STATE OF THE SALMON

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

To: The Marine Stewardship Council
Date: 27 April 2007
Re: Submission of comments on MSC's Quality and Consistency Project

The State of the Salmon Consortium (www.stateofthesalmon.org) is a joint program of Ecotrust and the Wild Salmon Center. Our mission is to support a knowledge system across the North Pacific to help people understand the condition of salmon and to aid in sustaining salmon biodiversity in perpetuity.

In response to the opportunity for public comment, members of the State of the Salmon consortium would like to submit feedback on the Marine Stewardship Council's (MSC) Quality and Consistency Project. We are writing to express our perspective that the treatment of fishery enhancement activities in the MSC certification process needs to be formalized at the criterion level for a number of reasons. To make this case, we have provided a description of MSC's current treatment of enhanced fisheries as we understand it, a brief review of the scientific basis for our concern over the certification of enhanced fisheries, and specific recommendations on how enhancement considerations could be better integrated into criteria evaluated during the certification process. While the remarks provided here are primarily focused on hatchery-based salmon enhancement activities, our comments generally apply to any artificially-enhanced wild fishery that seeks MSC certification.

Currently, the MSC Technical Advisory Board Directive (TAB D-001) does not adequately address the treatment of enhanced fisheries:

> At this time the strategic priority of the MSC is on un-enhanced wild capture fisheries, and so the scope of application of the Principles and Criteria does not include fisheries that include significant enhancement or the features of aquaculture. Fisheries that do include some small level of enhancement, particularly practices such as holding live fish for short periods that do not impact further on the wild stock or its habitat may be considered to be in-scope but this should be clarified with the MSC at the pre-assessment stage.

Given this statement, we believe that MSC's tolerance of salmon hatchery production levels for some certified stocks far exceeds both the spirit and letter of this mandate. For example, pink salmon fisheries in Prince William Sound, Alaska, consistently haul a catch that is primarily (>80%) of hatchery origin (e.g., Eggers et al. 1991). Further, considering the distribution and abundance of salmon hatcheries across the Pacific Rim (Figure 1), very few stocks of Pacific salmon are likely to meet the requirements of un-enhanced as described by the TAB directive. As hatcheries may be necessary to maintain and/or rebuild salmon returns in areas with compromised habitat or low productivity and therefore can serve an important economic and conservation role, we recognize the need

for flexibility in the interpretation of enhancement considerations in the review process. Individual certifiers (e.g., SCS) have succeeded at interpreting MSC principles and criteria in a risk-averse manner with respect to enhancement activities; the issue, however, remains open to a certifier's interpretation and application. This is particularly troubling given the large body of scientific information suggests that too high of a tolerance to hatchery effects could allow management activities to continue under MSC's emblem, which are counter to its very own sustainability goals.

Salmon enhancement activities can jeopardize wild salmon populations in several ways. In terms of ecological impacts, inter- and intra-specific competition due to high-volume releases of hatchery salmon can lower growth rates and have survival consequences for wild salmon in freshwater streams (Weber and Fausch 2003) as well as near-shore (Levin et al. 2001) and open-sea marine environments (Ruggerone et al. 2003). Hatcheries and hatchery-reared fish can also serve as sources and vectors, respectively, for novel pathogens that may adversely affect wild populations when straying and disease transmission occurs. Further, the genetic impacts and long-term fitness consequences of hatchery management are widely recognized on both a theoretical (Hindar et al. 1991) and empirical level (Riesenbichler and Rubin 1999). For example, progeny arising from crosses between wild and hatchery (traditional management) salmon and steelhead can have lower reproductive success than their wild × wild counterparts (Riesenbichler and Rubin 1999; Araki et al. 2007). And finally, an abundance of hatchery fish in mixed-stock fisheries can increase the risk of over-harvesting of co-mingling, weaker stocks by drawing greater fishing pressure (e.g., Flagg et al. 1994). Fortunately, many of these enhancement impacts can be avoided through better hatchery management (Brannon et al. 2004; but see Waples 1999).

Considering the combination of impacts that enhancement activities can have on wild fish populations and the range of possibilities for risk management, we feel that MSC should adopt criteria that clearly delineate which enhanced fisheries are eligible for MSC certification. Our suggestions specifically target management practices that use hatchery production to artificially inflate harvested stocks rather than hatchery applications designed for meeting conservation and/or recovery goals. We propose two criteria (with suggested sub-criteria) for inclusion under MSC Principle 1 intended to identify and ameliorate threats posed to wild fish populations by enhancement activities. These criteria are based on a combination of literature review, our own internal discussions, and previous applications of MSC principles and criteria for enhanced salmon fisheries (SCS 2006). It is our hope that MSC will adopt these criteria at the top level and therefore reduce the potential for ambiguity and incongruous application of MSC certification where enhanced fisheries exist.

