

Independent Scientific Review Panel

for the Northwest Power and Conservation Council, 851 SW 6th Avenue, Suite 1100, Portland, Oregon 97204

Independent Scientific Advisory Board

for the Council, Columbia River Basin Indian Tribes, and NOAA Fisheries

Memorandum (ISRP/ISAB 2011-1)

February 3, 2011

To: Tony Grover, Fish and Wildlife Division Director, Northwest Power and Conservation Council

From: Eric Loudenslager, ISRP Chair, and Nancy Huntly, ISAB Chair

Subject: Comments on the Anadromous Salmonid Monitoring Strategy

Background

In 2010, the Council, Columbia Basin Fish and Wildlife Authority, NOAA Fisheries, and Bonneville Power Administration developed the *Anadromous Salmonid Monitoring Strategy* ([ASMS](#)) and asked the Independent Scientific Review Panel (ISRP) and Independent Scientific Advisory Board (ISAB) to review the document and supporting final tables referenced in Appendix F of the ASMS. The ASMS document will serve as an Implementation Strategy in the Council's Monitoring, Evaluation, Research and Reporting ([MERR](#)) plan that the ISAB and ISRP reviewed in May 2010 ([ISAB/ISRP 2010-3](#)). The ISRP referred to the ASMS document during its Categorical Review of Research, Monitoring and Evaluation and Artificial Production Projects ([ISRP 2010-44A,B](#)). This ISRP and ISAB (ISRP/AB) memo draws from the ISRP's impression of how the ASMS informed those RME and artificial production projects, and vice versa.

The Council, BPA, NOAA, CBFWA, and the fish and wildlife managers asked us to address five specific questions to help improve the ASMS document:

1. Do the rationales (Section 5) and specific implementation strategies (described in the appendices) represent scientifically valid approaches for meeting the policy goals articulated in the guidelines (Section 4)?
2. Does the ASMS assist the ISRP, the Council and its regional partners by providing a basinwide context or framework for understanding and linking monitoring activities for viable salmonid population (VSP) parameters, as well as providing some guidance on tributary habitat effectiveness and

tributary hatchery effectiveness monitoring to the extent the monitoring of each of these can be informed by VSP? Does the ASMS assist in providing the basinwide context for related projects during the Council's RME+ categorical review process? What specific suggestions can you make to improve its usefulness for this purpose?

3. Is the ASMS information presented in the best format for communicating the basinwide monitoring strategy for viable salmonid population criteria, as well as providing some guidance on tributary habitat effectiveness and tributary hatchery effectiveness monitoring to the extent the monitoring of each of these can be informed by VSP? What specific suggestions can you make for improving how the information is presented?
4. Appendix F of the ASMS includes three tables, one each for steelhead, spring Chinook and sockeye (Tables 1, 2, and 3, respectively). These tables provide information on the list of critical projects being implemented to meet a specified strategy statement as well as identifying a prioritized list of gaps for each major population group or distinct population segment. A fourth table summarizes the basinwide funding prioritization for steelhead, Chinook, and sockeye projects. Please assess, as feasible, whether the combined information from these tables implements the ASMS guidelines.
5. What overall suggestions can you make for improving the usability and usefulness of the ASMS?

Comments

The goal of the ASMS as stated is to provide an efficient and effective monitoring strategy that integrates Viable Salmonid Population (VSP) criteria, habitat effectiveness, and hatchery effectiveness across multiple programs and geographic scales. The draft ASMS is a good start. It has potential to provide the regional managers and the ISRP with a framework and context for evaluating proposed projects. However, the draft can be improved to increase its effectiveness, and the ISRP and ISAB provide several suggestions below in our review comments. The five questions had some overlap, so we organized our comments under thematic headings to reduce redundancy.

Reorganization

The ASMS would benefit from reorganization. To evaluate monitoring within a subregion or subbasin, the ASMS requires reading a portion of section 5, then one of the appendices, then going online and viewing a summary document at the CBFWA ASMS site. At least for this initial version of the ASMS, all three of the components – the

rationale in section 5, the strategy in the appendix, and the gaps analysis in the linked documents – would be more clearly and effectively presented as a single chapter in the ASMS. The result would be a clearer chain of logic between the rationale, specific strategies, and data gaps.

