



COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

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Dr. Robert Naiman, Chair
Independent Scientific Advisory Board
Northwest Power and Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, OR 97204-1348

RE: CRITFC concerns in the Density Dependence Report and request for response

Dr. Naiman and Independent Scientific Advisory Board members:

On February 25, 2015, the Independent Scientific Advisory Board (ISAB) released its report “Density Dependence and its Implications for Fish Management and Restoration Programs in the Columbia River Basin,” hereafter referred to as the “Density Dependence Report” or “Report.” Due to evidence suggesting some anadromous salmon populations may be exhibiting reduced productivity even at relatively low spawner abundances, the ISAB chose to “review the issue of density dependence impacts on management and restoration programs in the Columbia Basin” (<http://www.nwcouncil.org/media/7138508/ISAB-FY15-SOW-8Aug2014.pdf>).

The Columbia River Inter-Tribal Fish Commission (CRITFC) greatly appreciates the ISAB’s effort on this assignment, as we and our four member tribes are also gravely concerned with current low levels of natural fish production associated with alterations throughout the Columbia River basin. During our review of the Density Dependence Report, CRITFC and fisheries staff from our member tribes have identified serious technical and policy-related concerns. In an effort to address these concerns, CRITFC and tribal fisheries staff met with several ISAB members on April 22, 2015. While the overall outcome of this meeting was positive, many of our key concerns with the analysis and recommendations for the Report remain unaddressed.

During the meeting, it became clear to those present that many of the Report’s key recommendations could be misinterpreted or mischaracterized. This is troubling from both scientific and policy perspectives. Due to the potential misinterpretation of the key recommendations of the Report, it is important that the ISAB consider our comments and provide a formal written response that can be incorporated into the existing Report as an appendix. In addition to a written response, CRITFC asks that if elements of this Report are to be considered for publication in a peer-reviewed journal, that a formal review by Columbia River basin co-managers be completed first.

Below is a summary of our key comments:

1. Overall assumptions should be explicitly stated at the beginning of the document. The Report appears to operate under the assumption that the Columbia River system exists in a highly altered, irreversible state. The Report should clearly state which aspects of the “novel ecosystem” the authors assume to be irreversibly altered and which aspects can be managed towards a more natural and productive state. By clearly stating these assumptions, the Report’s recommendations would less likely be taken as evidence that the only way forward is to treat currently degraded conditions as the new normal, and would be more inclusive of solutions that account for the reversal of some aspects of system degradation.
2. The Report presents itself as a general review of the ecology of density-related effects on abundance and productivity of Columbia basin fish populations, with an emphasis specifically on density dependent limitations in recruitment and survival. The central tenet of the Report is that despite abundances being below historical levels, some populations are producing adult recruitment below replacement. The Report delves into the realm of population recovery and management, but does so without first comparing the magnitude of these density dependent effects relative to the magnitude of density independent sources of mortality (e.g., mortality in the hydrosystem, elevated water temperature, and diversion of water). While CRITFC understands the ISAB cannot address every problem in a single report, we think clarification is needed to help readers understand the relative magnitudes of different sources of mortality.
3. The second and third key recommendations for anadromous salmonids focus on reducing hatchery production and harvest of hatchery-origin fish, as a means to reduce purported negative effects on natural productivity associated with over-escapement of hatchery-origin fish. However, the hatchery programs were instituted as mitigation for lost production and lost harvest opportunities due to the largely density independent effects of hydrosystem development and other human activities (e.g., agriculture, mining, and forestry). The Report’s general conclusion that managers need to be more cautious about over-production of hatchery fish, (i.e., hatchery production needs to be scaled back) due to density dependent decreases in recruitment, assumes tributary carrying capacities are static and also completely ignores the hydrosystem’s mitigation obligations driving much of this production. Tribes are taking a two-pronged approach to restoration—investing in habitat improvements while simultaneously supplementing salmon populations with biologically appropriate hatchery fish to rebuild and maintain escapement. The CRITFC member tribes do not accept a static view of carrying capacity, and also continue to support further improvements in hydrosystem management. Does the ISAB have quantitative estimates of the relative benefits of reducing supplementation and harvest compared to the benefits of actions that would yield truly significant improvements in freshwater habitat and migration conditions in the mainstem Snake and Columbia Rivers?
4. The Report cautions against the high proportion of hatchery-origin Snake River fall chinook on spawning grounds and opines that hatchery production risks causing density dependent reduction in natural productivity of the population. However, it is undeniable

that the recent high returns are a direct response of the hatchery supplementation program, and includes current natural-origin escapement of Snake River fall chinook at two orders of magnitude greater than before hatchery supplementation. Therefore it would be beneficial if the ISAB could provide further insight on how supplementation should be balanced in a novel system, recognizing instances when supplementation has been key in rebuilding threatened and endangered populations.

