**Independent Scientific Review Panel**
for the Northwest Power & Conservation Council
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**Memorandum (ISRP 2009-10)** **March 31, 2009**

**To:** W. Bill Booth, Council Chair

**From:** Eric Loudenslager, ISRP Chair

**Subject:** Review of two Columbia River Basin Fish Accord Proposals
- Develop a Master Plan for a Rearing Facility to Enhance Selected Populations of White Sturgeon in the Columbia River Basin (200715500)
- Expanded Multi-Species Acclimation Wenatchee/Methow (200900100)

## Summary

The memo contains the ISRP's review of two Columbia River Fish Accord proposals submitted February 24, 2009. Accord projects have established budgets and have been determined by BPA to satisfy in lieu requirements and other consistency issues. These projects are not competing with other projects for funding. However, these Accord projects are subject to ISRP review using the ISRP's standard and statutorily defined criteria. In reviewing Accord projects, the ISRP continues to focus on scientific criteria, project improvement, and scientific accountability. Since November 2008, the ISRP has reviewed more than a dozen Accord projects.[1] Because a goal of the Accords is to implement projects as quickly as they are ready and justified, the ISRP has agreed to review them as soon as they are submitted, rather than wait for a set of Accord proposals to be submitted.

In regard to the two proposals at hand, the ISRP finds:
- the proposal Develop a Master Plan for a Rearing Facility to Enhance Selected Populations of White Sturgeon in the Columbia River Basin meets scientific review criteria (in part, qualified); and
- the Expanded Multi-Species Acclimation Wenatchee/Methow proposal meets scientific review criteria (qualified).

[1] For the status of new Accord proposals, see www.nwcouncil.org/fw/projectselection/accord.

**200715500 - Develop a Master Plan for a Rearing Facility to Enhance Selected Populations of White Sturgeon in the Columbia River Basin**

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| **Proposer** | Columbia River Inter-Tribal Fish Commission |
| **Province(s)** | Columbia Cascade |
| **Subbasin(s)** | Columbia Upper Middle |

http://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P110455&session=fe8b46d1-66d9-4712-b871-c7e40afc6565

**ISRP Recommendation**

***Meets Scientific Review Criteria (In Part, Qualified)***

- Meets criteria for Objective 1, with the qualification that the sponsors address the questions and recommendations related to technical justification indicated below in section 1. The ISRP expects responses to our concerns be provided as part of the master plan submittal for the Council's Three-Step Process.

- Does not meet criteria for Objectives 2 and 3 at this time.

**ISRP Comments**

**1. Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)**

The technical background and justification are much improved since the FY 2007-09 proposal, including more detail and supporting references on the ecology and status of white sturgeon populations in the mid-Columbia and lower Snake above Bonneville Dam.

However, the technical justification for the proposed project would be further improved by providing more specific data on several of the following points that would help the ISRP in future reviews:

1. How similar or different are the mid-Columbia reservoirs and their tributaries to the habitats in the Kootenai and upper Columbia? The sponsors are trying to make the case that methods successfully applied in the upper Columbia are applicable in the mid-Columbia. Although an adaptive management approach is to be taken in the reservoirs if the program proceeds (proposal footnote, page 9), more contextually explicit information about sturgeon habitat in the two areas is needed. References to the adaptive management approach are also required.

2. What are the specific data on limiting factors for white sturgeon for the various reservoirs – the sponsors make a strong case for lack of recruitment, but on the other hand spawning habitat is also apparently limiting? The sponsors point out

that the population below Bonneville "continues to support a large diadromous population and excellent fisheries" but at the same time "no longer has access to thousand of miles of spawning and juvenile rearing habitat which has greatly reduced natural reproduction." On the other hand they point out (proposal, page 5) that some reservoirs have good spawning areas but that the reservoirs will not support juvenile production. It would be helpful to resolve some of these contradictions in this section of the proposal.

The apparent "healthiness" (blue zone) of the white sturgeon seems to decrease moving upstream with the reservoir populations between McNary and Bonneville dams doing the best (proposal, Figure 2). The proposal would be improved by a discussion of this phenomenon.

3. What are the genetics of the "endemic" mid-Columbia white sturgeon? Are they considered separate populations or have no genetic analyses been done? In the next iteration of this proposal the ISRP would like to see a description of how fragmented white sturgeon populations (other than the Kootenai sturgeon) are in the Columbia and lower Snake rivers along with an analysis of overall population structure.

4. It is not clear how all the hypotheses in Box 1 (mixture of null hypotheses and others) would be applicable to wild white sturgeon populations if hatchery white sturgeon were to be used in the experiments to test them (especially those relating to density dependence).