Adequacy and Clarity of Rationales and Strategies

Together, the rationales in Section 5 and specific implementation actions described in the appendices do not provide enough information to assess scientific and technical validity for meeting policy goals in the Section 4 guidelines.

The guidelines in Section 4 need to be more carefully linked to essential life-cycle metrics for salmon populations and the management questions that data are needed to address. The precision and accuracy requirements are not adequate to support management requirements under the Biological Opinion for the Federal Columbia River Power System (BiOp) or adaptive management within the Fish and Wildlife Program. Part of the challenge lies in the flexibility incorporated into the guidelines. For example, on page 10, section 4.1.1. Monitoring Study Design: “It is important to note that these are suggested guidelines and in some cases may not be applied due to feasibility or the need to increase monitoring for other purposes.” When guidelines are only suggestions, it is not clear what conservative consequences or precautionary actions are taken to offset the lack of monitoring. How would decision makers determine that monitoring is not feasible or that other priorities should receive increased effort and funding? Other guidelines are vague: (page 11, spatial structure) “Periodic surveys of adult and juvenile distribution at the population and/or MPG scale.” In this instance, what does periodic mean – once every decade or once every five years?

A section was not dedicated to habitat status and trends, as a component of Section 4.2. General Habitat Action Effectiveness. In this Section (4.2.1.) the ASMS states: “each of the four subregions considered these general study design recommendations when developing their habitat action effectiveness strategy.” Section 4 of the ASMS should provide the guidelines, and their rationale to support the BiOp and Fish and Wildlife Program, not identify what the managers in the subregions considered. The two sets of bulleted lists under 4.2.1. Monitoring Study Design, separated by a sentence, are not well linked. How do the more specific elements in the second list fit within the more general list? How are priorities established across the bulleted list? For example, the first bullet addresses intensively monitored watersheds (IMWs) and is very specific that one or two studies should be implemented per habitat action. The final bullet, “Habitat-fish response models will use the various populations, watershed and project level monitoring to estimate and extrapolate fish and habitat responses expected from various actions” is overly general.

It is not clear who is to undertake the habitat-fish response modeling, and whether this

incorporates the IMWs, substitutes for the IMWs, and how quality assurance/quality control across various projects will be implemented.

In Section 4.2.2. Preferred Quality Standards for the habitat effectiveness monitoring; only one of the bullet points actually appears to be a guideline: “IMWs should have a power analysis completed early in the project to determine the amount of the watershed required to be treated in order to detect a 30-50% change in fish response.” The second bullet instructs the reader to see the Pacific Northwest Anadromous Monitoring Program (PNAMP) effectiveness monitoring workgroup: evaluation of effectiveness monitoring projects. This does not communicate to readers of the ASMS what the important standards for data and experimental design quality are.

For Section 5, the rationale, 5.1., appears to be the same for each subregion. The narrative of the prioritization criteria, in 5.2., is worded in such a way as to often be confusing. For example for the Upper Columbia, the first bullet is “high precision status and trends in at least one population guideline is being addressed for steelhead with the Upper Columbia by sampling all populations.” Is this a statement that steelhead status and trends is the highest priority monitoring in this subregion? Similar vagueness is found in the Approaches portion of Section 5.3. For example, in the Mid-Columbia, under approach, for habitat effectiveness, a bullet point states “adequately assess habitat status and trends.” There is not enough information presented to determine what the actual approach will be, and whether it will meet the standards in Section 4. Furthermore, it is not evident what portions of the Mid-Columbia Appendix B is linked to this “approach.”

For many specific implementation strategies, it was difficult to ascertain exactly what was being counted or measured and how it was done or proposed to be done. Behind every complex strategy is something that is already measured or counted, or proposed to be measured or counted, and these need to be laid out clearly. For example, in the Mid-Columbia section, it is stated that VSP abundance and diversity information are obtained at Three-mile Dam (on the lower Umatilla River) but it is not stated exactly what those data are and how the data are collected. A clearer response might be something like “Total enumeration of adult fish through an electronic fish counter from July 15 to October 15.” This sort of response is much clearer than what was provided. The writers preparing the sections could easily be a bit more specific and still be brief on the what, where, and when of a particular monitoring strategy. For it to be useful to the ISRP for understanding the linkage between monitoring activities (Question 2), more specific information is required.

