STATE OF THE SALMON

KNOWLEDGE ACROSS BORDERS ЗНАНИЕ СКВОЗЬ ГРАНИЦЫ 国境を超えた知識

To: The Marine Stewardship Council (MSC) and Scientific Certifications Systems, Inc.
Date: May 20, 2005
Re: Submission of Comments on MSC's Evaluation of Alaska Salmon Fisheries Units of Certification and Scoring Guidelines

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In response to the opportunity for public comment, State of the Salmon is submitting comments on the Marine Stewardship Council evaluation of commercially harvested Alaska salmon. The first stage of this assessment— the draft units of certification and scoring guidelines— is available for public viewing and comment at www.msc.org.

Summary of Findings

State of the Salmon recommends that MSC do the following:

I. Expand units of certification from the 12 proposed units to a minimum of **60 units** (number of districts by commercial species), with additional units added in certain districts to accommodate fisheries using different gear types. A larger number of individual units for Alaska is expected given Alaska's greater geographical scope relative to the BC certification. We feel this change will allow for more clarity in the review process. Under MSC Principles and Criteria, a fish stock is the entity to which fishing regulations are directed.

Our proposed refined units include

- **Southeast**- sockeye, pink, chum, Chinook, and coho
- **Yakutat**- sockeye, pink, chum, Chinook, and coho
- **Prince William Sound**- sockeye, pink, chum, Chinook, and coho
- **Cook Inlet**- sockeye, pink, chum, Chinook, and coho
- **Bristol Bay**- sockeye, pink, chum, Chinook, and coho
- **Yukon River**- sockeye, pink, chum, Chinook, and coho
- **Kuskokwim**- sockeye, pink, chum, Chinook, and coho
- **Kotzebue**- sockeye, pink, chum, Chinook, and coho
- **Norton Sound**- sockeye, pink, chum, Chinook, and coho
- **Kodiak**- sockeye, pink, chum, Chinook, and coho
- **Chignik-** sockeye, pink, chum, Chinook, and coho
- **Alaska Peninsula/ Aleutians**- sockeye, pink, chum, Chinook, and coho

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In addition, where size and sex selective gear are used (typically gill nets), the units will need to be expanded. For example in Prince William Sound sockeye are taken by both gill net and purse seine, and these fisheries are markedly different. Please note that the MSC defines "Units of Certification" as "the fishery or fish stock (=biologically distinct population unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock). "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 MSC Principle 1, Criterion 3)." Criterion 3 cannot be properly evaluated without identifying the fisheries by dominant gear type for each salmon species in the 12 geographic areas.

II. Improve scoring guidelines to address issues about habitat productivity and to incorporate best practices for monitoring and management of mixed stocks.

Historic Abundance and Current Status

In order to understand the story of Alaska salmon and their significance in Pacific Rim salmon fisheries, it is important to understand the historical and evolutionary context of the species. Scientists generally place the center-of-range for North Pacific salmon in the Gulf of Alaska, the epicenter of the three major refugia that endured during the last glacial maximum. In the area radiating outward from the Gulf of Alaska—as far west as Kamchatka , across the Bering Strait, in Southeast Alaska and British Columbia—*Oncorhynchus* spp, with the exception of masu, demonstrate greater speciation than anywhere else in the Pacific. (Augerot 2005).

The origin of the family salmonidae can be traced back to the progenitor of all modern trout and salmon, *Eosalmo driftwoodensis,* which inhabited the Yukon River some fifty million years ago in what was then the supercontinent Laurasia (Behnke 2002). Although the supercontinent eventually split off into North America, Greenland, Europe, and Asia, the salmon progenitor remained in these northern rivers, in what would eventually become Alaska. When the first humans arrived 10-15 thousand years ago, salmon were well established and had diversified into the major branches of the subfamily *Salmoninae*: *Brachymystax (*lenok), *Hucho* (taimen- only in Asia), *Salvelinus* (char), *Salmon* (Atlantic salmon), and the 7 species of *Onchorynchus* we find in Alaska today:

