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: March 10, 2005
Re: Submission of Comments on MSC's Evaluation of California Salmon Fisheries Units of Certification and Scoring Guidelines

---

In response to the opportunity for public comment, State of the Salmon is submitting comments on the Marine Stewardship Council evaluation of commercially harvested troll-caught California Chinook salmon originating from the Klamath, Trinity, Sacramento, and San Joaquin River basins. 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 calls attention to the fact that this is the first MSC fishery certification that involves "taking" of federally listed endangered salmon stocks—specifically the spring and winter-run Central Valley Chinook ESU.

State of the Salmon recommends that MSC do—at a minimum—one of the following:

I. Expand units of certification from three units to five units so as to ensure the conservation of the ESA-listed stocks. Our proposed refined units include
   1. combined fall-run and late-fall-run Sacramento River Chinook
   2. spring run Chinook
   3. winter run Chinook

   in addition to the existing units
   4. Trinity and Klamath River basin
   5. San Joaquin River basin

II. Improve scoring guidelines to incorporate best practices for monitoring and management of mixed stocks.

State of the Salmon, *a joint program of Ecotrust and the Wild Salmon Center* 721 NW Ninth Avenue • Suite 280 • Portland, Oregon 97209
info@stateofthesalmon.org • (503) 467-0801 www.stateofthesalmon.org

ecotrust

Historic Abundance and Current Status

The historic center of abundance for Pacific Chinook salmon (*Oncorhynchus tshawytscha*) is the Columbia and Sacramento-San Joaquin river basins in Oregon and California, respectively (Behnke 2002). Before anthropogenic pressures greatly influenced the river systems, the Sacramento-San Joaquin River Basin may have contained Chinook salmon populations numbering more than 2 million fish (Yoshiyama et al. 1998; Behnke 2002).

Due to a combination of dams, diversions, agricultural runoff, and flood plain development, Chinook salmon habitat is now severely degraded. Chinook salmon populations have disappeared from a large portion of their former range in the river basin (Augerot 2005). The spring run Chinook of the San Joaquin was extirpated in 1951 (Yoshiyama et al. 1998). By 1985, the total run size for winter-run Chinook in the Central Valley was 3,962 individuals—by 1991, this number had dropped to 191 (NMFS 1996). In January 1994, Sacramento River winter-run Chinook were listed as an endangered species by the U.S. government (NMFS 1996). Adult returns of this run have been generally fewer than 1,000 in recent years. Of the original 59 stocks of Sacramento River Chinook, 14 have been extirpated. Of the 45 remaining populations, 24 percent are at high risk of extinction and 29 percent are at moderate risk of extinction (Augerot 2005; Huntington et al. 1996; Nehlsen et al. 1991). This information is available through the State of the Salmon knowledge system, www.stateofthesalmon.org/pattern/sosdb.asp.

When salmon populations diminish in abundance, qualitative changes in the genetic structure of the population render them more susceptible to extinction. Decline in per capita reproductive success, also known as “depensation”, may occur in populations of fewer than 100 females (Myers et al. 1995). Central Valley Chinook may already be experiencing this phenomenon. Winter-run Chinook may also be more susceptible to environmental stochasticities (unpredictable environmental events like weather changes, food supply, etc.) because of a restricted age composition. Further, winter-run Chinook are more susceptible to extinction because the run is limited to a single, isolated, undivided spawning population. Winter-run Central Valley Chinook have lower fecundity compared with other Chinook runs (NMFS 1996). Increases in freshwater rearing temperature for Chinook resulting from intensive water management in California’s Central Valley have also been shown to reduce juvenile growth rates, impair the process of smoltification, and increase vulnerability of fish to predation, further reducing the resilience of these runs in the face of continued anthropogenic stress (Marine and Cech 2004).

To our knowledge, this is the first MSC fishery certification that involves "taking" of federally listed endangered species (specifically the spring- and winter-run Central Valley Chinook ESU). The following are ESA-listed ESUs included in the MSC California Chinook Certification:

- Sacramento River Winter Chinook–listed Endangered in January 1994
- Central Valley Spring Chinook-listed Threatened in September 1999

In addition, the Central Valley fall-run Chinook population was identified as a candidate species in September 1999.

Units of Certification

Units of certification are made up of one or more salmon "stocks." 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. 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 a fine scale is essential.

The Marine Stewardship Council has proposed three units of certification for California Chinook salmon:

1. Trinity and Klamath River Systems
2. Sacramento River systems
3. San Joaquin River systems

Units of certification are a critical measurement in gauging sustainability. State of the Salmon believes that this certification must take into consideration the health of these listed ESUs. We propose that three units of certification be designated within the Sacramento River basin:

1. combined fall- and late-fall-run Chinook
2. spring-run Chinook
3. winter-run Chinook

Based on genetic and life history studies, there is ample evidence that these specific runs are significantly differentiated (Yoshiyama et al. 1998; Banks et al. 2000). The winter-run ESU, in particular, has been recognized as a unique population by Healey (1991) and warrants separate consideration for this assessment.

SoS strongly recommends that the units of certification comprising endangered ESUs should not receive MSC certification. Furthermore, we are concerned about how MSC will roll up sub-units into a single certification for a salmon population (i.e. California Chinook salmon). For example, what percentage of sub-units must be considered sustainable for the entire "fishery" to be certified? How is this threshold defined? The viability of these endangered and threatened stocks must not be overlooked in the certification process.

