reached, however, is that, over the breadth of issues and considerations included in this Element, considerable effort is still required in the management of commercial salmon fisheries in Alaska to bring it in line with the exemplary efforts being made in managing the resource. While the overall performance falls within the acceptable range, the performance nevertheless for several indicators fell

short of expectations. Even given this situation, the evaluation team has concluded that the management of Alaska's commercial salmon fisheries complies with all the MSC Principles and Criteria and is certifiable. For continued certification, Alaska's fisheries managers must meet the specific requirements outlined above.

7.3 ELEMENT 3 – THE MANAGEMENT SYSTEM

7.3.1 Performance Indicator 3A

The management system demonstrates:

-clear long-term objectives consistent with sustainable fishing;

-a consultative process that is transparent to all interested and affected parties;

-an appropriate mechanism for the resolution of disputes arising within the system.

SCORE = 94.5

The intent of this performance indicator is to evaluate the administrative structure and process of the management system as to the extent that it allows and encourages participation in rule-making and dispute resolution by fishery participants and other interested and affected parties. That decision-making process must have clear, long-term goals and objectives that assure that the fishery operates in a manner consistent with the principles of sustainable fishing.

Elements considered in scoring include:

1. Is there a formal delegation of legal authority to the management system?
2. Are the laws and regulations codified and available to all interested parties?
3. Does the management system establish goals and objectives that are consistent with the principles of sustainable fishing? Are these codified?
4. Is the rule-making body available for public input and is that input considered in their decisions?
5. Is there opportunity for active involvement by all stakeholders in the rule-making process?

100% Scoring Guidepost

There is a codified and formal system to:

- resolve disputes;
- consult stakeholders;
- identify and adopt long-term objectives.

80% Scoring Guidepost

The management system reflects the principles and criteria of the MSC but may not have a formal, codified system for:

- dispute resolution;
- stakeholder consultations;
- identifying and adopting long-term objectives.

Assessment of Performance

After statehood (1959) the authority to manage salmon fisheries in Alaska passed from the federal government to the state. The Alaska State Constitution at Article VIII, Section 2 set the stage for fishery management, directing that the legislature provide for the utilization, development and conservation of all natural resources belonging to the state for the maximum benefit of its people.

The legislature, thus empowered, enacts laws, which are codified as Alaska Statute Title 16, the Fish and Game Code. In AS 16.05.010, the legislature created the Alaska Department of Fish and Game (ADFG) and delegated management authority to the Commissioner. The legislature also created the Alaska Board of Fisheries (AS16.05.251), a seven-member body appointed by the Governor. It is charged with adopting regulations for the utilization and conservation of fishery resources which are then codified under the Alaska Administrative Code Title 5 (5AAC).

The Board of Fisheries (BOF) has exercised its broad authority to set seasons, identify fishing districts, define legal gear and vessels, and establish management plans and to allocate harvest among user groups. It has codified a policy for the management of mixed stock fisheries (5AAC39.220); adopted an Escapement Goal Policy which will be considered for adoption into regulation in January of ’01, and has developed and adopted a Sustainable Fisheries Management Policy, which was codified into regulation in March, 2000.

The BOF solicits proposed regulation changes from the public, ADFG, agencies and NGOs. The state is divided into several regions and the BOF generally deals with the regions on a 3-year rotation. The solicitations for regulatory changes are widely circulated. All submittals are reviewed and acted upon at a public meeting. The format of the pubic meetings includes public and agency testimony.

In addition, there are numerous, local Fish and Game Advisory Committees throughout the state. These are comprised of local residents who have an interest in the management of fishery resources. They encourage local input to the BOF, and formulate recommendations on the various regulatory proposals.

Strengths relative to this indicator:

- Statutes and regulations codify the authority and decisions of the management system.
- The Advisory Committee and Board system is generally understood by interested parties and is available for input from individuals, groups and agencies. The BOF meets 4-5 times per year, hears testimony from hundreds of individuals and groups, and reviews and acts on several hundred regulatory proposals each year.
- The BOF has adopted numerous management plans that control harvests and assure escapement in many important fisheries throughout Alaska. Management philosophy, articulated as BOF policy, has generally been codified as well.
- Adoption of a sustainable fisheries policy developed through consultation with a wide variety of stakeholders and external scientific review.

Weaknesses relative to this indicator:

- The recent reinsertion of the federal government into the management of certain fisheries scattered throughout the state will cause confusion regarding management authority and responsibility. Participation in the management process by affected parties may be less effective due to the inevitable jurisdictional confusion

7.3.2 Performance Indicator 3B

The management system considers:

- its effect on the cultural context, scale and intensity of the fishery;
- the legal and customary rights and long-term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.

SCORE = 93

The intent of this performance indicator is to evaluate the management system in light of its affects on local/ indigenous peoples dependent on fishing for food and livelihood and the effects of the fishery on the culture of local areas.

Elements considered in scoring include:

1. Does a formal, codified system exist which takes into account the views and customs of local/indigenous peoples?
2. Does the management system establish goals and objectives relative to local/indigenous peoples that are consistent with the principles of sustainable fishing?
3. Does the fishery operate in a manner that is compatible local custom and minimizes local community impact?

100% Scoring Guidepost

There is a codified and formal system to take into account the views and customs of local/indigenous peoples dependent on fishing for food and livelihood.

80% Scoring Guidepost

The management system reflects the principles and criteria expressed by the MSC but may not have a formal codified system.

Assessment of Performance

State and federal law define subsistence as the "customary and traditional uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing and trade". After 20 years of modifying laws and regulations regarding subsistence use of natural resources, mostly due to a non-stop string of legal challenges in state and federal courts, Alaska and the federal government are at impasse regarding certain details of subsistence management. The federal government, driven by the Alaska National Interest Lands Conservation Act (ANILCA), has reinserted itself in some important aspects of Alaska fishery management. Since 70% of the area of Alaska is federally controlled lands the impact on state management could be substantial. Specifically, ANILCA mandates a subsistence use priority for "rural" residents whereas the Alaska Supreme Court has ruled that such a preference cannot be allowed under its Constitution.

Alaska's current law establishes a priority for subsistence use and directs the Boards of Fisheries and Game to identify "non-subsistence" areas where hunting and fishing under subsistence regulations are prohibited. The federal government has ruled that Alaska is not in compliance with ANILCA because under state law all Alaskans are eligible to participate as subsistence users, where ANILCA provides solely for rural residents. The federal subsistence program includes a federal rule-making body, the Federal Subsistence Board, and local advisory groups called Regional Advisory Councils.

There are, therefore, two parallel, codified management systems with overlapping authority, mission and regulatory activity. Communication and the infrastructure for coordination between the two regulatory bodies is evolving.

Neither system specifically identifies or prioritizes use by indigenous peoples. But the federal application of its rural area standard, and the state's use of its non-subsistence area / all Alaskans approach, combined with the demographics of Alaska, result in subsistence priority for Alaska Natives living outside the urban areas. Under state rules subsistence opportunities are available for residents of non-subsistence areas but they must travel to a subsistence area to partake in the harvest. Under federal rules "local" people living in "rural" areas have a subsistence priority.

Strengths relative to this indicator:

- Clear, codified state regulations establish the primacy of management for sustained yield and identify subsistence as the priority use for the harvestable surplus.
- Subsistence uses defined by the management systems meet the standards of the MSC.

