



**Independent Scientific Review Panel**  
for the Northwest Power & Conservation Council  
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**Memorandum (ISRP 2008-8)**

**July 22, 2008**

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

**From:** Eric Loudenslager, ISRP Chair

**Subject:** Final Review of June 2008 Results Report and Project Response for the *Mainstem, Middle Fork, John Day Rivers Fish Habitat Enhancement Project* (1984-021-00)

## **Background**

This ISRP memorandum is the latest in a series of ISRP reviews of Oregon Department of Fish and Wildlife (ODFW) proposals, results reports, and responses for the *Mainstem and Middle Fork John Day Rivers Fish Habitat Enhancement Project* (1984-021-00). The project's purpose is to enhance production of indigenous wild stocks of spring Chinook and summer steelhead within the John Day subbasin through fish passage improvement and habitat protection and enhancement. The previous ISRP reviews and project sponsor responses have primarily focused on results reporting for the project. This review is of ODFW's June 20, 2008 report, Comprehensive Project Review (1984-2007), and appendices. Before providing our review of the June 2008 submittal, we provide a brief history of the ISRP's last three reviews related to the project. Links to the full ISRP memos are provided in the footnotes.

### ***2006 Review for the Fiscal Years 2007-2009 Proposal***

At the time of the ISRP's 2006 review<sup>1</sup> of this project's Fiscal Years 2007-2009 proposal, the project had been ongoing since 1984, for 22 years. The ISRP commented that "after 22 years, the project should be showing changes in characteristics such as abundance of fishes, bank stability, and stream-width relationships." The ISRP recommended that "it is time for a comprehensive review of this project's biological results. One year of funding should provide time for this activity, while continuing ongoing field projects. Future funding should be contingent on completion of a satisfactory document." The Northwest Power and Conservation Council recommended to the Bonneville Power Administration that the "sponsor should complete [an] accomplishments report as called for in the ISRP recommendation."

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<sup>1</sup> ISRP Final Review of Proposals submitted for Fiscal Years 2007-2009 Funding through the Columbia River Basin Fish and Wildlife Program: [www.nwccouncil.org/library/isrp/isrp2006-6.htm](http://www.nwccouncil.org/library/isrp/isrp2006-6.htm).

### ***Spring 2007 Review***

In response to the Council's recommendation, ODFW submitted an initial response, March 6, 2007, that was intended to serve as a comprehensive accomplishments report. In an April 19, 2007 memo to the Council,<sup>2</sup> the ISRP provided a review of ODFW's response report and concluded that ODFW made a conscientious effort to address our specific concerns, but the document did not serve the function of a comprehensive analysis of project results. The document also made it clear that sufficient data for a much needed review and analysis probably did not exist. Recognizing both the limitations of the existing data and the pressing need to evaluate the effectiveness of past project actions, the ISRP recommended that a comprehensive report was still needed.

The ISRP suggested that the report should at least:

1. Identify locations where restoration has occurred;
2. The locations of these sites relative to spawning and rearing areas for the focal species;
3. Identify all the monitoring data that may exist for each of these sites;
4. Analyze and interpret the data;
5. Outline monitoring for the future.

On May 9, 2007, the Council (email from Mark Fritsch) requested that the sponsors address the first three questions but did not seek a response to questions four and five. The Council, however, suggested that a response to ISRP M&E concerns about the project would be desirable.

### ***Winter 2008 Review***

On February 20, 2008, ODFW provided a report intended to cover the first three issues raised by the ISRP. On April 22, 2008, the ISRP submitted its review of ODFW's response finding that it did not meet the ISRP's scientific criteria because of inadequate results reporting, apparent inadequate monitoring, and the lack of data collected in the past.<sup>3</sup> The ISRP noted that the inadequate monitoring and lack of data resulted, in part, from the lack of adequate financial support for monitoring in the John Day subbasin. The Council, moreover, did not request that the sponsors answer questions 4 and 5 which were critical to a determination of whether the project was showing benefits or might show benefits in the future. Even so, the ISRP stated that the sponsors could have provided more comprehensive answers to questions 1 through 3 based on available data, which was requested by the Council. The ISRP added that if the project is redesigned and reconfigured to account for advances in restoration science on landscape scale approaches and understanding of cumulative effects, the John Day could be a suitable candidate for an Intensively Monitored watershed in the long term.

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<sup>2</sup> See ISRP 2008-5a: [www.nwcouncil.org/library/isrp/isrp2008-5a.htm](http://www.nwcouncil.org/library/isrp/isrp2008-5a.htm) (Note: this is an April 19, 2007 memo appended to the ISRP's 2008 review).