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 California Chinook salmon.

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."*

> 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,--which is a group of con-specifics baselines. Specifically, the guidelines should indicate principles found in the SoS IMAKS that impose:

- hierarchical levels of biological organization uniquely defined by biology, space, and time, in particular subpopulation to meta-population;
- a probabilistic sampling design within each level that are not necessarily panmictic, and hence are not technically an independent, interbreeding population. We suggest assessment would be more meaningful at the meta-population, or ESU, scale;
- the other key element of IMAKS is arriving at an integrated measure of viability, including *distribution, diversity, abundance* and *productivity*. Acknowledgement of the current fragmented, restricted *distribution* of these populations is critical.

The spatial extent of spawning grounds for many of these populations has experienced marked reductions during the last 100 years (Yohiyama et al. 1998). A key component of population diversity—run timing—needs to be explicitly acknowledged as well. In the case of the California salmon MSC certification, assessments rely disproportionately on *abundance* trends. An obvious improvement here is to rely on a rigorous measure of population *productivity*. The fishery is presently managed based on a Central Valley Index, which provides escapement projections for the stock complex. State of the Salmon notes that this approach could lead to overfishing for those populations that represent "weak stocks" or less-productive components of the stock complex. This is very likely to be the case for winter-run Chinook, in particular.

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."

We have identified two sources that indicate harvest rate (also referred to as the "harvest fraction" by NMFS, as measured by catch/catch + escapement) is on the order of 0.5 for winter-run Chinook ESU, and that the objective of management has been established to maintain, but not exceed, that level of harvest pressure on this population. Given the low resilience of this stock and the fact that it is, indeed, a federally listed species, we feel that this is not a "defensible set of objectives for … harvest … for [the] target species" as defined in Indicator 3.1.1.

Indicator 3.1.4 states, *"When dealing with uncertainty, the management system provides for utilizing the best scientific information available to manage the fishery while employing the precautionary principle."*

To be more consistent with the precautionary approach as described in Indicator 3.1.4, we propose a greater target reference point for the winter run Chinook be set at 1000 individuals given the reduced fecundity observed for the population. In addition, we consider the techniques developed recently for stock identification using molecular genetic techniques should be included among "… the best scientific information available to manage the fishery".

Indicators 3.1.2, 3.1.4, 3.1.5, and 3.4.1.1 deal with criteria for effective salmon management.

State of the Salmon maintains that it is critical that the management system provide for routine assessment of catch of winter run Chinook in season to better control the impact of harvest on this population in particular and have management provisions in place when catch exceeds a certain threshold. There is an approach now available using specific molecular genetic markers to recognize with a high degree of certainty winter-run Chinook in the mixed stock troll-fishery. This approach should be incorporated into the management to ensure there is clear understanding of what stock unit is being taken and to minimize impacts on the endangered ESUs.

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 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.

State of the Salmon, *a joint program of Ecotrust and the Wild Salmon Center* 721 NW Ninth Avenue • Suite 280 • Portland, Oregon 97209
info@stateofthesalmon.org • (503) 467-0801 www.stateofthesalmon.org

References

Augerot, Xanthippe. *Atlas of Pacific Salmon: The First Map-Based Status Assessment of Salmon in the North Pacific.* Berkeley, CA: University of California Press, 2005.

Behnke, Robert. *Trout and Salmon of North America.* New York: The Free Press, 2002.

Hillborn, Ray, Thomas Quinn, Daniel Schindler, and Donald Rogers. "Biocomplexity and fisheries sustainability." In *Proceedings of the National Academy of Sciences*

Huntington, Charles, Willa Nehlsen, and John Bowen. "A Survey of Healthy Native Stocks of Anadromous Salmonids in the Pacific Northwest and California." *Fisheries* 21, no. 3 (1996): 4-21

Hyatt, Kim and Brian E. Riddell. "The Importance of "Stock" Conservation Definitions to the Concept of Sustainable Fisheries." In *Sustainable Fisheries Management- Pacific Salmon* Edited by

Marine, Keith R. and Joseph J. Cech, Jr. "Effects of High Water Temperature on Growth, Smoltification, and Predator Avoidance in Juvenile Sacramento River Chinook Salmon." *North American Journal of Fisheries Management* 24: 198-210, 2004.

Myers, R.A., N.J. Barrowman, J.A. Hutchings, and A.A. Rosenberg. 1995. "Population dynamics of exploited fish stocks at low population levels." *Science* 269: 1106-1108.

National Marine Fisheries Service- Southwest Regional Office. *Evaluating the Effects to Sacramento Winter-Run Chinook.* 1996. Available on line at http://swr.nmfs.noaa.gov/evaluat3.htm

Nehlsen, Willa, Jack E. Williams, and James A. Lichatowich. "Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington." *Fisheries* 16, no 2 (1991): 4-12

Pauly, D. 1995. "Anecdotes and the shifting baseline syndrome of fisheries." *Trends in Ecology and Evolution* 10(10):430.

Yoshiyama, Ronald M., Eric R. Gerstung, Frank W. Fisher, and Peter B. Moyle. "Historical and Present Distribution of Chinook Salmon in the Central Valley Drainage of California." In *Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. III, Assessments Commissioned Reports, and Background Information* 309-362. Davis, CA: University of California, Center for Water and Wildland Resources, 1996.