Coordination and Integration

The ASMS is a reasonable initial draft and does assist the ISRP, the Council and its regional partners by providing information concerning the basinwide context for monitoring VSP parameters. However, it needs considerable refinement and further development to be useful as an integrating framework. Within each of the watersheds, the management agencies do a reasonable job of assessing VSP parameters – as observed in the RME+ categorical review or the Lower Snake River Compensation Plan Symposium in December. What is lacking in the basin is coordination and synthesis of evaluation across subbasins. No one is charged with this responsibility. The ASMS does not appear to tackle the challenge of integration among subregions, or even among subbasins within subregions. This is a major shortcoming.

Additionally, the utility of ASMS would be improved by providing a schematic showing the relationship among MERR, the Anadromous Fish Implementation Strategy, and ASMS. The ASMS sponsors should also develop a solid ecosystem strategy including freshwater, estuary, and ocean habitats for monitoring population status and trends using VSP and TRT criteria.

Data Accuracy, Precision, and Quality

In general, accuracy and precision are not assessed in the ASMS. This extra information would allow us to assess if there are better ways to sample for improved accuracy, precision, and ultimately, effectiveness. In many cases, it did not appear that the details of the proposed specific sampling strategies had been worked out. It also did not appear that feasibility of designs nor anticipated accuracy and precision of proposed actions had been projected. It would be useful to have concise statements on what the limitations are for a particular strategy, and what might be done to improve a given metric in place or proposed. These additions would give us more to comment on the scientific results of the monitoring. In addition the ISRP/AB recommends evaluating the adequacy of using specific data quality standards, such as average CV of 15%, for scientific and management uses as suggested in the 2010 ISRP programmatic comments ([ISRP 2010-44A](#)).

Past ISRP/AB requests for data reporting the precision and accuracy of abundance and productivity data for Snake River steelhead and Chinook have revealed instances where projects are not yet meeting data standards. This points out the need for ongoing evaluation of data quality, with a follow-up dialog on the BiOp and Fish and Wildlife Program adaptive management constraints owing to the data quality, and finally decisions on whether additional effort is prudent.

Effectiveness of Communication Style

The format and style of this document can be improved for more effective communication. For example, the report suffers from overuse of bulleted statements. Few of the bulleted statements are supported by citations to published literature or other information sources (no literature cited or reference lists). In general, scientific or technical justifications or explanations are not provided. Information throughout in the report and appendices is unnecessarily repetitive (for example, Section 5). The report has too many appendices. A concise, stand-alone document clearly outlining the overall strategy and specific metrics to be used as part of that strategy would be much more effective. In the appendices, when discussing the specific strategies, it is often unclear what category the strategy or approach falls into. For example, is the strategy “In place and evaluated”, “In place and not evaluated”, “In place but proposed for modification or improvement (with the specific modification proposed)”, “Partially in place”, “In development”, or “Proposed for development” (i.e., with a link to a specific proposal)? This clarification might help in identifying how the monitoring pieces fit together and what might be priority needs for funding. This approach should at least be considered.

In quite a few cases, terminology is used loosely and inconsistently, leading to confusion. In Section 11.3.1, for example, there are specific strategies or approaches listed to get the required data for monitoring and the last strategy is a “goal.” This does not make sense, as these goals should be more generalized and be placed ahead of these specific strategies. Some of the criteria listed in various sections are goals, some targets, some specific strategies, and some very specific actions. We assume that the specific approaches are what are actually being measured (e.g., smolt trapping, dam counts, etc.). The document should better clarify what goals, criteria, overall strategies, and approaches are, and exactly what type of statement (and the level of detail) belongs in each category.

The ISRP/AB noted that the three points constituting the rationale are the same for all areas, yet repeated in each section. This repetition may not be necessary. It may be better to just highlight it once, clearly at the beginning and use the extra space for more details of the strategy/approaches, as mentioned above.