Weaknesses relative to this indicator:

- Twenty years of court challenges and statutory rewrites have reduced public understanding and confidence in the state management system and support for the state's regulatory program.
- Two parallel systems create substantial confusion and may undermine sound management and enforcement of fishery rules.
- The federal system lacks the mandate to manage for MSY and in fact does not require managers to assure adequate spawning to produce yields that will continue to support established commercial fisheries.
- The federal management system lacks the database, knowledge and experience of the state fishery regulators and managers, though this may be changing since many state managers have accepted jobs with the federal subsistence program. It is unclear whether the two systems will establish a protocol for sharing information and co-managing fish resources, but progress is being made.

Recommendation:

Establish through letters of understanding or other formal administrative means a system to delineate areas of responsibility and authority, share historical and real-time data, provide management expertise and inform the public explicitly how and by whom the various fishery components will be managed.

7.3.3 Performance Indicator 3C

The management system provides economic and social incentives that contribute to sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.

SCORE = 86

The intent of this indicator is to evaluate whether economic or social programs undertaken by the management system are compatible with the principles of sustainable fishing.

Elements considered in scoring include:

1. Does the management authority have a codified program for limiting fishery effort?
2. Is there an operational program to buy back vessels, gear or permits from overcapitalized or over-fished fisheries?
3. Are there government subsidies to purchase, modify or upgrade vessels or gear in fisheries that are fully exploited or depleted?
4. Are there government programs that are incentives for developing or deploying vessels or gear that reduces by-catch of non-target stocks/species or that reduces fishing mortality of discards, dropouts, etc.?

100% Scoring Guidepost

- There are programs authorized that provide economic or resource access benefits for deploying fishing gear that has low discard rates or mortalities.
- There are government/industry buy-back programs for overcapitalized fisheries.
- No subsidies are offered for the purchase of vessels or fishing vessel modifications targeting fully exploited and/or depleted resources. (See FAO definitions for fully exploited and overexploited).

80% Scoring Guidepost

- There are government programs in place to limit effort.
- There are government or industry buy-back programs for over-capitalized or over-fished fisheries.

Assessment of Performance

Article VIII, Section 15 of the Alaska State Constitution states that "No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the state". After a referendum in 1972, a second sentence was added: "This section does not restrict the power of the state to limit entry into any fishery for purpose 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 the following year the legislature established the Commercial Fisheries Entry Commission (CFEC) and began the process of limiting entry to all salmon fisheries in the state. Limited entry permits are issued to natural persons and may not be held by a corporation or commercial entity. Permits are issued for a specific region and gear type (e.g. Bristol Bay drift gillnet, Prince William Sound purse seine, southeast Alaska power troll). They are not transferable between areas or gear type. They are bought and sold as capital property and can be willed to heirs or distributed as property of an estate. Although there has been a small, gradual increase in numbers of permits as appeal hearings and court cases have been adjudicated, the limited entry program has effectively capped the amount of gear fished in the districts in Alaska.

The limited entry statutes include a system for buy-back of permits in a fishery area due to long-term biological changes or long-term market changes. In theory, the buy-back would be financed by a fund established through annual assessments levied on the holders of similar permits. In reality, no buy-back programs have been instituted in Alaska salmon fisheries although managers often describe various fishery components as fully exploited and over-capitalized.

The Alaska Department of Commerce and Economic Development has established and maintains the commercial Fisheries Revolving Loan Fund. Loans can be used to purchase limited entry permits or to purchase, refinance or upgrade vessels or gear. Interest rates are set at 2 percent above prime not to exceed 10.5 percent.

The hatchery program in Alaska is considered by some to be a *de facto* government subsidy, and therefore should be evaluated as to its impact on the sustainability of the common property fisheries and the wild stocks. During the 1970's the Alaska legislature established the legal framework for private involvement in fishery enhancement, allowing the development and operation of hatcheries by private nonprofit (PNP) corporations. The legislature also established the Fisheries Enhancement Revolving Loan Fund (AS16.10.505-.560) to underwrite the facility construction and operations. Further, the legislature allowed the sale of salmon and salmon eggs by the hatchery operator for "…*reasonable operating costs, including debt retirement, expanding facilities*…" The law does not describe what "*reasonable operating costs*" entail.

When political interest in public hatchery operations waned in the mid-1980's, ADFG facilities were leased to private operators. In Prince William Sound, for example, the two state hatcheries were turned over to the local PNP hatchery operator, bringing their inventory to four large production units which now release in excess of 500 million juvenile pink salmon annually.

In 1993, the Alaska Board of Fisheries adopted the Policy for the Management of Mixed Stock Salmon Fisheries which stated, in part: "*In applying this statewide mixed stock salmon policy, conservation of wild salmon stocks consistent with sustained yield shall be accorded the highest priority.*" At about the same time the Board redefined the "escapement" to mean: "*The number of*

brood stock or spawners required to perpetuate and achieve natural, semi-artificial and artificial production objectives…and the number of hatchery produced fish taken for hatchery harvest requirement, to be used to pay for reasonable operating costs and capital costs, at current market prices…" A new term was coined to describe the fish caught and sold to pay hatchery costs: *corporate escapement.*

Fishery management priorities in Prince William Sound in descending order are wild stock escapement (this priority is required by statute at 16.05.730), hatchery brood stock, hatchery sales for cost recovery (corporate escapement) and then the common property fishery. This sequencing was set to allow hatcheries to repay loans and sustain the businesses; the question becomes whether this enhances or diminishes sustainability of the fish stock. Problems have been experienced in achieving wild stock escapement goals, while at the same time hatchery straying rates as high as 80% have been observed in some streams adjacent to hatchery facilities in the Sound. Hilborn and Eggers (2000) question whether total production in PWS has increased and provide evidence that hatchery production has replaced wild stock production to a large extent, perhaps due to carrying capacity limitations.

This sequence of events suggests potential for allocation of both harvest and production potential from natural spawning stocks to artificial enhancement. There is little question of the legal right of the Board of Fisheries to allocate harvest opportunity among beneficial users. At present the returns of pink salmon to Prince William Sound are very large. In the future, the sustainability of this segment of the Alaska salmon fishery will depend not only on natural production and marine survival of pink salmon but also on economic conditions (e.g. pink salmon prices) and continued interest in private hatchery operation. At present the fishery is sustainable and although there is concern, there is no evidence of irreversible impact on wild stock and natural spawning. However, this is a situation where the statement “Absence of evidence is not evidence of absence.” is appropriate.

In their 1989 paper, *Background of the Genetic Policy of the Alaska Department of Fish and Game*, Davis and Burkett stated:

> *“The importance of the wild stocks of salmon to the state economy was recognized as paramount. It was also understood that development and operation of a hatchery system could,*

if not done with care, have a detrimental impact on wild salmon populations. There has never been any intent to replace wild production with hatchery fish. The intention is to augment wild production and perhaps even reduce the pressure on wild systems."

The paper continues by recognizing the inherent risks of a hatchery program and managing it to reduce impacts to an acceptable level: *"The need is not to avoid all genetic change, but to allow for the long-term retention of natural communities under conditions that would provide for continuing evolution."* (Davis and Burkett 1989).

Strengths relative to this indicator:

- The limited entry system has effectively controlled effort in salmon fisheries throughout the state and has thus facilitated management for sustained yield.
- Legal provisions are in place for a permit buy-back program.
- The Private Non-Profit Hatchery system is regulated through regional planning teams that include fishery managers. It is also subject to policy and regulations regarding fish disease, fish genetics, statutory priority for wild over enhanced stocks, and fish and egg transport. Department biologists have strong input in the review process.