<u>Proposed Criterion 1:</u> For fisheries occurring in the presence of artificial enhancement activities, the regulatory agency must engage in monitoring and research activities that permit the rapid identification and long-term reduction of enhancement-related impacts on wild populations. For salmon-specific applications, a minimum set of sub-criteria that could be incorporated into the MSC certification process includes the following:

A) <u>*Monitoring activities*</u> – Monitoring for the adverse effects of hatchery fish on wild populations will serve an integral role in risk management for enhanced fisheries. At minimum, the following monitoring is required for salmon:
i) *Stock composition and harvest monitoring in mixed-stock fisheries*: There have been many instances where commercial harvest operations focused on hatchery fish have unintentionally over-harvested co-mingling wild populations in mixed-stock fisheries (Flagg et al. 1994). In only a few instances, however, are there established monitoring programs that adequately quantify this

indirect impact of hatchery management on wild salmon populations. At minimum, enhanced fisheries seeking certification should have marking (e.g., coded-wire tag) and other monitoring (*inclusive of escapement monitoring for wild indicator stocks*) efforts in place that can reliably detect harvest-related impacts.

ii) *Hatchery-stray monitoring*: Focused spawning-ground monitoring efforts (e.g. carcass recovery), coupled with an adequate marking program, could provide an estimate of the proportion of spawning escapement due to hatchery strays. Thus, a proxy for the genetic and/or fitness risks due to unintentional hatchery × wild introgression could be monitored. Other approaches (e.g., genetically-based parentage analyses) could also inform monitoring for this aspect of negative-enhancement effects. At minimum, a fishery seeking certification must include a monitoring program that can detect biologically meaningful straying levels with reasonable certainty.

B) <u>*Research activities*</u> – Research will also have an integral role in identifying hatchery production and management strategies that minimize the unintended negative ecological, genetic, and/or harvest-related effects of hatchery-based stock-enhancement activities. Rather than address issues on only an *ad hoc* basis, we feel that a proactive, stably-funded research body should exist that can both treat long-term hatchery research objectives and answer short-term questions arising from management problems identified through routine monitoring. Relevant research endeavors could include:

i) *Defining ecologically-based hatchery production levels*: In setting production quotas, traditional hatchery practices focus on facility limits, which tend to be static, and not on environmental capacity, which can be quite dynamic. For instance, several environmental factors (e.g., sea-surface temperatures, upwelling conditions) that tend to vary widely on inter-annual or decadal cycles are known to influence the ocean survival rate of Pacific salmon species. Several studies suggest a negative relationship between wild salmon performance and the number of hatchery fish released due to inter- and intra-specific competition, particularly during periods with poor ocean conditions (Levin et al. 2001; Ruggerone et al. 2005). We propose that one ecological impact of enhancement activities (i.e., competition) could be avoided through environmental capacity research that informs hatchery planning. Based on existing knowledge of the effects of physical forcing on marine survival, juvenile salmon production at hatcheries could be capped based on measured and readily accessible ocean productivity indicators; where relevant, freshwater capacity could also be quantified and incorporated into hatchery production planning. Thus, a general and ongoing research program could be developed that seeks to identify long-term production strategies that are cognizant of the shared environment of wild and hatchery fish.

ii) *Identifying risk-averse hatchery practices*: Research should also be focused on identifying hatchery management strategies that minimize risks to the wild components of enhanced stock units. This could include work aimed at maintaining genetic diversity in captive populations, identifying release strategies that minimize straying, and/or managing the health of hatchery populations. Additionally, socio-economic research aimed at identifying hatchery-funding mechanisms that minimize risk-prone cost-recovery harvest behaviors could be included under this research umbrella.

iii) *Ad-hoc research needs*: The research body should also have the resources available and mandate to respond to changing needs due to problems and situations identified though routine monitoring, as defined under *A*) above.