- *Oncorhynchus tshawytscha* or Chinook salmon
- *Oncorhynchus kisutch* or coho salmon
- *Oncorhynchus nerka* or sockeye salmon
- *Oncorhynchus keta* or chum salmon
- *Oncorhynchus gorbuscha* or pink salmon
- *Oncorhynchus mykiss* or steelhead
- *Oncorhynchus clarki* or cutthroat trout

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Alaska salmon populations are abundant chiefly because their habitat is in comparatively good condition. British Columbia and the lower 48 states have experienced dams, widespread timber extraction, human population growth to 16 million, 8 times the size it was in 1900, and, more recently, salmon farms all threaten the health of salmon streams, Alaska, however, has remained largely unaffected by such human-induced changes (Northwest Environment Watch- Cascadia Scorecard 2004). While salmon are now extinct in 40% of the rivers salmon historically spawned in across Oregon, Washington, Idaho, and California, Alaska continues to experience abundant salmon returns (Lichatowich 1999). Alaska regularly sees its total salmon catch near 200 million fish caught annually, four times the catch in 1959, the year Alaska state government took over management of the salmon resource.

Much of this salmon cornucopia can be attributed to effective management in Alaska. Indeed Alaska continues be a leader in terms of North Pacific salmon management and has, over the years, introduced a number of innovative management approaches that play a vital role in the state's abundant salmon returns. For example, Alaska mandated conservation of salmon stocks in its state constitution. Alaska has led the way with its in-season, local salmon management approach- later recognized and replicated among fisheries management agencies around the world. Alaska was also one of the first to introduce the harvest policy known as "fixed escapement," in which management's first priority is to ensure that sufficient numbers of adult spawning salmon escape capture in the fishery in the ocean and are allowed to spawn in the rivers, thus maintaining the long-term health of the stocks. Furthermore, Alaska has banned fin fish farming in its waters, recognizing the danger fish farms can pose to wild salmon runs.

Nevertheless, State of the Salmon's message to the Marine Stewardship Council and Alaska is: ***Alaska is not immune to the challenges experienced in salmon management and conservation of salmon fisheries in the lower 48 states and British Columbia.*** Declining salmon runs in Western Alaska, where most salmon habitat remains intact, is clearly a warning sign. Regional declines in chum salmon (*O. keta*) began in the Nome Subdistrict, progressed through the Seward Peninsula, and by the late 1990's had affected the majority of summer-run chum salmon populations returning to spawn in western Alaska. Salmon populations reached such low levels that the U.S. Secretary of Commerce declared the region a fisheries disaster on 8 August 2000. Sharply reduced pink returns plague southeast Alaska and Prince William Sound (Jon Holland 2005). Meanwhile, many scientists predict that the favorable ocean conditions that have benefited Alaska's salmon fisheries for some time are likely to end soon (Peterson and Schwing 2003; Kaeriyama 2005). Global climate change and its impact on the North Pacific salmon management is the wild card for future salmon productivity and salmon management (e.g. Overland and Stabeno 2004).

While hundreds of millions of dollars are spent each year in Alaska and elsewhere on salmon research and conservation, the distribution of salmon is shrinking across their entire range and risk of population

extirpations are marching northward. Explanations for these changes remain elusive. State of the Salmon maintains that Alaska must continue to raise the bar on its management performance if it is to weather the coming changes.

Units of Certification

The MSC defines "Units of Certification" as "the fishery or fish stock (=biologically distinct population unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock).

A salmon stock is the unit to which regulations are addressed within each area and gear type. A stock may be made up of multiple populations. As such, a salmon stock complex is typically an amalgamation of several hundred distinct spawning populations that display a diversity of life history characteristics and local adaptations. This *biocomplexity* of fish stocks is critical for maintaining their resilience to future environmental change. Even stocks in marginal habitats that have little commercial value may be of adaptive significance to the species (Hillborn et al. 2003). In order to prevent the loss of such stock components, managing at as fine a scale as practicable is required by MSC Principle 2.