Weaknesses relative to this indicator:

- No consideration is being given to reductions in the number of permits in areas that are fully exploited.
- The commercial fisheries loan program is a subsidy for purchasing or upgrading vessels and does not take into account whether the fishing area in which they will be used is fully exploited.

In future years fish production and survival may not be as strong as it has been in recent years and it may be more difficult to mange the resource with the current number of permits and continually upgraded equipment.

- - The hatchery program is a direct benefit to commercial (and in some cases sport) fishing. The Alaska Department of Fish and Game has conducted genetic surveys of many populations of

salmon and is cataloguing genotypic and phenotypic variability for numerous regions and populations, There is, however, limited information on how genetic changes caused by hatchery straying or fishery related selection affect the reproductive fitness of the individual populations and therefore the sustainability of the fishery.

Requirements for Continued Certification

- Within 2 years of certification ADF&G must present information to the certification body reporting on progress made by the Commercial Fisheries Entry Commission on reducing the number of permits to the numbers determined to be consistent with the limited entry law on an annual basis.

- The Department must identify long-range research needed to assess the magnitude of the interaction of hatchery programs on the wild stock gene pool and the effect on the reproductive fitness of those stocks. The department must document the programs, policies and regulations and statutes as well as specific actions taken to assure the consistency of the hatchery program with the Genetics Policy.

Recommendations:

Loans for use in fully exploited and over-capitalized fisheries should be considered in light of the effect on the continued sustainability of the fishery. To this end, it would be useful if ADF&G could help educate loan program managers to consider the conditions within the area to be fished when reviewing applications for purchasing or upgrading vessels or gear.

7.3.4 Performance Indicator 3D

The management system acts in a timely and adaptive fashion on the basis of the best available information using a precautionary approach when dealing with scientific uncertainty.

SCORE = 93

The structure and overall function of the management system has been scored previously under criteria 3A and 3B. Performance indicator 3D assesses the ability of the system to utilize the best, most current information to respond quickly to unexpected changes in the environment or the fishery in order to assure sustainability.

Elements considered in scoring include:

1. Does the management system include methods for continual fishery and environmental monitoring?
2. Are there methods for rapidly altering fishery rules in light of unexpected events or changes in fishery performance?
3. How does new information affect fishing operations and management plans in subsequent years?
4. How do the mechanisms that allow response to unexpected events affect the sustainability of the fishery?

100% Scoring Guidepost

- The management system contains provisions for immediate in-season adjustments to established rules thus allowing for timely and adaptive management throughout the fishery

80% Scoring Guidepost

- The management process responds to unexpected changes.
- Unexpected changes are identified and dealt with using adjustments to management plans in following years.

Assessment of Performance

The Alaska salmon fishery has been divided into a number of management areas. Within each management area an area management biologist has been designated. That individual receives a formal delegation of authority from the Commissioner under AS16.05.060 that allows him/her to summarily change regulations to assure escapement and conduct an orderly harvest of surplus fish. These in-season changes to regulation are called Emergency Orders. They carry the full force and effect of law and can be implemented on an hour by hour basis if required to manage the fishery in that area.

In general, the area manager has a staff of full-time and seasonal biologists and technicians. Some of the principle tasks of the area management staff include the monitoring of fish movements into and through the fishing districts, observing and reporting the performance of the fishing operations, and evaluating the migration of fish into fresh water and thence to the spawning grounds.

The primary objective of in-season management is to assure adequate escapement and an orderly harvest that distributes the catch throughout the duration of the run. The inherent flexibility of the system therefore promotes sustainability but is obviously limited by the quality and quantity of historical information and the data gathered during the salmon runs.

Management staffs produce reports that summarize general information on the strength of the runs, the operation of the fishery and the escapements that were monitored. These may be completed within one to two years of the season being reported and are maintained in the gray literature produced by the department. Summary reports may be produced for relevant portions of the BOF meetings.

Strengths relative to this indicator:

- There is a large cadre of well-trained area management biologists who live near the districts that they manage and are therefore familiar with the local environment and the fishing operations.
- The Emergency Order system allows rapid, on-site response to changed or unexpected fishery conditions.

Weaknesses relative to this indicator;

- Management reports are often not completed until long after the fishery is completed,
- Management reports are not widely available for the public and interested parties.
- Fiscal constraints often limit the ability of the area management staff to adequately monitor the fishery and there is very little monitoring of the associated environmental conditions.

Recommendations:

- The review, editing and dissemination of area management reports should be standardized and reasonable timeframes established.
- Increased funding for staff and monitoring projects is essential. Without adequate data the management system may be unprepared for salmon returns that deviate from those of the past several years.

7.3.5 Performance Indicator 3E

The management system requires that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.

SCORE = 90

The intent of this performance indicator is to evaluate the ability of the management system to continually gather biological data, determine the status of the fishery resources and to determine the impacts of the fishery those resources and the ecosystem.

Elements considered in this scoring include:

1. Are there programs in place to monitor the fishery, target stocks and the associated biological communities?
2. How often are these monitoring programs conducted?

3. Is the information derived from these programs sufficient to assure sustainable fishing?
4. How is the information from these programs reported to the rule-making body and is it available for all interested and affected parties?

100% Scoring Guidepost

There is a formal status update on a yearly basis for all stocks.

80% Scoring Guidepost

A mechanism is in place to allow for periodic status updates (based on life history characteristics) on whether the fishery is consistent with sustainable fishing goals.

Assessment of Performance

State law and policy mandate management for MSY except where harvest allocation issues adjudicated by the BOF give rise to a lower or higher escapement target. In many, but not all, cases management objectives are defined and codified in BOF management plans. Clearly the ability to manage for a defined escapement level and thereby assure sustainability of all the fishery components hinges on an understanding of the population dynamics of the local salmon stocks and their interaction with the associated ecological community. Historically the department was involved in numerous activities to monitor the production and survival of the principal salmon stocks. Such activities include catch and escapement sampling for biological characteristics, fry and smolt studies, spawning timing and distribution, etc. Although greatly reduced due to fiscal constraints some of these activities are still conducted.

Stock status, generally in the form of a pre-season harvest outlook or more detailed forecast, is still reported for some important fishery components. In some cases the information is provided to the BOF for their review in setting regulations for subsequent seasons.

Strengths relative to this indicator:

- There are many long-term databases that represent a broad knowledge of Alaska salmon population dynamics.
- There are well-established sampling methodologies for some of the major fisheries.
- The management system has a very high success rate in achieving target escapements, and conducting orderly harvests of surplus stocks.

Weaknesses relative to this indicator:

- Fiscal limitations have resulted in widespread program reductions in recent years and many of the projects that contribute to an understanding of stock dynamics and current stock status were casualties in the budget cuts.
- There is no formal stock status report protocol.
- There is very little work done to assess the stock status of non-target or weak stocks in mixed stock fisheries.

Recommendations

Increased funding for data gathering, analysis and a formal stock status report process is very important and may become more so in future years when production and survival are less robust than in the recent past.

7.3.6 Performance Indicator 3F

The management system incorporates and implements a research program – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely manner.

SCORE = 84

This performance indicator evaluates the methods by which the management system identifies information needs and develops and implements a research plan. It assesses the consistency of the plan with the scale and intensity of the fishery and evaluates how and when results are disseminated.