The proposal states that the overarching goal is "restoring productive, viable sturgeon populations and fishery opportunities in FCRPS portions of the mid-Columbia and lower Snake river reservoirs." This proposal clarifies the dual goals of restoring white sturgeon populations and eventually fishery opportunities by using supplementation. The rationale is that supplementation may be (in the short-term) one of the only viable opportunities to restore white sturgeon populations above Bonneville Dam because the habitat restoration activities for improving successful white sturgeon spawning would involve (1) significantly altering mainstem dam operations in late spring for improved spawning conditions in dam tailrace habitats or (2) altering adult fish passage structures at mainstem dams to improve adult white sturgeon passage and movements among mainstem reservoirs. Both of these actions would be extremely difficult to achieve because they would be counter-productive for salmon and steelhead adult passage recovery actions related to upstream immigration.

The proposal explains links of this proposed project with several major regional programs including the NPCC 2000 Fish and Wildlife Program, the NPCC 2004 Subbasin Plan for the mid-Columbia mainstem, and the NOAA Fisheries BiOp. The one that specifically considers supplementation strategies for white sturgeon is mentioned in the 2004 NPCC Subbasin Plan for the lower mid-Columbia mainstem, which was: "3) considering the use of hatchery fish to supplement The Dalles and John Day populations."

The proposal provides good descriptions of how this project is related with many past and current projects within the Fish and Wildlife Program and outside the Fish and Wildlife Program including the active supplementation projects in Canada. The sponsors also indicate that this project is closely affiliated with and complementary to the Yakama Nation sturgeon management project but provides almost no details of that project or how their actions will be coordinated. Details of how this coordination will be accomplished would improve this proposal.

**2. Objectives, Work Elements, and Methods (section F)**

Objective 1 "Complete, in conjunction with regional, tribal, and state management entities, a collaborative and comprehensive strategic plan for sturgeon conservation, restoration and management to include specific objectives, strategies, actions, milestones and schedules for habitat protection and restoration, natural production, hatchery production, fishery management, research, monitoring, and evaluation." This objective is a reasonable beginning for development of a Hatchery Master Plan and if widespread regional participation in the proposed workshop (WE #189) and the outcome from the workshop is general agreement in the direction and drafting of the regional plan (WE#174), then this would form the basis for initiation of the three-step review process. Overall, the sponsors are proceeding in a logical rational way for a three-step review realizing that as stated "hatchery-related actions (if any) may not prove the way to go."

The ISRP commends the sponsors for the collaborative way that Objective 1 is framed, placing the initial priority on a regional workshop - the initial focus on a workshop is very necessary step in building a regional plan. However, the ISRP has one question about the workshop: are two days enough to achieve a successful outcome? It seems that by adding one or two additional days would allow more thorough development of the regional plan and the setting of priorities for implementing the plan.

The sponsors have indicated (in Work Element # 183) that they will produce a peer reviewed journal article based on the results of the workshop and this is an excellent way to widely disseminate information. However, as it sometimes takes a long time to get something published, we would expect to see some written documentation on the results of the workshop and a draft plan shortly following the workshop.

Objectives 2 and 3 are conditional on completion of Objective 1, and the ISRP finds that these objectives do not meet scientific review criteria at this time.

**3. M&E (section G, and F)**

No specific M&E information provided – to be developed later.

**4. Overall Comments - Benefits to F&W (all proposal)**

Have the potential benefits to white sturgeon populations basinwide been weighed against the risks from potential hatchery effects? Even though this proposal centers on the

mid-Columbia and lower Snake region, a wider range of white sturgeon population segments may be affected by releases of supplementation or hatchery-reared fish. For example, the wild sturgeon stock below Bonneville Dam, the only viable population segment capable of significant harvest, and its important fisheries may be affected by many activities suggested and implied in this proposal. There is concern from peer-reviewed literature on salmon and other species that putting large numbers of hatchery fish on top of wild fish is a detriment to wild fish. There is also strong evidence (presented in the proposal) that hatchery-reared fish move downriver into lower pools. There will thus be impacts not only on the wild stock below Bonneville but also on the fishery. Short-term positive effects may be more fish, but long-term consequences should be considered. Any negative impacts to wild fish, whether through loss of genetic diversity, fitness, diseases, etc. will affect the key white sturgeon population segment remaining in the Columbia River. There is valid concern, based on scientific precedents, for the wild stock concentrated below Bonneville Dam, which is the lynchpin of the Columbia River Basin stock and provides important fisheries.