<sup>3</sup> See ISRP 2008-5: [www.nwcouncil.org/library/isrp/isrp2008-5.htm](http://www.nwcouncil.org/library/isrp/isrp2008-5.htm)

On May 20, 2008, the Council (email from Mark Fritsch) recommended that ODFW have an opportunity to respond to the ISRP's review. As requested and noted above, on June, 2008, ODFW responded, and the ISRP's review of that response follows below.

## **ISRP Review of ODFW's June 2008 Report: Comprehensive Project Review (1984-2007)**

### **Question 1: Identify locations where restoration has occurred**

The project sponsor provided extensive maps of the John Day subbasin, identifying locations of riparian improvement projects by watershed, along with maps of riparian function and watershed areas of high, medium, and low priority for protection and restoration, as well as focal species distribution by major life history stage. The amount of material provided for review represents a significant improvement over what was submitted in the past.

The narrative in the Comprehensive Report would be improved if a quantitative relationship between sites treated and their prioritization for improvement and protection were established and contrasted with the priorities in the subbasin plan. This task need not be a particularly complicated. For example, what number and percentage of projects and activities took place on reaches of high, medium, low priority for protection and improvement of steelhead and spring Chinook habitat? How do these compare with the general vision and explicit priorities in the subbasin plan?

### **Question 2: The locations of these sites relative to spawning and rearing areas for the focal species**

The sponsor provided a more complete response to this question than in their previous report. For each major subbasin they provided maps showing migration corridors; rearing and migration habitat; and spawning and rearing habitat for steelhead and spring Chinook. The locations of projects were displayed on each map relative to the various habitat types.

The maps were helpful in identifying locations of projects in relation to fish habitat use, but some items such as location of specific habitats (e.g., spring Chinook spawning; Figures 10e, 11b) seem to be described very broadly, suggesting that spawning occurs over many reaches whereas redds may be localized within these reaches. Indeed, on page 12 of the Comprehensive Report, index specific spawning sites are mentioned (e.g., site MF-11), but these sites are not shown on the map. More specific identification of actual spawning areas would be helpful.

### **Question 3: Identify all the monitoring data that may exist for each of these sites**

The sponsors identified available monitoring data more extensively than they did in their previous report. The amount of monitoring data available, however, appears to be quite

limited for important indicators of habitat recovery and juvenile fish abundance. The sponsor's discuss only one project where juvenile fish sampling occurred. Long term stream temperature data was reported for only four sites, bank stability rating for two sites, and channel profiles for three sites. The most extensive data sets are for photopoints at restoration sites (261 points) and long term index redd counts for steelhead at 13 project sites and for spring Chinook at four sites.

It is unclear how the monitoring sites were selected and whether the information gained from them can be extrapolated to other unmonitored sites. There appear to be few sites where comprehensive collection of data on riparian and in-stream conditions, and fish abundance was done concurrently. This hampers the sponsor's ability to relate changes in fish abundance following restoration actions to changes in terrestrial and aquatic habitat conditions. Furthermore, the restoration effort is largely founded on small scale studies (Beschta 1991, Kaufman et. al, 2002 and 2004). Developing future strategies is still necessary for improving riparian condition that address (1) the size of the treatment, (2) location of treatments to address specific aquatic habitat conditions, and (3) specific life-history stages of steelhead and spring Chinook.

The sponsors acknowledge that they are dealing with an unbalanced sampling design and low statistical power for some analyses. The problem with statistical power may be revealed in the variable levels of significance given for the statistical tests and correlation factors. Also, in various places in the Comprehensive Report the sponsors state that it would be very difficult to draw conclusions based on the tasks they have completed.

Compilation of some key habitat data seems to be a difficulty because many agencies have been involved in collecting this data and it apparently has not been assembled, summarized, and made available to all workers in the John Day basin. The sponsors acknowledge this difficulty (p.15): "Throughout the subbasin, many different agencies have inconsistently gathered thermograph data through sections of streams within the John Day Subbasin. No compilation of the data from these different agencies has been undertaken to potentially compare sites above and below fish habitat project sites."

#### **Question 4. Analyze and interpret the data.**

The sponsors were not required to answer this question in their previous report. The current report provides a more comprehensive presentation of results and improved analysis of the data than any of the sponsor's previous project proposals and reports provided to the ISRP.