Elements considered in scoring include:

1. Does the management system have a research program that provides all necessary technical information so that the rule-making body makes timely decisions consistent with current biological information.
2. Is the planning and funding of the research program adequate to assess fishery impact on target and non-target stocks and the associated biological communities?
3. Does the research program provide timely data to assure continued high productivity and broad environmental protection?
4. How are the results distributed or made available to stakeholders?

100% Scoring Guidepost

The management process contains a research component that addresses all current/relevant information needs for management and is sufficiently flexible that it can address any unanticipated biological changes or changes in the fishery.

80% Scoring Guidepost

The management process contains a research component that provides for the collection and analysis of information vital to short and long-term management needs.

Assessment of Performance

In general, many of the functions that are described under the previous criteria dealing with monitoring the fishery and the target stocks are termed research by the management agency. The department does

have scientific staff assigned to the headquarters and regional offices and occasionally the area offices. Some examples of their research activities include the development and implementation of acoustic fish counters, limnological studies, tagging of wild and hatchery juvenile fish to determine migration pattern and interception, development of stock specific spawner-recruit models and the cataloging of allelic frequencies for possible use in stock identification.

While the department has adequate programs to address some major information needs in the short run, fiscal constraints have prevented much needed research from being conducted. A comprehensive program would identify the studies that are needed to further the understanding of the impacts of fishery management on non-target stocks and the associated community, expand the knowledge of stock specific spawner-recruit relationships and better understand the response of salmon populations to climatic changes and environmental perturbations. There is no overall long-term research plan. The annual budget request to the legislature constitutes the research program planning for the agency.

Strengths relative to this indicator:

- A decentralized research function exists that provides adequate information to the management system for recent years fishery and environmental conditions.
- Basic research activities being conducted by universities and federal agencies are providing some important information.

Weaknesses relative to this indicator:

- There is no umbrella research program and no long-term plan that defines needed research.
- Present research is limited in scope due to budget limitations.
- The results of research studies are not consistently reviewed and published. Many are published within the gray literature and have limited availability outside the agency.

Recommendation:

- Develop a comprehensive research program with a planning horizon substantially beyond the budget request cycle.
- Improve the research report, review and publication process.

7.3.7 Performance Indicator 3G

The management system specifies measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:

- setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and
- account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
- identifying appropriate fishing methods that minimize adverse impacts on habitat, especially in critical or sensitive zones such as spawning or nursery areas;
- providing for the recovery and rebuilding of depleted fish populations to specified levels within specified timeframes;
- having mechanisms in place to limit or close fisheries when designated catch limits are reached; establishing no-take zones where appropriate.

SCORE = 95

This performance indicator evaluates the management systems ability to use a wide variety of fishery management tools to assure catch levels consistent with sustainable fishing at high productivity levels while protecting non-target species/stocks, minimizing adverse habitat impacts and protecting and rebuilding depleted populations.

<u>Elements considered in scoring include:</u>

1. Does the management system specify and the rule-making body utilize methods and strategies that assure catch levels consistent with high productivity?
2. Do these methods and strategies recognize and protect non-target stocks and species?

3. Does the management authority utilize no-take zones; catch limits, and closed fishing times/seasons to control the fishery?
4. Do fishing methods minimize adverse environmental impacts, recognize critical and sensitive habitat and provide for the planned rebuilding of depleted stocks?

100% Scoring Guidepost

The management system contains all the measures noted in criterion 3G and has demonstrated their availability in actual practice.

80% Scoring Guidepost

The management system has adequate measures and strategies available to effectively control exploitation of the resource.

Assessment of Performance

As previously discussed, the state is divided into management areas. Within each area the BOF has delineated fishing districts, and in many cases sub-districts, to facilitate management. In general districts are in-shore and as near as feasible to the river to which the target stocks are migrating. Fishing outside designated districts is illegal. Individual fishing districts or sub-districts may be opened or closed by regulation or Emergency Order to efficiently harvest target stocks and assure escapement.

The BOF defines fishing seasons and often schedules days and or hours for fishing to be open in a certain district. These are routinely altered in-season as the run develops through emergency orders. The Board defines legal gear, vessel size limits and catch reporting requirements. These regulations are generally not modified during a fishing season. In some cases the Board has adopted management plans that define limit reference points and/or target reference points. These plans often provide guidance to the fishery managers regarding catch allocation matters, dealing with mixed stock harvests or harvests of hatchery fish. Based on the Escapement Goal Policy , it is clear to managers that their

first priority is protection of spawning stocks at levels consistent with MSY, a lower sustainable level, or a higher optimal level if guided by a BOF management plan.

Although the management system has a limited number of projects intended to identify non-target stocks and species in the commercial fisheries, the current statewide program appears to be adequate to assure sustainability under current conditions. The system is highly successful in achieving stated escapement targets while protecting most secondary or non-target stocks by using the full array of management tools provided in law and regulation. Cases where stocks have become depleted are infrequent and typically result in regulatory changes to provide protection.

The Board does have the authority to identify and protect critical habitat. The location of fishing districts also avoids such areas. The gear types utilized in the Alaska salmon fishery combined with the location of the districts serve to minimize the impact on habitat.

Strengths relative to this indicator:

- There is a full range of fishery management strategies available to and utilized by the BOF and the management agency.
- An Escapement Goal Policy has been adopted requiring conservation of salmon stocks, including weak stocks and non-target stocks. This policy is scheduled for adoption into regulation in January, 2001.
- Fishing methods and locations serve to minimize adverse environmental impacts and to protect critical and sensitive habitat.
- The management system has demonstrated the ability and willingness to close fishing areas and seasons to protect depleted stocks.

Weaknesses relative to this indicator:

- Fiscal limitations have caused curtailment of many activities needed to identify river of origin in mixed stock fisheries and this may compromise the agencies ability to protect weak stocks in some fisheries.

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- The Escapement Goal Policy focuses on existing escapement targets and the potential for catch allocation conflicts, and does not fully address the need for expansion of monitoring programs and the development of spawner-recruit models for additional stocks.

Recommendation:

Identify and prioritize the additional stocks for which escapement and production data need to be gathered or reviewed in order to increase the number for which escapement objectives have been defined.

7.3.8 Performance Indicator 3H

The management system contains appropriate procedures for effective:

- compliance,
- monitoring,
- control,
- surveillance,
- enforcement.

These measures ensure that established limits to exploitation are not exceeded and that corrective actions are taken when it is.

SCORE = 88.5

The intent of this performance indicator is to evaluate the management systems ability to implement its fishing rules and to assure that fishing operations comply with those rules. It assesses the management

systems ability to control illegal fishing activities and assure its adherence to the MSC conservation principles.

Elements considered in scoring include:

1. Does the management system include an effective method of surveillance and monitoring of the fishing operations to determine the rules are being observed?
2. Does the management system have adequate resources and strategies to enforce the fishery rules?
3. Is the management system able to estimate the degree of non-compliance with the fishing rules and to estimate the illegal removal of resources?
4. Does the non-compliance with fishing rules compromise the ability of the management system to meet the goals and objectives of the fishery or conservation principles of the MSC?

100% Scoring Guidepost

The management system has the resources and enforcement strategies to ensure that illegal fishing is negligible.

80% Scoring Guidepost

The management system has adequate resources to ensure compliance of the regulatory regime at a level that does not jeopardize its ability to adhere to the conservation principles of the MSC.