5. The Report recognizes that identification of the appropriate stock-recruitment relationship has important management implications. As indicated in the Executive Summary - Appendix I (p.20) “For a population best described by the Beverton-Holt curve, excessive spawning density has no adverse consequences other than lost harvest opportunities during the year of return. However, for a population best described by the Ricker curve, excessive spawning density will, on average, reduce recruitment in the next generation, in addition to reducing opportunity for harvest in the year of the large return.” Simply put, if the population follows the Ricker model, “too many” fish is bad, but if it follows a Beverton-Holt model, “too many” fish is not bad, and the “excess” adults have the beneficial effect of delivering additional valuable marine-derived nutrients to the freshwater ecosystem. The working assumption throughout the Report is that observation of compensatory density dependent effects means that the population will suffer from overcompensation at high escapement levels. That is, the Report assumes that Columbia basin populations are represented by Ricker relationships, despite the fact that the very first illustration of a stock-recruitment relationship in the Report (figure 1.1, p. 24), which is of hatchery supplemented Snake River spring chinook, clearly fits the Beverton-Holt model. The Report should be revised to address the Beverton-Holt relationship as at least equally probable if not more probable than to the Ricker relationship.
6. The Report recommends consideration of possible density dependent effects for lamprey, particularly in relation to tribal programs for translocation and supplementation. Given that most interior Columbia populations of lamprey are teetering on the brink of extinction, this recommendation borders on nonsensical. As one CRITFC member mentioned during our April 22 meeting, “the only problem with lamprey is that there aren’t enough of them.” Should the ISAB instead have focused its evaluation on possible Allee effects - positive density dependence with increasing density of a population at very low abundance? Such an evaluation could help guide the tribes in their Pacific lamprey translocation/reintroduction efforts in the basin. Unfortunately, this aspect of density dependence was not addressed in the Report.
7. The Report’s recalculation of historical salmon and steelhead abundance is suspiciously low and contrary to published literature. A more thorough inclusion of traditional knowledge and effects of industrial development would seem to lead to the opposite conclusion, (i.e., that the historical abundance estimates were conservative). We strongly object to the Report’s assessment on historical abundance and request that it be removed from the document. At present, CRITFC is reviewing the analysis of Chapter III of the Report for comparison with the run size estimates adopted by the Northwest Power Planning Council in its Columbia Basin Fish and Wildlife program in 1987. We will

share the results of this analysis with the ISAB for inclusion as an Appendix in the Report.

8. The ISAB states that current numbers of smolts, both natural-origin plus hatchery-origin, likely exceed historical levels and makes the simplistic inference that “throughout the interior Columbia River basin” freshwater habitat is being overwhelmed by the addition of hatchery juveniles and excessive numbers of returning hatchery-origin adults. This statement is misleading. It disregards the fact that hatcheries release juveniles at the smolt stage – fish that do not have long residence times in the tributaries, and thus compete minimally for resources prior to smoltification with wild parr/smolts. Also, much of the hatchery production in the Basin is from large lower river harvest augmentation programs whose adults generally do not return to natural spawning areas and thus do not compete with wild and supplementation hatchery adults. As opposed to interior freshwater habitat, more focus should be directed towards possible density dependent effects in the estuary and ocean.

As an equal partner in the oversight of the ISAB, CRITFC greatly values the expertise and guidance the ISAB provides to fisheries management and restoration in the Columbia River basin. We look forward to working with you on this and are happy to provide additional information should you have any questions regarding our request.

If you would like to further discuss how our organization can work with the ISAB on this issue, please contact CRITFC Science Department Manager, Zach Penney at (503) 238-0667.

Sincerely,



Babtist Paul Lumley
Executive Director

Cc: 15 Tribes, Columbia Basin Tribes Coalition
Michael Ford, Northwest Fisheries Science Center Division Director
Members, Northwest Power and Conservation Council
Erick Merrill, Independent Scientific Review Program Manager
Barry Thom, National Marine Fisheries Service Deputy Regional Administrator