The ISRP appreciates the before-and-after comparisons presented in the photopoint summaries (Appendix C). This appendix is an excellent example of the type of information that can be gleaned from the relatively low cost effectiveness monitoring technique of periodic photo documentation. We also appreciate that qualitatively described habitat characteristics – bank stability, rush and sedge recovery, shrub and tree recovery, width:depth ratio, and instream habitat complexity – were assessed based on the photopoints. The fact that almost three-fourths of the riparian fencing projects

demonstrated improvement in all five of these categories and an additional 15% showed improvement in two or more categories provides convincing evidence of some habitat recovery. In fact, the photo documentation probably yielded the best overall evidence that habitat improvement has in fact occurred, compared to trends in stream temperature, bank stability measurements, and channel profiles.

The most extensive data sets that the sponsor analyzed quantitatively were index redd counts collected by ODFW. The sponsors used this data to determine if the number of redds at four locations increased following restoration actions. They compared trends in steelhead and spring Chinook redd counts in reaches where significant restoration actions had occurred to trends in control reaches. They found no change in redd densities in two of the four treated reaches, when compared to the reference stream, and a suggestion of a positive trend in another. They did, however, conclude that redd densities increased in the Upper Mainstem John Day following restoration actions in the mid-1980's when compared to redds in the North Fork, a stream mostly in wilderness. However, it appears from the graph of redd density trends in the Upper Mainstem (Figure 3) that densities might have been increasing prior to restoration. It is unclear from the graph or the sponsor's analysis whether the positive trend in redd counts after restoration was a result of the treatment or simply a continuation of the increasing trend observed prior to restoration. The sponsors acknowledge that "The increasing slope of redd density is not significant for the period after the 1980s" when restoration actions took place. Furthermore, there were some restoration activities undertaken on the North Fork reference stream, complicating comparison. In short, the sponsor's analysis does not suggest convincingly that redd densities in any of the four reaches have shown long term increases directly resulting from restoration actions.

The stock-recruitment graph (S-R) in Figure 8 plots data on the number of smolts outmigrating against number of redds. On page 34, the authors mention there has been a downstream shift in spawning, implying that use of particular habitats and reaches by spawning fish has shifted over the time that the S-R data was collected. No information was given on the location of the smolt traps and whether smolts were being trapped below the major spawning areas, which would be needed if the S-R relationship is intended to represent the entire basin.

In their analysis of the stock-recruitment curve, the sponsors conclude, using the Ricker version of the curve, that "recruitment reaches a plateau, suggesting that existing rearing habitat is limiting production." This "plateau" (at 1000 redds) really appears to be the peak of the S-R curve and not a plateau. The sponsors also present a Beverton and Holt stock-recruitment curve using the same data. Perhaps the B-H curve may give a better indication of carrying capacity as it actually begins to plateau at about 500 redds and would suggest that habitat is in far worse condition than what the sponsors conclude from the S-R curve. The sponsor's do not explain why they chose the S-R curve over the B-H curve.

The status and trend data presented for spring Chinook at the subbasin scale, unfortunately, fail to provide compelling evidence that habitat improvement projects have

increased the productivity of the system as a whole for this species. The “stock recruitment curve” (Figure 8, page 28) has been plotted as a single line, suggesting that the number of progeny (smolts) produced by their parents (i.e., redds) has followed the same relationship over about 25 years. If habitat were becoming more productive as a result of restoration activities, there should be a shift toward greater numbers of smolts per redd. However, the average number of spring Chinook smolts (91,647) for the most recent six years when adult escapement has been relatively high is little changed from the average annual smolt production (97,600) in 1978-1982 when adult escapements were less than 50% of what they have been more recently, implying that smolts per redd had actually declined after restoration actions were instituted.

### **Question 5. Outline monitoring for the future**

The sponsors were not required to answer this question in their previous report. The sponsors plan to continue limited monitoring and evaluation (M&E) on some existing sites and expand to some new sites. The project would benefit greatly from a statistically rigorous sampling design that would allow greater generalization of results to other project locations within the subbasin. The sponsor proposes to take steps that would improve project M&E by randomly selecting photopoints and expanding sampling for riparian cover and channel changes to additional sites or new projects. Even so, these additional sampling sites need to be carefully and systematically selected so as to allow extrapolation of results to other sites. The sponsors should also consider adding additional reference streams, if available, to the sampling design to attempt to account for out-of-basin effects and natural variability (e.g., a BACI or BACI-P type design). The project sponsors are referred to the recent ISRP Metrics Review (ISRP 2008-7<sup>4</sup>) for suggestions on appropriate implementation and effectiveness monitoring metrics for different restoration actions.