Assessment of Performance

Enforcement of the Fish and Game Code and associated regulations of the BOF is primarily the responsibility of the Department of Public Safety, Division of Fish and Wildlife Protection. That organization has faced substantial budget reductions in recent years and the availability of sworn officers to enforce the regulations has been severely limited. Fish and Game biologists and technicians

are sometimes trained and deputized to undertake enforcement activities but this is always secondary in importance to their fishery management activities.

The size and geography of the Alaska salmon fishery requires that staff involved with management and monitoring of the fishery areas travel almost continuously around their management area by boat, light plane and land vehicles to accomplish their jobs. Although they may not be as "high profile" as uniformed officers, their presence does serve as a deterrent for violators. Further, they are often able to identify potential problem situations and the uniformed officers can then focus their limited resources on the situation.

Most commonly, commercial fishery violations seem to be fishing "over the line", often near but not quite within the legal area, and fishing during closed days or times. Although such activities are clearly illegal, it is believed that the fish are sold through normal means and therefor reported along with the legal harvest. This fact combined with the agency's escapement based management serve to minimize the likelihood that these activities would compromise sustainability. Cases where fish are illegally removed from river systems or spawning grounds appear to be infrequent.

It can be argued that the need to station the enforcement staff in or near the fishing areas to enforce season, time and area rules prevents the management system from recognizing other, potentially more severe violations that may occur some distance away. There is limited information on this but is believed that there is no large-scale or systematic problem that would endanger sustainability.

Strengths relative to this indicator:

- The locations of the fishing areas combined with the strategies of the management system make surveillance and enforcement relatively straightforward.
- The most common violations do not compromise sustainability due to escapement based management.

Weaknesses relative to this indicator:

- It is likely that the number and severity of fishing violations may increase if and when poor fish production or survival is encountered and fishing is curtailed. Resources for surveillance and enforcement may be inadequate when that occurs.
- The management system is not able to estimate the degree of non-compliance and its impact on fish stocks due to budgetary limitations.

Recommendation:

Concerted efforts should be made to obtain adequate funding to assure enforcement levels are commensurate with the value and intensity of the fishery.

Relative performance of the indicators for Element 3

Utilizing the judgement-based weighting protocol described in Sections 6.2.1 and 6.2.2 of this report, the Evaluation Team arrived at cardinal indices of relative importance for the performance indicators associated with MSC Principle 3. These weights of relative importance were derived using AHP's paired comparisons as to the relative importance of each indicator. The derived weights represent the team's collective judgement as to the extent to which each indicator should contribute to the overall evaluation of Alaska's commercial salmon fisheries.

Indicators	**Normalized Weight**
3A	0.14
3B	0.06
3C	0.07
3D	0.16
3E	0.13
3F	0.11
3G	0.17
3H	0.16

Importance-weighted aggregate score for Element 3

Multiplying the indicator scores by their respective weights of relative importance and summing the scores across all indicators yields an overall normalized, weighted score for this principle of:

91

As this computed score exceeds the 80-point threshold for certification, the general conclusion to be reached is that, over the breadth of issues and considerations included in the MSC Principle 3A, Alaska's commercial salmon fisheries are being managed with a rigorously structured system. Though the overall performance falls well within the range required for certification, there are nevertheless areas for improvement that are outlined as weaknesses under each indicator.

7.4 ELEMENT 4 - FISHING OPERATIONS

Note: the criteria under Principle 4 were originally a sub-component of the MSC's Principle 3. The fishery should be conducted in a manner that encourages the efficient use of available resources, avoids waste, promotes economic viability, and provides a wide rage of environmental and social benefits.

It is important to note this entire element was drafted with the intent that the fishing industries seeking certification adopt a stewardship role consistent with the FAO Code of Conduct and the principles enunciated by the MSC. It is a role that many fishing industry sectors have traditionally left to the management agency, but which the MSC feels the harvesters and processors of the oceans fisheries should play a more important and positive role in promoting efficient use of the oceans' living marine resources and their appropriate conservation.

7.4.1 Performance Indicator 4A

Fishing operations shall make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target sizes, age, and/or sexes of target species), minimize mortalities of this catch where it can be avoided and release the discards where it can be released alive.

Score = 80

Intent

The intent of this performance criteria was to encourage the fishing vessel operators, associations, processors and buyers to promote institutional polices and educational programs designed to reduce discarded bycatch and to improve its survival after discard.

Elements considered in scoring

1. Evidence in the actions of the industry demonstrating their sensitivity to the potential impacts of bycatch on the ecosystem and actions taken to encourage fishing operations consistent with this performance indicator.

2. Information showing that the industry has adopted or endorsed conservation and operational modes to reduce bycatch, particularly to reduce the take of threatened and or endangered species.

3. Evidence that the levels of discarded bycatch is being reduced and or takes of threatened and endangered species are at levels consistent with permits.

<u>100% Scoring Guidepost.</u>

There are requirements in the management system, such that all discarded species are released alive, if feasible.

<u>80% Scoring Guidepost</u>

- Fishing operations are conducted in a manner that minimizes capture of non-target species or the sizes, ages, or sex of non-target or target species.
- Non-target species released have a high survival rate.
- Mortalities imposed on non-target species have no known significant negative impacts on the community of fish and wildlife that coexist in the region of the fishery.
- There is evidence that elements of the fishing industry have actively supported the reduction in the capture of discarded bycatch.

Assessment of Performance

As noted earlier the vast majority of bycatch species taken are other salmon taken in association with the dominant managed species of a fishery. As these species are marketed in a sense they are secondary target species that are managed in association with the dominant species harvest regime. This strategy is total in the hands of the management agency and hence not subject to change- except through the hearing process. The quantities of non-target species taken in the salmon fishery, including marine mammals and birds can be affected by the harvesting and processing sectors. The certification team is aware that sectors of the salmon industry have promoted and adopted conservation policies, which incorporate the concept of reduced waste of species harvested and discard of bycatch. It is, however less evident that there has been an active program to encourage and implement active programs in the industry to achieve this performance criteria, .the exception being a major industry effort designed to reduce illegal shooting and killings of Steller sea lions.

Strengths relative to indicator:

- Adoption of NFI conservation and stewardship principles.
- Industry efforts through advertisements to stop killings of Steller sea lions
- Fishing gears used have harvested only small quantities of fish and invertebrate species caught as bycatch, other than secondary salmon bycatch species.

Weaknesses relative to indicator:

- There does not seem to be any active industry (harvesters or processors) efforts to assist state managers in developing a comprehensive understanding of bycatch in the various salmon fisheries.
- Most industry efforts undertaken by the salmon fishing and processing sectors are designed to identify bycatch and discards of salmon in non-salmon fisheries. Efforts to document bycatch within the salmon fishery are not evident.

Recommendations:

The fishing industry working in cooperation with the ADF&G should organize an overall effort to help improve the state of knowledge on bycatch and discards in the Alaskan salmon industry through education, development of more selective fishing gear gears and or harvest strategies.

7.4.2 Performance Indicator 4B

Fishing operations implement appropriate fishing methods designed to minimize adverse habitat impacts, especially in critical or sensitive zones such as spawning grounds and nursery areas.

Scoring = 93

Intent

This performance criteria evaluates industry contributions to the deployment of fishing methods that are not likely to negatively impact the environment.