A "vision" for white sturgeon in the Mid-Columbia is required before proceeding into supplementation or artificial production. Certainly, the proposed workshop as indicated in Objective 1 would facilitate finding the "vision." The workshop discussions would involve a facilitated planning process to identify and discuss potential alternative conservation, restoration and management objectives, strategies, etc. These discussions would form the basis for development of an initial draft of a strategic plan for further review and consideration. Overall, as stated above, the sponsors are proceeding in a logical rational way for a three-step review realizing that as stated in the proposal that "hatchery-related actions (if any) may not prove the way to go."

A useful reference for the sponsors:

Smith, C. T., R. J. Nelson, S. Pollard, E. Rubidge, S. J. McKay, J. Rodzen, B. May, and B. Koop. 2002. Population genetic analysis of white sturgeon (Acipenser transmontanus) in the Fraser River. Journal of Applied Ichthyology 18: 307-312.

## 200900100 - Expanded Multi-Species Acclimation Wenatchee/Methow

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| **Proposer** | Yakama Nation Fisheries Resource Management |
| **Province(s)** | Columbia Cascade |
| **Subbasin(s)** | Wenatchee, Methow |

http://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P110477&session=fe8b46d1-66d9-4712-b871-c7e40afc6565

**Recommendation**

***Meets Scientific Review Criteria (Qualified)***

The proposal is to add an unspecified number of acclimation ponds for long-term rearing (but not full-term rearing) of spring Chinook and summer steelhead in the Wenatchee and Methow subbasins. One objective of the proposal is to develop a plan for the addition of these ponds (facilities).

The proposal narrative was sufficient to understand the intent of the sponsor, but not enough detail was provided to fully appraise any likely benefits to fish and wildlife. Since the first objective is to produce a plan, it should probably be a Master Plan, although the scale is such it would not necessarily require the full implementation of a three-step process. Any plan should:

1. fully document the current status of the resource (spring Chinook and summer steelhead) in the two subbasins;

2. establish clear improvements to the VSP parameters for these focal species as a consequence of using long-term acclimation ponds;

3. craft a monitoring design to evaluate any success (especially since the sponsor acknowledges not much is known about whether this strategy will improve the status of the species); and

4. integrate the principles from the Council's 2009 program, the HSRG findings, the Upper Columbia River Chinook and Steelhead recovery plan, the 2008 BiOp, and impending hatchery biological opinions.

The qualifications are covered by the four points above. The spring Chinook and steelhead ESUs are endangered (or threatened) so any artificial production needs to be carefully directed at improving the status of these species, not harvest, to be consistent with the Upper Columbia recovery plan and the Council's Fish and Wildlife Program. Any program that has the purpose of putting hatchery fish on the natural spawning grounds needs to be fully consistent with best management practices that are reflected in the HSRG guidelines for PNI, pHOS, pNOB, and limitations of the number of generations of supplementation reflected in the Council's 2009 Fish and Wildlife Program.

Without a more complete analysis, it is not possible to determine whether the use of the long-term acclimation strategy will be an improvement over the status quo, detrimental, or neutral. The hope appears to be that the long-term acclimation will distribute spawning hatchery fish broadly across the subbasins. However, the HSRG report states that spring Chinook released from the acclimation ponds in the Chiwawa River in the Wenatchee subbasin are found straying all over within the subbasin. So it is not clear how the additional ponds will add to the spawning distribution. Without knowing where the current hatchery steelhead spawn, it is not possible to know whether there are reaches that have suitable habitat but are underseeded. At this time the PNI for each of these programs is very small, and there is a need to progress toward larger proportions of natural fish on the spawning grounds and in any artificial production. So it is not clear that there is a need or desire to substantially expand the natural spawning by hatchery-origin adults.

**ISRP Comments**

1. **Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)**

The proposal is to initiate an expanded acclimation program for existing spring Chinook and steelhead hatchery mitigation programs in the Wenatchee and Methow basins. Instead of the direct stream releases and large single point hatchery releases currently utilized, it is hoped that juveniles would survive better and be directed to more appropriate habitat throughout the basins by adding acclimation sites. The intent is that small acclimation/release sites scattered throughout spawning habitat would then disperse returning adults, producing smolt-to-adult survival rates that would be higher than those from direct scatter plants or large single point releases.

Currently some 850,000 steelhead and over 2.2 million spring Chinook are released annually by PUDs and the BOR. The release protocol (direct stream releases and large single point hatchery releases) meets FERC license requirements and is set in place. Based on this alone, it appears to reviewers that this Accord proposal, if well designed, presents an opportunity to improve the performance of hatchery fish in the two basins.