Different gear types are usually managed under different regulations for each salmon species, hence applying criteria of sustainable salmon management to geographic areas without regard to gear type or species may prove problematic, if not impossible. Furthermore, broad geographic aggregation may not permit evaluation of the degree to which Principle 1 is being attained for the many stocks in the widely differing fisheries within those areas.

The Marine Stewardship Council has proposed 12 units of certification for Alaska salmon:

1. Southeast
2. Yakutat
3. Prince William Sound
4. Cook Inlet
5. Bristol Bay
6. Yukon River
7. Kuskokwim
8. Kotzebue
9. Norton Sound
10. Kodiak
11. Chignik
12. Alaska Peninsula/ Aleutians

To maintain conformity in the approaches used to certify other salmon fisheries through the MSC, State of the Salmon recommends the units of certification be expanded to a minimum of **60 units**, representing the 12 ADF&G fishing districts by the five individual species harvested commercially within each district (*Oncorhynchus nerka, O. gorbuscha, O. keta, O. tsawtscha, and O. kisutch*).

- **Southeast**- sockeye, pink, chum, Chinook, and coho
- **Yakutat**- sockeye, pink, chum, Chinook, and coho
- **Prince William Sound**- sockeye, pink, chum, Chinook, and coho
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Given the large geographic area and the volume and diversity of freshwater salmon habitats, 60 is a very reasonable number taken in comparison to the 40 units presently going through certification in the much smaller and less diverse habitats of British Columbia. The larger number of individual units for Alaska is essential to evaluating the three MSC principles given the greater geographical scope of Alaska. We feel this change will allow for more clarity in the review process and in the manner in which results of the certification review will be reported. Further, we recommend that the gill net fisheries be separately identified and evaluated, as this gear type is known to alter the sex and size composition of the target species' spawning populations. It would not be appropriate, or even possible, to evaluate MSC Principle 2 (ecosystem health) with respect to the areas and species if selective and non-selective gear types were aggregated.

One of the key aspects of this certification is proper evaluation of how current ADFG stock assessment and management by ADF&G tracks the biodiversity and dynamics of salmon populations in Alaska, a topic recently elucidated in a paper by Hilborn et al. (2003). While this particular paper addressed the Bristol Bay fishery, these same issues apply to other regions of the state. The thesis is that populations that are biocomplex (i.e. exhibit a significant degree genetic and life history diversity) are better suited to cope with both natural and anthropogenic stresses, and that it is difficult to predict *a priori* what traits might impart resilience on populations or stocks in the future.

An earlier synthesis effort in southeast Alaska (Baker et al. 1996) found that the majority of salmon populations in that area were not assessed well enough to allow quantitative assessment of trends in abundance. It is also worth noting that Baker et al. also found evidence of the extirpation of a chum salmon population. A similar conclusion regarding the lack of quantitative assessment data for a large number of salmon populations in a broader geographic area was provided in a companion synthesis project (Wertheimer et al. 1996).

In related research Randall Peterman and colleagues at Simon Fraser University (e.g. Mueter et al. 2002) have shown that while spatial autocorrelation exists among stocks with respect to temporal trends in productivity, the level of explained variation is small relative to the level of residual variability (the so-called "nugget" effect, as defined in the field of geostatistics). It is this "nugget" effect that might be critical to imparting resilience to populations and stocks. The take home points are that variability is intrinsic to these populations, that the state of our knowledge does not allow us to explain the source of this variability, and that this variability may serve as a built-in safeguard that allows these population aggregates to cope with change. This necessitates adopting a precautionary approach to management as a means to safeguarding biodiversity.