Other Specific Comments and Suggestions

- The ASMS treatment appears to be limited to ESA listed ESUs. For example, we did not see any treatment of lower or mid- Columbia spring Chinook (including John Day, Deschutes, or Yakima non-listed ESUs). During the Skamania Symposium (11/09) several co-managers identified that they were interested in RM&E beyond BiOp needs. Clearly for the Fish and Wildlife Program, the ASMS needs to include non-listed ESUs such as these listed above.

- PIT Tag detection arrays in tributaries to estimate downstream movements and mortality of juveniles and smolts are another way to pinpoint critical locations and times of high mortality.
- The ASMS was a useful aid for the ISRP during the Council's RME+ categorical review when evaluating groups of projects within a region. It was not often consulted for individual project reviews.
- Kelt reconditioning is mentioned but not their contributions to wild spawners. A comparison of the downstream survival and frequency of repeat spawning of kelts from Snake, Upper, Mid, Lower Columbia may be instructive in light of conditions along the hydrosystem and in the ocean.
- Adult steelhead: Current strategies employ a method of parsing out abundance into various tributaries based on historical frequencies from telemetry studies. This is a reasonable approach, but it stands to be less and less accurate as future habitat changes and abundance fluctuations result in changing frequencies. Is there an effort in place to update these percentages based on more recent or updated radio telemetry work? We also assume that there is not a good way to sample and take temporary possession of many adult fish or even to have them go through a narrow orifice such that PIT tags can be applied and/or detected. The approach in mind is that employed for sockeye at Tumwater Dam (a smaller system) where tagged fish are then parsed out into tributaries. If capture was possible, genetic approaches would be useful and microchemistry perhaps useful in more accurately and precisely assessing the frequencies of fish of each population. It is unclear, however, exactly what sampling conditions might or might not enable investigators to obtain the appropriate samples of fish to use these methods.
- Smolts (steelhead and spring Chinook): It was unclear if the smolt sampling is designed specifically and optimally to attempt to sample as large of a segment of the fish as possible or if the sampling is based mostly on historical activities and therefore provides less than optimal coverage of the migratory smolts. If smolt trap deployment is not optimal, some reconfiguration may be useful to improve coverage.
- Is there a separate ASMS for the Willamette River stocks? We did not find anything included about the Willamette River system, even though it appears to be included in Figure 1.
- Density dependence as it affects the spatial distribution of spawners and juvenile productivity is another factor that needs to be considered. Will increases in spawners necessarily result in higher smolt production?

- An ocean monitoring strategy needs to be developed.
- A mainstem monitoring strategy should explore methods to evaluate SARS of fish using different passage routes through the hydrosystem on a seasonal basis. In addition, flows and instream versus barged survival through the hydrosystem should be considered.

Additional Specific Comments (by Section #)

1.0. In the introduction it states that using hatcheries for “reducing undesired salmonid predation.” Where is there evidence for this benefitting wild stocks? One widely held theory is that the massive hatchery releases at restricted seasons, as on the Columbia (versus historic smolt runs occurring at all seasons) actually attracts predators, such as Caspian Terns and marine mammals. In coastal rivers, attraction to hatchery releases by seals is thought to negatively affect survival of wild fish.

4.1.1. The General Monitoring Design looks good – abundance, productivity, spatial distribution and diversity are all critical components to monitor. But more emphasis is needed on smolt to adult (SARs) survival. Adult abundance and adult to adult survival is and will be affected by many factors, including climate change and ocean conditions, so that interannual variances may be large, much larger than the CV target of 15% for annual estimates of adult spawner abundance.

4.2.1. What habitat conditions will be monitored? Temperatures, flows, toxics?

4.3.1. The study design on hatchery effects is good. How will it be implemented? Marking all hatchery fish is primary. How will physical habitat and biological productivity be monitored?

5.1.1.3. Here and elsewhere, smolt trapping is mentioned to evaluate juvenile productivity in the Upper Columbia River, but traps to monitor both juvenile/smolt production versus adult returns for the same stream or tributary are needed to monitor smolt to adults survival for wild populations (as stated for the Snake River and the Lower Columbia – ODFW’s life cycle monitoring).