Elements included in scoring

1. The types of fishing gears utilized to harvest Pacific salmon in the streams, rivers and marine waters of Alaska

2. Evidence that the fishing gears employed, as a whole or individually, does not cause damage to known salmon habitats.
3. The extent of impacts if known and identified.
4. Knowledge of the quantities of fishing gear lost in the environment and which may contribute to ghost fishing.

100% Scoring Guidepost:

All fishers:

- utilize legal fishing gears,
- employ captive techniques that completely avoid adverse impacts on habitats, and
- avoid operating in critical areas.

80% Scoring Guidepost

Fishing operations minimize habitat impacts and there are no demonstrated negative consequences of the gears employed.

Assessment of Performance

There are four major fishing gears deployed to harvest Alaskan salmon, set and drift gill nets, purse seines and troll (hook and line gear). With the exception of set gill nets, the gears deployed are for the most part, not in contact with stream, and riverbeds, or the seafloor in the regions they are deployed. Further, none of the gears are powered over the bottom. The set and gill nets are passive fishing gears, while troll and purse seine methods are actively powered during fishing operations. Occasionally, pieces or sections of the fishing gear may be lost, but they are not considered a significant component of marine debris found in the region. We found no documented reports of detrimental impacts of salmon fishing gears. In addition, there were a number of publications that indicated that lost nets in these areas were not of major concern since as stated earlier, entire nets are less often lost compared to pieces or sections of nets.

Strengths relative to indicator:

- The fishing gears deployed do no actively interact with the seabed.
- The fishing gears deployed are not known to be treated with toxic materials.
- The fishing gears deployed are not allowed to be fished on spawning grounds and are only infrequently fished in freshwater rearing areas.

Weakness relative to indicator:

There is an absence of scientific information dealing with this subject with respect to salmon fishing gear. However, this may reflect the lack of perceived impacts.

Recommendations

None

7.4.3 Performance Indicator 4C

Fishing operations do not use destructive fishing practices such as fishing with poisons or explosives.

Scoring = 86.5

Intent

The intent of this performance indicator is to insure fishing methods that are destructive, negatively impact environment, or which are non-selective in terms of species or their size or sex, are not utilized in the harvest of the resource in question.

Elements considered in scoring:

1. Is there any evidence that the management agency authorizes the use of disruptive fishing gears?
2. Are there known instances where destructive fishing practices are used and are they considered to be common place in the fishery?

100% Scoring Guidepost:

The management authority can provide evidence showing that there are no destructive fishing practices authorized and the fishing industry has not been documented as using destructive fishing practices.

80% Scoring Guidepost:

- Destructive fishing practices are not permitted by the management authority and the laws governing their use are effectively enforced by the management agency.
- Processors are not known to buy fish from harvesters using destructive fishing practices.
- Fishers' organizations actively discourage destructive fishing practices.

Assessment of Performance:

Discussions with fish managers, industry elements, NGOs were unaware of any authorized use of destructive fishing practices and there was no anecdotal information, which identified the use of explosives or poisons. The issue does not seem to be a concern of the stakeholders. No individual or group contacted raised destructive fishing practices as a problem.

Strengths relative to indicator:

Not identified as a problem within the fishing community, fishery managers, NGOs or scientists contacted. No known reports on the matter were identified.

Weaknesses relative to indicator:

The management area is so vast and enforcement spread so thin that destructive practices could be used without detection.

7.4.4 Performance Indicator 4D

Fishing operations minimize operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.

Score = 88

Intent

The intent of this indicator is to promote fishing operations that do not result in environmental degradation.

Elements considered in scoring

1. Reports of fishing vessel or processor waste disposal into the freshwater or marine environments.
2. Reports of lost salmon fishing gear adding to the problem of marine debris.
3. Inability of harvesters to offload catch which may lead to waste.
4. Observations of stakeholders regarding gear losses or oil spills from fishing vessels.

100% Scoring Guidepost:

- The management authority and fishing industry can provide evidence that waste, oil spills and gear losses are negligible.
- The catch is handled according to high industry or government standards such as HACCP.

80% Scoring Guidepost:

- The management authority and industry sectors can provide evidence that waste, gear and environmental contamination are identified as factors of concern and there is an effort made to minimize these where possible.
- Fishing organizations promote proper catch handling procedures.
- Processors promote high standards in the purchase and processing of fish products.

Assessment of Performance:

This was a difficult performance indicator to judge as most of the information available is of an anecdotal nature. It is apparent that in some years there are spoilage losses when catches are larger than anticipated and processors become backed up. There are also questions regarding some waste disposal procedures utilized by some processors. However, industry, in general, seems to avoid such losses and in more recent years has improved disposal of waste product through conversion of such product into meal, etc. There is room for improvement.

Strengths relative to indicator:

- Industry elements have adopted new NFI policies that are consistent with the goal of this performance criterion.
- Environmental quality throughout most of the salmon habitats in Alaska is good.
- A number of the fishing organizations and processors promote proper handling and care of fish landed.
- There are state and federal laws that govern behavior of fishers and processors related to the indicator.

Weaknesses relative to indicator:

- There is little documented data available to evaluate this performance indicator.

- The quantities of harvests as waste are related to run abundance and product demand and can be affected by an established fishing regime. Not all harvested salmon species are marketable at agreeable prices.

Recommendations

The industry and harvesters convene at least one workshop to evaluate how to utilize the available catch in a manner that does not lead to product loss or waste.

7.4.5 Performance Indicator 4E

Fishing operations are conducted in compliance with the fishery management systems in place and adhere to legal and administrative requirements.

Score = 83

Intent

The basic intent of this performance indicator is to insure that extensive illegal fishing does not prevail, preventing managers from achieving sustainable yield goals and the social and economic objectives of management.

Elements considered in scoring:

1. The level of reported illegal fishing.
2. The extent which illegal fishing prevents managers from meeting escapement goals.
3. The commitment of fishers' organizations and processors to prevent illegal fishing activities.

100% Scoring Guidepost:

- The management authority can provide evidence that illegal fishing does not exist.
- All fishing operations are conducted as prescribed by law and by industry standards for sound fishing practices.
- All harvest is reported as required by law.

80% Scoring Guidepost:

The enforcement and management authorities estimate that less than 5% of the total harvest is unreported or taken illegally.

Assessment of Performance:

The general evidence is that illegal fishing constitutes a very small fraction of the landed catch. However, the management goal is to achieve a desired escapement goal and this goal is normally achieved regardless of illegal fishing activities. The reported and documented successes of fishery management to achieve escapement goals suggest illegal fishing has not been a major factor in Alaska fishery management.

Strengths relative to indicator:

- The state and federal enforcement activities and the manner in which fisheries are confined to prescribed areas and times has facilitated monitoring and enforcement of the regulatory regimes.
- The reported number of illegal fishing appears to account for a small fraction of the overall catches in the dominant fisheries of the region.
- Success of the overall management in achieving escapement goals suggests illegal fishing has not prevented managers from reaching their conservation and socio-economic goals.

Weakness relative to indicator:

The enforcement capabilities are minimal when one considers the geographic region over which the fishery operates. If there was significant stakeholder opposition to the management procedures, one can assume that illegal fishing could constitute a major problem.

Recommendations

The industry should consider joining with other stakeholders in forming of a peer group that would help ADF&G and federal authorities enforce salmon fishing regulations.