We propose that this needs to be achieved though a thoughtful monitoring strategy, much like an investor manages his/her stock portfolio to hedge bets against future uncertainties. When stock assessment is conducted at an aggregated level, the analysis is blind to real changes occurring at a more fundamental biological level (i.e. at the scale of individual populations). We know this structure exists from a variety of scientific studies; the question is - can we properly evaluate the impacts of fishing and non-fishing activities on the biocomplexity that serves as a safeguard against future fishery declines?

We offer an example of Bristol Bay sockeye to illustrate this point. ADF&G maintains a list of "managed stocks" for the state that will be used in the context of the MSC certification. For Bristol Bay sockeye, a total of 11 stock aggregates are "managed", and stock assessment work is focused separately on each of these. Habicht et al. (2004) reported on genetic evidence for the existence of 16 individual populations in two of the main drainages in the Bristol Bay region, specifically Kvichak and Naknek Rivers, and the authors hypothesized that as many as 300 individual populations may exist for this species throughout this region of Alaska. While it is impractical to conduct individual assessments on each, it is critical that we develop a means to evaluate trends among a sample of these individual populations (e.g. Baker et al. 1996; Wertheimer et al. 1996). The fishery in this region is managed in a way that harvest pressure is distributed over time to prevent overfishing on a particular segment of the run. Without information on the status of individual populations (particularly populations that might currently be exhibiting lower productivity during the current "regime"), it is uncertain whether the existing management approach is conducted in a way to prevent overfishing individual populations. Indeed, Habicht et al. report evidence of genetic "bottlenecks" in some individual populations among tributaries of the Kvichak

drainage that suggests recent declines in stock abundance may translate into reductions in biodiversity, which could reduce resilience of these populations and ultimately lead to population extirpations.

Our recommendation is for the review team to examine this issue closely, with an eye toward improving the state of salmon monitoring throughout Alaska to provide more reliable data on status and trends of individual populations that make up these managed stock aggregates, following up on the earlier recommendations of Baker et al. and Wertheimer et al. This issue gets to the heart of defining units of study that allow evaluation of the first criterion within MSC Principle 1 (1.1: "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), and specifically Indicator 1.1.1.1 under Subcriterion 1.1.1 ("The stock units are well defined for the purposes of conservation, fisheries management and stock assessment") and Subcriterion 1.1.2 ("The monitoring and assessment of fisheries and stocks is adequate for fisheries managers to maintain the high productivity of the target stocks and associated ecological community relative to its potential productivity"). Based on the decision made on what the Units of Certification will be, we recommend language here to reflect the biological structure of the "unit"; in SKS, for example, we identify discrete points along the

The issue also has relevance for evaluating MSC Principle 2, specifically Criterion 2.2 (*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*). Our point here is that in most cases we lack the data and information needed to definitively address these questions. As noted in our comments regarding the above definition of Units of Certification, we anticipate that many of these questions cannot be scored for particular species, districts and gear types. We feel that is it imperative that the process make it possible for certification units that are lacking data, or are managed based on the performance of a dubious indicator stock, to receive failing scores. Without the possibility of failure, the certification process lacks credibility. In more borderline cases where units receive a low, but passing score, we recommend strong language for corrective measures that are directed toward reforming and expanding monitoring efforts to remain in compliance with the certification.

Questions

State of the Salmon has some fundamental questions about the Units of Certification process that we feel have yet to be adequately answered by the Marine Stewardship Council and its certifier, Scientific Certification Systems. As we stated before, the proposed units of certification are made up of one or more salmon stocks or populations. However, a salmon stock complex can be an amalgamation of more than several hundred distinct spawning populations that display a diversity of life history characteristics and local adaptations. We know, for example, that while Bristol Bay sockeye are seeing good returns, there are some individual stocks that are not abundant and are at risk of being overfished in a mixed-stock fishery. As such are questions are as follows:

