



Independent Scientific Review Panel

for the Northwest Power & Conservation Council
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Memorandum (ISRP 2012-20)

December 10, 2012

To: Rhonda Whiting, Chair, Northwest Power and Conservation Council

From: Rich Alldredge, ISRP Chair

Subject: Follow-up review of Beaver Creek and Mill Creek restoration actions under the Fish Accord proposal, *Habitat Restoration Planning, Design and Implementation within the Boundaries of the Confederated Tribes of the Warm Springs Reservation of Oregon, Lower Deschutes River, Oregon, #2008-301-00*

Background

At the Council's October 26 and November 2, 2012 requests, the ISRP reviewed proposals for Beaver Creek and Mill Creek restoration work to be implemented through the Confederated Tribes of the Warm Springs Reservation Fish Accord project: *Habitat Restoration Planning, Design and Implementation within the Boundaries of the Confederated Tribes of the Warm Springs Reservation of Oregon, Lower Deschutes River, Oregon, #2008-301-00*.

The ISRP has participated in five previous review iterations of the Lower Deschutes River restoration proposal. The most recent review was released December 21, 2011 ([ISRP 2011-27](#)). In that review, the ISRP found that the revised proposal met scientific review criteria (qualified). The ISRP concluded that, for the most part, the proposal was adequate for the planning phase. However, the ISRP asked for more details on the site-specific actions and an overall monitoring plan.

The ISRP offered the following qualifications:

1. Essential details of actions at a number of project restoration sites have not yet been worked out (see first two paragraphs under Section III, p. 21). The general approach to identifying candidate sites and addressing specific limiting factors appears to be sound, but site-specific details should include (1) *quantitative* habitat information on existing conditions and improvements expected after restoration, (2) descriptions of how restoration of the site will contribute to improvement in viable salmonid population (VSP) parameters of focal species, and (3) estimates of the increased carrying capacity of the site following habitat improvement, which can be tracked over time to see if initial assumptions were justified. These issues should be addressed adequately as detailed information is gathered as part of annual reporting requirements, and certainly before restoration work begins.
2. More details about the habitat project monitoring efforts are needed. The proposal states that PNAMP protocols will be followed, with physical and biological components of the

monitoring constituting separate phases of the monitoring and evaluation work. Each project site should have its own monitoring and evaluation plan, as the specific restoration actions will vary from place to place and will require different habitat and fish population metrics for monitoring purposes. Site-specific monitoring details should be developed and reported as part of annual reporting requirements, and the details should be clear before restoration work begins. The ISRP understands that the level of detail in plans will vary according to the scope and scale of restoration actions at a particular site and recommends that project-specific scientific review be commensurate with the complexity of the proposed action.

3. The ISRP should review a draft of the project evaluation criteria and monitoring plan before it is finalized. In particular, plans for tributary actions following the “contract design” phase should be scientifically reviewed before implementation. Likewise, monitoring plans for restoration sites should be peer-reviewed for scientific adequacy. A reasonable schedule should be established for site-specific plan development and scientific review.

Based on the ISRP’s review ([ISRP 2011-27](#)), the Council developed a recommendation, which they summarized as follows:

1. *The CTWSRO will submit further detail as requested by the ISRP for each work area as detailed in the following.*
 - a. *Beaver Creek: Upper Beaver, Coyote, and Quartz creeks enhancement will be made available for review during Spring/Summer 2012;*
 - b. *Mill Creek: Potters Pond to Boulder Creek restoration available Spring/Summer 2012; and*
 - c. *Warm Springs River: Large woody debris additions/placements available for review in late 2012/early 2013 or reviewed during the Geographical Review.*

Bonneville will include as part of contracting specific deliverable of the details for the three proposed project work areas that can be used as the basis to evaluate project merit and action effectiveness. In response to the ISRP request, at a minimum the deliverables will include site-specific detail defining baseline habitat condition; expected improved condition post implementation; a description of how restoration will contribute to improved parameters of focal species for each site; and a description of project evaluation criteria and monitoring to determine action effectiveness. Site-specific monitoring and results will be included in annual reporting requirements for the project. Implementation of the three work areas will be based on a favorable review by the ISRP.

2. *The goal of this CTWSRO habitat project is to protect, manage, and restore aquatic habitats in Reservation watersheds. Given the Council’s understanding of the focus of this project, the Council expects adequate monitoring of physical aspects of restoration actions to detect whether the desired physical change is achieved. The Council understands the difficulty of detecting a fish population response at a local project scale. The Council therefore anticipates regional status and trend and watershed effectiveness programs, such as IMWs, to provide within the appropriate timeframe the evidence that these types of habitat restoration actions do contribute to improved fish condition and productivity.*
3. *The qualification raised by the ISRP is addressed in #2 above and in the work area submittal and review by the ISRP as addressed in #1.*

Based on the ISRP review the Council supports continued planning and design associated with projects in Beaver Creek, Mill Creek and Warm Springs River. Implementation of the plans in Beaver Creek, Mill Creek and the Warm Springs are conditioned on favorable review from the ISRP.