7.4.6 Performance Indicator 4F

Fishers and processors assist and cooperate with management authorities in the collection of catch, discard and other important information necessary for the effective management of the fishery and resources

Score = 79

Intent

It is the intent of this performance indicator to encourage fishers and processors to work with, and facilitate, the collection of information that is needed for effective resource management.

Elements considered in scoring:

1. Evidence that the industry actively supports and enhances the ability of ADF&G and other responsible management agencies in the collection of catch statistics, bycatch information and data on catches of non-target threatened and or endangered species.
2. Organized industry efforts designed to improve the general management of the fishery.

100% Scoring Guidepost:

All fishermen and processors comply with agency requests for logbook programs or other data gathering methods that provide the types of information necessary for timely and adaptive management.

80% Scoring Criteria:

Sufficient numbers of fishers comply with requests for information through voluntary log book programs, or other such data gathering methods, such that the data are adequate and reliable enough to support necessary management activities.

Assessment of Performance:

There is general agreement among managers and stakeholders that industry elements are generally supportive of state and federal efforts to collect statistical and other information required to achieve escapement goals. However, industry efforts to assist in the development of information that is important to ecosystem management is lacking. We see no evidence of any major industry effort to assist managers in the collection and identification of non-target species, other than other salmon species, that are taken in gill net, set net, purse seine and troll fisheries.

Strengths relative to performance indicator:

- Industry members interviewed have a positive attitude regarding documentation of fishing activities
- The fishers and processors complete dockside documentation of catch by gear type, area, and fishing time.

Weakness relative to performance indicator:

The evaluation team, while acknowledging the troll fishery logbook program, observer programs, and participation in test fisheries, believes more assistance could be provided to department managers by the fishing industry in the collection and documentation of information necessary for the documentation of non-salmon by-catch.

Relative performance of the indicators for Element 4:

Utilizing the judgement-based weighting protocol described in Sections 6.2.1 and 6.2.2 of this report, the Evaluation Team arrived at cardinal indices of relative importance for the performance indicators associated with MSC Principle 3B (Element 4). These weights of relative importance were derived using AHP's paired comparisons as to the relative importance of each indicator. The derived weights represent the team's collective judgement as to the extent to which each indicator should contribute to the overall evaluation of Alaska's commercial salmon fisheries.

Indicators	**Normalized Weight**
4A	0.22
4B	0.10
4C	0.08
4D	0.14
4E	0.32
4F	0.14

Importance-weighted aggregate score for Element 4

Multiplying the indicator scores by their respective weights of relative importance and summing the scores across all indicators yields an overall normalized, weighted score for this principle of:

As this computed score exceeds the 80-point threshold for certification, the general conclusion to be reached is that, over the breadth of issues and considerations included in this Principle, Alaska's commercial salmon fisheries are being managed reasonably well. Though the overall performance falls well within the range required for certification, there are nevertheless areas for improvement that are outlined as weaknesses under each indicator.

8.0 TRACKING, TRACING FISH AND FISH PRODUCTS

No analysis was performed to determine the chain of custody of Alaska salmon from boat to processor or from processor to customers.

9.0 CONTROVERSIAL ISSUES

9.1 Identification and discussion of controversial issues

The management tasks of the ADF&G are immense and the numbers of stakeholders involve various gear groups, native and non native-interests, sports fishermen, non-resident fishermen, NGO's, as well as the general public. Most Alaskans consider themselves expert on fisheries and fish conservation matters. The management process also encourages participation of stakeholders in the formation of new laws governing both allocation and conservation issues. It is then not unexpected that a number of local, inter regional and international views are held, which are in conflict with the management agency's (ADF&G) actions, policies and performance. We have evaluated a variety of comments made to the certification group in the conduct of work; however, we feel that relatively few bear on the question of certification of the Alaskan management process.

We have identified the issues listed below as being controversial and which could bear on certification.

1. State management actions have not responded to the U.S./Canada Salmon Agreement.

2. Management of fish culture activities, largely in Prince William Sound, may negatively impact wild stocks in the region.

3. The escapement and catch data for Yukon-Kuskoquim region is inadequate for effective management.

4. Conduct of the marine interception fisheries, largely in statistical area M, may generate management problems in other regions.

5. Inadequacy of the research, habitat and enforcement personnel limits the State's capacity to effectively manage the salmon fisheries of the region

6. Increased federal authority and management of stocks in areas under federal jurisdiction could lead to confusion and erosion of the current management process.

9.2 General Discussion of Controversial Issues

1. The certification group heard a number of complaints, mostly from Canadian sources, in regards to the manner ADF&G has responded to the International Salmon Agreement. There was a strong sense among some stakeholders and fisheries interest in Canada, that failure of the earlier agreement of 1985 was the result of excessive interceptions of Canadian fish by Alaskan fishermen. However, we did not feel that the reviewers were in a position to evaluate the claims and counter claims regarding treaty violations. The team noted that disputes over the levels of interceptions and "equity" have prevailed for several decades and that the level of nation commitment to conservation and equity elements of the treaty continue to plague user acceptance of the Agreement. The manner in which the treaty participants have conformed to their treaty obligations has been in a continued state of debate, which has demanded the time of key politicians, fishery managers, and fishery scientists for decades. Although the team recognizes the potential danger of this continued riff to effective management of interceptions fisheries, it did not feel competent to sort out and allocate blame among and between the two sides. We know that a

new and modified treaty is now in place and adherence to its Articles will have to be evaluated over the next several years. Examination of the annual Chinook harvest and treaty quota arrangements over the last several years does not indicate a significant interception above those agreed upon.

2. Over the past several decades Alaska has developed an extensive hatchery/open ranging culture activity, primarily located in Prince William Sound. There are concerns among some fisher groups and scientists that interbreeding between strays from the hatchery system may lead to lower "fitness" of the wild stocks in the region. There are also claims that local wild populations in the region have already suffered as a result of competition for available food, etc. However, other scientists feel that adequate safe guards are in place to prevent significant harmful interaction. The issues need constant evaluation by the State.

3. Some fishery managers and a number of stakeholders are concerned that the level of state management and the number of scientists assigned to the large salmon river systems, such as the Yukon and Kuskoquim, are inadequate to effectively monitor escapement levels for the dominant and secondary salmon species in these watersheds. We are of the opinion that the criticism is legitimate, however, note that this concern extends throughout the area of management responsibility for the State. Further, the political process that funds the agency, may in the face of the successful management history, not be as responsive as desired by the agency.

4. Considerable concern was expressed by some stakeholders, as well as some scientists, that the fishery conducted in the offshore areas along the outer Peninsula and Aleutian Islands, exploit mixed stocks which enter watersheds south of the chain, from the Bering Sea and Bristol Bay, as well as stocks bound for Asia. However, it is not apparent to the reviewers there is evidence that these fisheries are causing a conservation problem in other regions. However, they do promote allocation disputes. Better documentation of the bycatch and origin of stocks could help sort out appropriate management actions.

5. There was general complaint that the State does not provide the funds necessary to fulfill its stewardship responsibilities. We suspect complaints of this sort will be universal with regards to funding research, management and enforcement.

6. The State is currently undergoing jurisdictional changes with increased federal responsibilities in regards to subsistence fisheries and management on federal lands. While we recognize that both state and federal laws clearly establish a subsistence use priority in fishery management, we cannot predict the long-term consequences of the growing partitioning of management responsibilities, but urge the MSC follow this development over the next decade.