- Within each certification unit, do all the stocks or sub-units need to pass in order for the unit as a whole to receive a passing grade? And if not, what percentage of sub-units need to pass for the whole unit to pass? How is this threshold settled on?
- If sub-units do not pass but the full unit does, will there be remedial actions required on the sub-units?
- Further, what happens to the unit that does not receive a passing grade? Can certification be extended to only a subset of the total certification units? For example, what if Norton Sound chum salmon do not pass certification but other units do?
- Finally, how would this play out in the markets? Yes, MSC has chain of custody certification, but we can envision some problems with retailers marketing their salmon as Alaska certified when it may have originated from a failed certification unit within the State of Alaska. How would MSC deal with this likely scenario?

A separate but related concern of State of the Salmon is that some MSC certified salmon may intentionally be mislabeled. Tests performed for *The New York Times* in March on salmon sold as wild by eight New York City stores, going for as much as $29 a pound, showed that the fish at six of the eight were farm raised (*NYTimes* 4/09/05). Chain of custody certification would help prevent this from happening, but State of the Salmon wonders if a market-based inspection involving genetic sampling could be instituted as part of the MSC certification process to ensure salmon products are properly labeled and have not been replaced by or mixed with uncertified seafood.

Scoring Guidelines

State of the Salmon has systematically researched the MSC scoring guidelines to ensure that that they are clear and scientifically defensible and that they prioritize the long-term interest of salmon populations, ecosystems, and the people that rely on them. To this end, we have identified certain strongly recommended and recommended modifications to the scoring guidelines for Alaska salmon.

Approved Modifications

State of the Salmon has become aware of the improved scoring guidelines for the Alaska certification compared with the previous Alaska, British Columbia, and California salmon certification scoring guidelines. In particular, we noticed that four additional indicators have been added (Indicators 2.1.5, 2.2.5, 3.1.9, and 3.1.10). Indicators 2.2.5 and 3.1.10 deal with improved hatchery management, which is a major step forward in recognizing the potential harmful impacts of hatcheries on wild (unenhanced) salmon fisheries. Further 2.1.5 and 3.1.9 deal with the management systems' support for research that seeks to understand the impacts of habitat degradation caused by non-fishing activities such as timber harvests on salmon production. This is a critical element considering the diverse life history of salmon,

which includes time spent in marine, freshwater and estuarine habitats. We at State of the Salmon have earlier gone on record that MSC cannot overlook the full suite of threats to all salmon habitats and that we cannot ignore the activities of land management agencies on salmon ecosystems. We applaud MSC and Scientific Certifications Systems for these welcome changes and look forward to further improvement in the scoring guidelines.

Strongly Recommended Modifications

Indicator 1.1.1.5 states, *"Where stocks units are composed of significant numbers of fish from enhancement activities, the management system provides for 1) identification of enhanced fish and 2) they are harvested in such a way that they do not adversely impact the diversity, ecological function or viability of Wild stocks."*

> A third criterion needs to be added whereby the presence of hatchery fish on the spawning grounds in streams adjacent to the hatcheries. The indicator and scoring guideposts address only mixed stock fishery effects but do not address any potential hatchery-wild interactions (disease transmission, juvenile competition for food resources, and/or genetic effects). Further, this scoring guideline provides no framework for assessing the effects of enhancement from the standpoint of stock unit viability.

Indicator 2.3.1 states, *"Management strategies include provisions for restrictions to the fishery to enable recovery of non-target stocks to levels substantially above established LRPs (Limit Reference Points)."*