<u>Proposed Criterion 2:</u> The management system should contain appropriate mechanisms for adapting in response to information collected through research and monitoring activities described under Proposed Criterion 1. In addition to collecting the data necessary to identify hatchery-related problems, we feel that there needs to be a clear enforcement and implementation structure in place for there to be any assurance that all measures are being taken to minimize hatchery impacts in enhanced MSC-certified fisheries. Ideally, each monitoring and research

activity aimed at detecting the ecological, genetic, and harvest-related effects of enhancement activities should be tied to a transparent set of triggers that initiate a management response. An example might be the establishment of a hatchery stray-rate threshold that forces hatchery closure until alternative actions that minimize this parameter are identified and taken. Similarly, harvest-pressure triggers expressed in wild indicator stocks in enhanced mixed-stock systems could be used to close hatchery operations until more risk-averse approaches towards hatchery management are advanced. A final example might be the existence of a standing and robust epizootic-containment policy. While the details of Proposed Criterion 2 (i.e., sub-criteria and indicators) could still be left to individual assessors, the goal here is to ensure that there is rigid adherence to a risk-averse hatchery management strategy for certified stock units.

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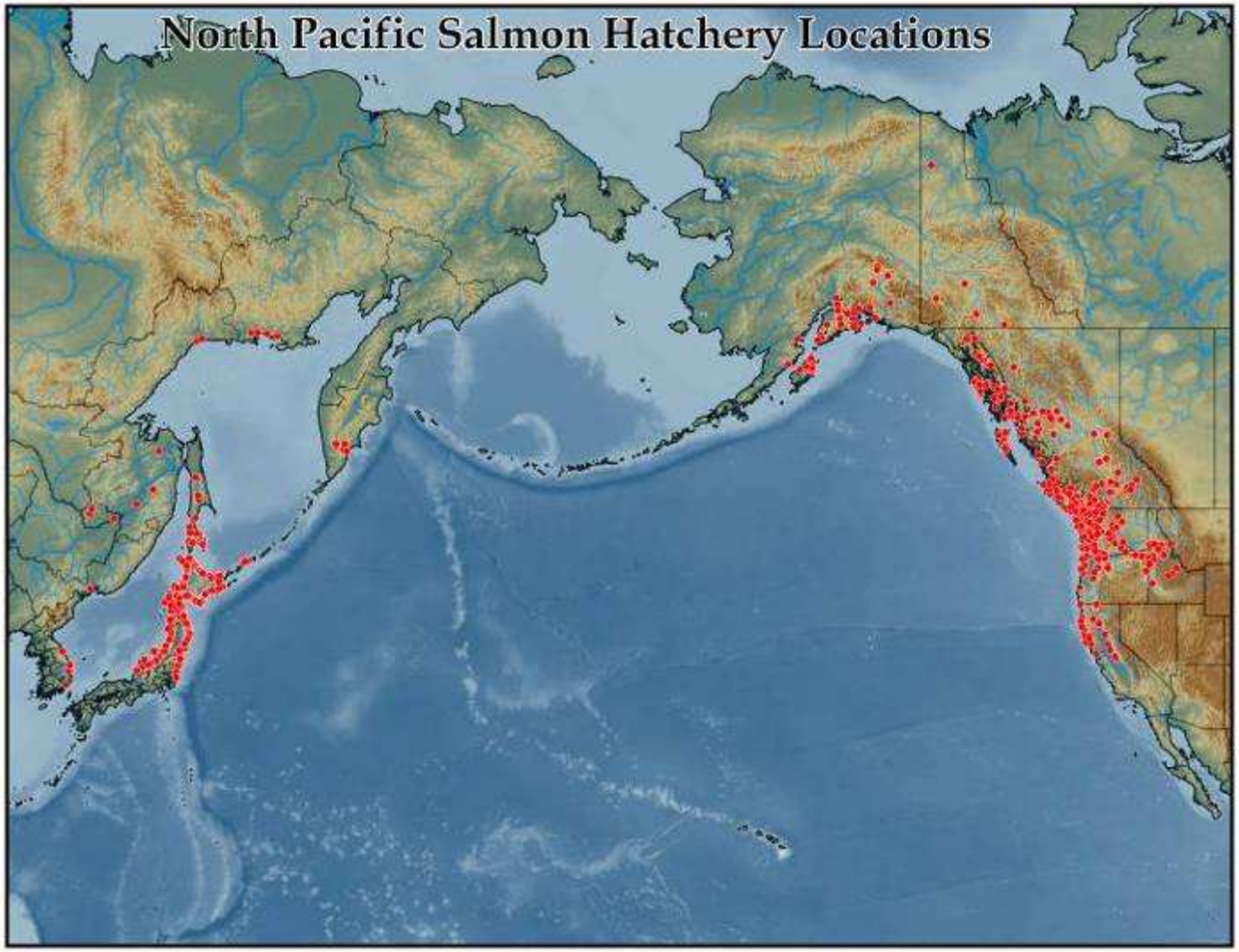

Figure 1. North Pacific distribution of hatchery-based salmon enhancement activities.