10.0 ISSUES FOR CONTINUED CERTIFICATION

It is the assessment team's consensus judgement that the management of Alaska's commercial salmon fisheries passes the certification evaluation based on its overall compliance with the MSC Principles and Criteria. On balance, the team was quite favorably impressed with the management system and the resource sustainability of the fishery as they pertain to the Principles and Criteria of the MSC.

There are notably some issues that need further clarification, as well as issues within Alaska's management system that the evaluation team believes need to be strengthened to ensure that the management of Alaska salmon stays on course in maintaining "sustainability".

The Assessment Team finds that the state of Alaska will have to agree to meet the following general requirements for continued monitoring after the initial certification:

10.2 General Requirements for Continued Certification

- ADF&G must recognize that MSC standards require regular monitoring inspections at least once a year, focusing on compliance with the requirements set forth in the report (as outlined below) and continued conformity with the standards of certification.

- ADF&G must recognize that MSC standards require re-evaluation for certification purposes (as opposed to yearly monitoring for update purposes) on a five-year cycle.

10.3 Specific Requirements for Continued Certification

In addition to the general requirements outlined above, Alaska also must agree in writing through a Memorandum of Understanding with SCS to meet specific requirements with recommended timelines as described below.

10.3.1 Performance Indicator 1E - Target Reference Points

Within 3 years of certification the Alaska Department of Fish & Game must:

1 Determine the number of salmon spawning stocks or spawning stock aggregates in the state that are managed on the basis of (1) escapement goals determined by stock-recruitment analysis, (2) escapement goals determined by average escapements, and (3) no established escapement goals.

2 Categorize each spawning stock or spawning stock aggregate according to relevant characteristics such as: whether it is a mixed stock fishery, the number of individual stocks exploited, methods used to estimate escapement, whether escapement goals were based on data before or after the mid-1970s, and whether the monitored stocks exploited in the mixed stock fisheries are representative of unmonitored stocks exploited.

3 Present the distributions in terms of the number of spawning populations, the number of fish, and the economic value of the fishery.

10.3.2 Performance Indicator 1F - Limit Reference Points

1 Within 3 years after certification ADF&G must provide an explanation to the certification body about how Alaska salmon fisheries will continue to be sustainably managed even if there is an

event that changes ocean survivals back to rates equivalent to those seen in the 1950s, 1960s, and 1970s. The explanation provided should at a minimum include:

a) What types of analyses are being conducted to understand how potentially lower ocean survival rates effect population abundance and commercial catches (use stock recruitment data where available).
b) An assessment of the projected distribution of catches over spawning populations, the distribution of fisheries that would be shut down, and the socio-economic impact.
c) A description of how ADF&G would respond to these conditions and to well-reasoned arguments that most escapement goals are arbitrarily set at an average level, therefore are not based on population dynamics and should be lowered.
d) A description of the department's response to poor salmon survival conditions experienced historically including the 3 years in the early 1970s.

2 Within 1 year after certification ADF&G must provide evidence to the certification body that the joint stock status report for northern coho required by the Pacific Salmon Treaty is being undertaken in a timely and cooperative manner. This can take the form of presenting the certification body with ADF&G's portion of the report, or presenting copies of the correspondence from ADF&G to the appropriate PST representatives regarding progress being made.

3 Within 2 years after certification ADF&G must present to the certification body an explanation of why ADF&G believes the stocks being co-managed under the PST are considered sustainable based on the current management paradigm.

10.3.3 Performance Indicator 2A - Bycatch and discards:

1 Within 3 years after certification the state must implement a sampling program to identify major non-salmon fish species, birds and marine mammals taken in the salmon net fisheries of the State. The program should be designed to provide a reasonable understanding of fish, shellfish, birds and marine mammals taken incidentally in the fisheries. This requirement can be met in a number of

ways. For example, one solution is that the sampling program may involve collection of bycatch information in the course of the department's test fisheries, and reference to similar data collected by the National Marine Fisheries Service. The certification body is not requiring any specific method, merely evidence that ADF&G is utilizing some process to collect the necessary information to adequately understand bycatch in the net fisheries.

2 Before 5 years pass after certification, ADF&G must provide evidence and a summary regarding its findings on bycatch of non-salmon species taken in the Alaskan salmon fisheries to an accredited certification body.

10.3.4 Performance Indicator 3C - Management system incentives and subsidies for sustainable fishing

1 Within 2 years of certification ADF&G must present information to the certification body reporting on progress made by the Commercial Fisheries Entry Commission on reducing the number of permits to the numbers determined to be consistent with the limited entry law on an annual basis.

2 The Department must identify long-range research needed to assess the magnitude of the interaction of hatchery programs on the wild stock gene pool and the effect on the reproductive fitness of those stocks. The department must document the programs, policies and regulations and statutes as well as specific actions taken to assure the consistency of the hatchery program with the Genetics Policy.

10.3.5 Recommendations

Along with the general and specific requirements that Alaska would be required to agree to in a formal written document, there are a number of other factors that the Assessment Team believes could be beneficial to strengthening the management of the commercial salmon fisheries. While these are not formal requirements for continued certification, the Assessment Team believes they are worthy of special mention:

2B - Theoretical studies of the implication of long term climatic changes on the productivity of salmon and dependent species is encouraged.

2C - ADF&G should join with the NMFS and PSC and provide salmon "take" levels for listed ESA species on an annual basis.

3A - Establish through letters of understanding or other formal administrative means a system to delineate areas of federal and state responsibility and authority, share historical and real-time data, provide management expertise and inform the public explicitly how and by whom the various fishery components will be managed.

3B - Loans for use in fully exploited and over-capitalized fisheries should be considered in light of the effect on the continued sustainability of the fishery. To this end, it would be useful if ADF&G could help educate loan program managers about conditions within the area to be fished when reviewing applications for purchasing or upgrading vessels or gear.

3C - The review, editing and dissemination of area management reports should be standardized and reasonable timeframes established. Also, increased funding for staff and monitoring projects is essential. Without adequate data the management system may be unprepared for salmon returns that deviate from those of the past several years.

3D - Increased funding for data gathering, analysis and a formal stock status report process is very important and may become more so in future years when production and survival are less robust than in the recent past.

3E - Develop a comprehensive research program with a planning horizon substantially beyond the budget request cycle. Also, improve the research report, review and publication process.

3F - Identify and prioritize the additional stocks for which escapement and production data need to be gathered or reviewed in order to increase the number for which escapement objectives have been defined.

3G - Concerted efforts should be made to obtain adequate funding to assure enforcement levels are commensurate with the value and intensity of the fishery.

4A - The fishing industry working in cooperation with the ADF&G should organize an overall effort to help improve the state of knowledge on bycatch and discards in the Alaskan salmon industry through education, development of more selective fishing gear gears and or harvest strategies.

4B - The industry and harvesters should convene at least one workshop to evaluate how to utilize the available catch in a manner that does not lead to product loss or waste.

4C - The industry should consider joining with other stakeholders in forming of a peer group that would help ADF&G and federal authorities enforce salmon fishing regulations.

11.0 SUMMARY

The issues noted in Section 11 - Controversial Issues along with those listed under the heading "Requirements for Continued Certification" found at the end of the performance assessments in Section 9 and summarized in this section (Issues for Continued Certification) summarize the evaluation team's concerns. All of these issues bear close scrutiny and therefore form the basis for a continued monitoring program of Alaska salmon management.

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