The sponsors seem frustrated by the lack of adequate funding support through the Fish and Wildlife Program/BPA. Have the sponsors fully engaged other agencies and groups involved in M&E activities, particularly the IMW program, in order to join forces and further biological assessment monitoring in the John Day? The sponsors state (p. 13): “The objectives of the Middle Fork RM&E project are to assess population abundances/rearing densities, length and weight information, growth rates upon potential recaptures, and ideally survival to the smolt stage. In relationship to fish spending time within the fenced areas there is potential to quantify parameters that may be different between fenced and unfenced areas.”

This project seems to provide an ideal opportunity for close coordination, especially as the Middle Fork RM&E project is run by another Oregon State entity (Oregon Watershed Enhancement Board), but no solid plan is apparently in place to capitalize on it. There are other IMWs in place elsewhere in the Columbia Basin (e.g., those under the NOAA ISEMP project), but these do not seem to be well coordinated with the current project. Perhaps there are solid initiatives underway to consolidate all the monitoring work in the John Day basin but, if so, they are not clearly identified in the Comprehensive Report.

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<sup>4</sup> [www.nwcouncil.org/library/isrp/isrp2008-7.htm](http://www.nwcouncil.org/library/isrp/isrp2008-7.htm)

The sponsors state that there is an “informal partitioning” of projects among partners and agencies. While this arrangement seems to be working very well from an implementation view, it is not clear if it has helped or hindered M&E. The “informal partitioning” may have led to dilution of effectiveness monitoring.

It appears clear from the maps in Appendix A and also from the narrative review that the restoration program still has a long way to go in terms of addressing spawning and rearing habitat issues on privately-owned lands. The sponsors acknowledge this fact:

“The lower mainstem of the John Day River has approximately 880 miles of steelhead/Chinook distribution streams within private property of which 257 miles is delineated through EDT modeling as migration-only habitat. The total treated stream miles comprise about 4% of the privately owned salmonid distribution in the Lower Mainstem of the John Day River for salmonid habitat other than migration-only.”

“The upper mainstem of the John Day River consists of approximately 275 miles of steelhead/Chinook distribution streams that are within private property. The 34.7 total stream miles protected, involving 35 landowners, comprises 13% of the privately owned salmonid habitat in the upper mainstem (or 15% of all steelhead/Chinook habitat that is not considered as migration-only).”

“The North Fork of the John Day River has approximately 371 miles of steelhead/Chinook distribution streams within private property. The treated reaches comprise about 14% of the privately owned salmonid distribution. When considering that 65 miles and 56 stream miles were identified as steelhead and Chinook migration-only habitat respectively, the treated percentages are 16% for steelhead and spring Chinook.”

“The Middle Fork of the John Day River contains approximately 177 miles of steelhead/Chinook distribution streams within private property and the Habitat Project treatments comprise about 10% of the privately owned salmonid distribution. When considering that 25 miles and 42 stream miles were identified as steelhead and Chinook migration-only habitat respectively, the treated percentages are 12% for steelhead and 13% for spring Chinook.”

In aggregate, these statements suggest that over the history of this project approximately 10-20% of the streams flowing through privately-owned lands above the lower mainstem have received restoration treatments. Overall, the Comprehensive Report indicates that over 800 miles of stream on public and private lands are likely in need of treatment. In 24 years since the inception of the project, only 123 miles have been treated and another 20.9 miles treated by other projects, for a total of 143.9 miles. At a rate of approximately 6 miles per year it will take 133 years to treat the subbasin.

In all likelihood some ranchers and farmers will resist any habitat restoration actions on their property, but the ISRP would like more information on what is being done to convince other less reluctant land owners to participate in programs that improve their streams and riparian areas. Given the extensive privately held lands within the John Day

subbasin, getting private land owners engaged in riparian protection programs will be a key to future success.

The sponsors describe riparian and stream condition as improving for many projects, but not yet achieving desired conditions. Sponsors state that these streams will continue to improve over the next 50 years as the riparian vegetation matures. Landowner agreements for projects appear to expire after 15 years. An important consideration is what happens to the riparian areas after the agreements terminate. According to the text in the Comprehensive Report, 93 projects with 85 land owners have been completed and there are currently 54 active agreements. That means 39 projects are no longer covered by agreements. It would seem important for achieving subbasin and Fish and Wildlife Program goals to have an idea of the fate of stream habitats for projects that have expired. A plan for evaluating the fate of expired treatment reaches seems to be needed.