> Both the 100 and 80 scoring guideposts require that *"Monitoring and assessment programs are established to determine with a high degree of confidence and in a timely matter that recovery is occurring."* We feel that this guidepost needs to be more explicit and needs to avoid over-reliance on a shifting baseline (Pauly 1995). We urge a more rigorous standard for reliable monitoring data in order to gauge salmon population viability. State of the Salmon has developed a framework that includes explicit acknowledgement of population structure (regional groups, meta-populations, and subpopulations). The units of certification, as framed in the MSC proposal, are more aligned at the coarsest scale of our hierarchy--regional groupings. Specifically, the guidelines should include principles found in the SoS Salmon Knowledge System (SKS), including:
>
> - Instituting a framework that includes hierarchical levels of biological organization uniquely defined by biology, space, and time. This framework specifically describes the population structure of salmon as a biological continuum, from broad regional groupings, to metapopulations to individual populations;
> - Placing a greater emphasis on establishing monitoring programs that have a probabilistic element, thus generating better, more robust inference on the status and trends of salmon in

Alaska. Monitoring programs should focus on biologically relevant scales, either at the metapopulation, or ESU scale or at the scale of individual populations;

- Generating a meaningful measure of salmon viability and habitat production potential, including, in particular, assessment of four key population parameters: *distribution, diversity, abundance* and *productivity*.

State of the Salmon maintains that it is critical to obtain population-specific productivity measures in order to provide a better foundation from which to manage this fishery. A key component of such a monitoring system, which is currently lacking in this fishery, is in-season stock identification to apportion catch to separate stock units. This can be accomplished through an expanded coded wire tag program or through the use of molecular genetic techniques. The bottom line here is that certain populations within this managed stock are very likely to be at or below LRP, and efforts need to be directed at rebuilding these populations, and this necessitates the development of a more reliable monitoring system. For more information on monitoring, please see the State of the Salmon's Monitoring Strategy at www.stateofthesalmon.org/tracking/page.asp?pID=21.

Indicator 3.1.1 states, *"The management system has a clear and defensible set of objectives for the harvest and escapement for target species and accounts for the non target species captured in association with, or as a consequence of, fishing for target species."* Scoring guideline 100 states, *"The management system provides estimates for all catches, landings and bycatch in a timely manner."*

The existing 100 scoring guidepost should be moved to the 80 scoring guidepost and the following should replace the 100 scoring guidepost "A monitoring system is in place to establish, with high confidence levels, that harvest rates and escapement goals are ecologically appropriate."

Recommended modifications

Indicator 1.1.1.3 states, *"The geographic range for harvest of each stock unit in the fishery is known."*

We hold that scoring guidepost 80 should include language that mandates "an ongoing effort to improve understanding of the relationship between indicator stocks and the status of other stocks."

Indicator 1.1.1.4 states, *"Where indicator stocks are used….. … the status of the indicator stocks reflects the status of other stocks within the management unit."*

The scoring guidepost 80 is too low, relative to 100 and 60. Instead of reading *"There is some evidence of coherence between the status of indicator stocks and the status of other stocks…."* We

suggest this guidepost read "*There is scientifically validated evidence of coherence between the status of indicator stocks and the status of other stocks….*"

Indicator 1.1.2.4 states: "*The information collected from catch monitoring and stock assessment programs is used to compute productivity estimates for the target stocks and management guidelines for both target and non-target stocks.*"

We have concerns that the guidepost 100 language does not include reference to carrying capacity of the habitat. Our concern stems from the fact that a stock/recruitment relationship, for example, can be scientifically defensible mechanistically, yet misrepresent the true productivity, particularly if the data used in the estimate are taken from a period of chronic stock depression (among other causes) (Knudsen 2002). We suggest the guidepost 100 read: "*Scientifically defensible productivity potential estimates (e.g. stock/recruitment relationships with specific reference to habitat capacity) have been derived for all target stocks and the relative productivity of non-target stocks is known.*"

Indicator 2.1.4 states, *"The management system supports research efforts to understand the adequacy of existing escapement goals for meeting freshwater ecosystem needs."*

We maintain that scoring guidepost 100 should include language that requires "There is a clear and transparent mechanism to incorporate best available knowledge into management action."

For comments on our review, please see the State of the Salmon website at www.stateofthesalmon.org or email info@stateofthesalmon.org.

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