Section B.3. of the proposal endeavors to put forth justification for the project. It states that “published research shows that acclimation is a critical component of salmonid recovery strategies” and “research conducted to date forms the basis” for eight “assumptions” (acclimation minimizes straying, aids in adult dispersal, etc.) that support or justify the work, according to the proposal authors. A ninth hoped-for result, reducing residualism of released fish (especially steelhead), is given in section B.3.1. In reality, some of the “assumptions” have been established by studies on steelhead and/or spring Chinook, but others are based on studies with other species (especially coho) and some have not been tested at all. The "success" of the coho study is mentioned, but the results are not succinctly presented here, and they should be, so that the actual success can be

assessed. The description of the coho acclimation program as "uniquely successful" in the introduction is not especially convincing. Supporting evidence from other studies that more numerous and more diverse acclimation sites have led to better results (however defined) is urgently needed. Reviewers are familiar with relevant published reports done on the Wenatchee system by the USFWS and consultants that were not discussed.

Although the basic concept of the proposal is intuitively inviting, it is not as yet shown to be based on strong science. Reviewers feel that at this stage the project should be more clearly thought of as being experimental rather than production-level. The proposal would be strengthened by differentiating (triage-like) the eight assumptions (plus two others: decreasing residualism and increasing SAR) prior to the beginning of the study and then using the appropriate subset as hypotheses to be tested by the project.

In addition, although it is reasonable that using more sites to spread out the smolts may favor better survival, the actual outcome is mainly dependent on the nature of the mortality in the days and weeks after stocking at the acclimation sites. In some situations, the risk may be spread out and survival increased with several ponds. In other situations, where predator saturation is possible, it may yield better results to stock at one place to saturate predatory and avoid depensatory mortality. What do the literature and results of specific studies say on this point?

Also, it appears that discussion of one important aspect of the project is neglected, which is the extent to which there might be negative (or positive) impacts on wild fish, both juveniles and adult, if the program more thoroughly distributes (and perhaps increases the size and number of) hatchery-produced steelhead and spring Chinook in the Wenatchee and Methow basins. The risk for Chinook would seem greater if, as the proposal suggests, wild steelhead no longer exist. Is this effort compatible with wild fish goals?

**2. Objectives, Work Elements, and Methods (section F)**

The proposed activities under this section are presented as resulting first in a Plan identifying specific types of acclimation sites, etc. The first objective is not really a proposal for implementation but a proposal for the planning of implementation. The second objective is more of an implementation objective once work has progressed past objective 1. However, reviewers encourage project staff to think more of the effort as an experimental study and to place more emphasis on framing testable hypotheses (as discussed above). By doing so, designing M&E efforts will be more straight-forward and after a few years it will be more evident if the expanded acclimation indeed provides cost-effective gains in fish production. Staff and facilities appear well suited for the tasks.

**3. M&E (section G, and F)**

The proposal points out that in addition to the existing hatchery M & E plan for the Wenatchee and Methow subbasins, “new, natural acclimation sites will require more project performance indicators to evaluate survival and condition of fish acclimated in the ponds compared to fish released without acclimation. Monitoring of these additional

project performance indicators will allow for adaptive management of hatchery practices to improve benefits achieved. M&E results will be reviewed and revised every 5 years on the same schedule as program M&E objectives." Three additional metrics are proposed if the Accord proposal is initiated: assessing in-pond survival, monitoring pre-release fish condition, and assessing smolt-to-adult survival. All three would then be compared with values for the conventional release program. Reviewers agree in general with this approach but offer three specific comments.

First, a few additional metrics should further be added to test the appropriate "assumptions" as discussed above (evaluating residualism, assessing possible effects on wild fish, etc.).

Second, the authors state that in the event that PIT tag detection cannot be installed at the pond outlet, in-pond survival rates would be estimated based on moribund fish, numbers of predators observed, and predator consumption rates. Reviewers have serious doubts that basing survival estimates on numbers of moribund fish or predator consumption would be worthwhile and suggest placing emphasis on PIT tagging or alternatives.

Third, because the testing of a possible change in SAR is the most important measure of success and is so easily confounded, it will need to be designed carefully with a high level of resolution. Sample size (number of CWT-tagged fish) was not provided in the proposal but will presumably need to be substantial.

**4. Overall Comments - Benefit to F&W (all proposal)**

The topic of this proposal is interesting and potentially important, involving the response of fish to acclimation sites scattered through a basin and the possible benefits to SARs. The results have ecological, evolutionary, and practical significance. However, it appears that the literature review pertinent to this proposal has just begun. There is too little specific evidence presented that this method has worked in other locations, and reviewers feel the project should be thought of as being more experimental than production-level. A review of possible impacts on wild fish is urgently needed. It is also true that this proposal is a sort of hybrid planning and implementation proposal. The proposers are sketching the bare bones outline of the study as being similar to the coho study (without clearly reporting results and benefits of that study) and then requesting funds to develop a similar study for Chinook and steelhead.