## **Conclusions**

This project has many strengths. It has implemented 93 projects since its inception in 1984 and has had success working with landowners to establish restoration projects on private lands. The sponsor's analysis indicates riparian and channel changes have improved at many sites following restoration activities, but it remains unclear how these changes have affected fish abundance. In the current report, the sponsors put significantly more effort into presenting and analyzing data than in the previous reports and proposals given to the ISRP for review.

Among the principal limitations of M&E for this program are the lack of quantitative data for assessing project effectiveness, the small number of project sites where monitoring is occurring (with the exception of photopoints), and the lack of a coherent statistical design for sampling site selection. The approach adopted by this project of monitoring a few selected sites may not be cost-effective, and certainly with the limited funds apparently available there is little scope for meaningful biological effectiveness monitoring for the multitude of projects scattered throughout the basin. A possible strategy would be to focus all M&E in the Intensively Monitored Watersheds.

Much of the text repeats earlier assertions that riparian habitat improvement through exclusion fencing is a worthwhile endeavor, citing Beschta et al. 1991, Kauffman et al. 2002 and 2004. The ISRP's concern is not whether livestock exclusion fencing, off-site watering, and planting riparian zones with cover can improve in-stream habitat conditions. The concern is whether the specific sites selected, exclusion zone sizes, and the scale of the effort is sufficient to significantly improve habitat within the subbasin in a defined timeframe, and whether this improvement leads to increased salmon productivity.

The effectiveness monitoring part of this program lacks a coherent design which limits the applicability of results. The monitoring sites are few (except photopoints), and it is unclear how they were selected and whether they are representative of other unmonitored sites. Ideally, sites should be selected so that information gained from them could be

generalized to other unmonitored locations. Also, ideally, measurement of the riparian and stream condition, and fish distribution and abundance should occur concurrently at each sampling location.

The sponsor's presentation of results and analysis of existing data was improved over past efforts. The analysis suggests that riparian and stream channel conditions may be improving at many locations, but whether these habitat improvements have directly enhanced juvenile and adult fish abundance is uncertain at this point in time. Even a more rigorous data analysis, however, would be unlikely to yield much greater understanding of the effectiveness of the restoration projects because of the lack of quantitative data and a scientifically sound sampling design.

Based on the information provided in the 2007-09 proposal and subsequent reports on accomplishments, the ISRP is unable to conclude that this project meets reasonable expectations for project criteria set forth in the 1996 amendment to the Power Act. The tasks implemented – exclusion fencing, off-stream watering devices, planting – meet review criteria in that they are recognized as acceptable, scientifically justifiable practices. Nonetheless, the overall project lacks clear physical habitat or biological (fish population) objectives. The proposal identifies several limiting factors for fish production from the subbasin plan – i.e. flow, temperature, in-stream habitat complexity – but does not identify the improvement these collective projects are intended to provide, or a timeframe or method to evaluate whether project implementation is meeting the subbasin plan objectives and vision. Based on the information provided in the Comprehensive Report, the ISRP is unable to establish that there are meaningful benefits to fish and wildlife to date. The fish habitat improvement projects being undertaken in the John Day subbasin through the Fish and Wildlife and other programs do not appear to be sufficiently integrated to conclude that the individual projects add up to an effort that can restore and enhance the salmon and steelhead populations in a defined timeframe.

#### **ISRP Recommendation 2008: Meets Scientific Criteria (Qualified)**

The qualification is that the overall project needs a clear objective for the amount of improvement in physical habitat that it will achieve on private lands (miles of stream with some level of improvement in riparian condition); needs a clear objective for improvement in aquatic habitat conditions (increasing spawning capacity, increasing juvenile rearing habitat, etc); and needs clear objectives for improving the status of the steelhead and spring Chinook focal species. The sponsors also should develop a more rigorous, statistical sampling design for both current and future projects to try to (1) ensure that results can be generalized to other unmonitored sites within the basin and (2) obtain more data on juvenile fish abundance. These deficiencies should be addressed in future proposals if the project is continued.

Because the John Day subbasin is critically important to Columbia River basin salmon and steelhead resources, and because habitat conditions on private lands are critical to the overall functioning of this subbasin, continuing the project while refining it may be

warranted. The sponsors appear to understand the required designs and methods for monitoring the projects but are unable to obtain support through the Fish and Wildlife Program/BPA. An adequate fish and fish habitat monitoring program that would serve both the Council and other program projects (OWEB, Pacific Salmon Fund) within the subbasin is needed.