The current review pertains to site-specific actions on Beaver Creek and Mill Creek. The project sponsors responded to the ISRP's concerns in their cover letters to the ISRP, and the project design for Mill Creek can be found at:

<https://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P126981>.

It is important to note the nuances between the ISRP's recommendation on biological/fish monitoring and the Council's. The ISRP recommendation states, "Each project site should have its own monitoring and evaluation plan, as the specific restoration actions will vary from place to place and will require different habitat and fish population metrics for monitoring purposes." The Council's recommendation requests that the project sponsor monitor the "physical aspects of restoration actions to detect whether the desired physical change is achieved." However, because of the Council's understanding that detecting a fish population response at a local project scale is difficult, they recommended that regional status and trend and watershed effectiveness programs provide evidence that these types of habitat restoration actions contribute to improved fish condition and productivity.

A theme of the ISRP's comments for both Mill Creek and Beaver Creek is that the project sponsors should better demonstrate how fish response will be monitored and reported, even if not by this specific project. The ISRP understands that the project sponsors may feel they are getting mixed messages from the ISRP and the Council, but the ISRP believes that by coordinating with some of the fish monitoring already in place in the Deschutes subbasin, the project sponsors can benefit from biological as well as physical habitat monitoring and evaluation.

Beaver Creek Recommendation

Meets scientific review criteria (Qualified)

The ISRP raised three primary concerns in its previous review of this project. A response to the first of these concerns, regarding information about current and future habitat conditions, is partially addressed, although quantitative estimates of expected future habitat conditions is lacking. The ISRP's concerns about quantitative estimates of expected fish response and a mechanism to measure actual fish response in the future are not adequately addressed. Therefore a part of Qualification 1 has not been addressed. Qualifications 2 and 3 from the original ISRP review still remain and need to be addressed. The ISRP suggests that the sponsors take advantage of the upcoming Geographic Review to engage in discussions, if possible including site visits and presentations, that respond to the ISRP qualifications on any remaining issues raised in this review.

The ISRP urges the project sponsors to implement pre and post project habitat monitoring and to complement it by implementing a biological monitoring element that is coordinated with the monitoring efforts being conducted under other projects.

The proposal does a good job of identifying general factors that are likely adversely affecting habitat quantity and quality. It proposes treatments at a watershed scale and appears to focus on reducing some of the major factors responsible for habitat degradation, especially erosion/sediment delivery, water storage and routing and biological connectivity. Good examples of these proposed actions include the use of fencing to encourage recovery of floodplain and riparian vegetation, treatment of the road network to reduce erosion and sediment delivery, and elimination of the current stream diversion to reconnect the original channel of North Fork Quartz Creek.

The ISRP's request for more information on current habitat condition and the processes that have been responsible for habitat degradation is adequately addressed. However, quantitative descriptions of current and expected, post project habitat conditions are needed. Currently only qualitative descriptions are presented. A more robust consideration of habitat response would be valuable in establishing objectives and designing a habitat monitoring program.

The most serious deficiency of the proposal remains the lack of a biological assessment effort. There are ongoing monitoring programs for fish in the project area that could provide useful information about fish response to this project with minor additional effort. For example, it should be possible to take advantage of existing smolt monitoring to assess contributions from the restoration sites. A comparable sampling design to the sampling of juvenile fish densities ongoing in the basin should be implemented at the project sites to estimate response in parr abundance to project implementation. Ongoing spawning surveys should be used pre- and post-restoration to assess benefits of the restored habitat to spawners. The ISRP is not suggesting initiation of an intensive evaluation of fish response to these habitat projects, but that the project sponsors consider all options to take full advantage of monitoring programs already in place to generate information about the response of focal species to habitat improvements from this project. It would also be useful to the ISRP if the project sponsors described how monitoring possibilities that they considered were deemed feasible or infeasible.

Comments

1. *Quantitative habitat information on existing conditions and improvements expected after restoration*

Some quantitative information describing pre-project conditions (road densities, channel length, percent of substrate fines, and the vertical extent of channel down cutting) is provided, but descriptions of post-project physical conditions are qualitative and quite general. Restoration objectives, including expected post project conditions and a time frame for response, should be provided. These objectives would be very valuable in designing post implementation monitoring and interpreting monitoring results. The current proposal does not fully meet the Council's expectation that deliverables will include "*site-specific detail defining baseline habitat condition; expected improved condition post implementation...*"

Some of the treatments are in the planning stages and details for their actual design are incomplete. The ISRP has some suggestions for these project elements that may improve design and effectiveness. This is especially true for the road treatments and channel re-connection (control of channel head cutting and treatment of eroding stream banks).

Road treatments: The proposal states that there has been an assessment to identify priority road segments for treatment. It is not apparent if fish passage at road-stream crossings was included in the assessment. Given the high density of roads and the likelihood of numerous road-stream crossings, such an assessment, if it has not been completed, would be useful to identify passage obstructions and ensure that opportunities to reconnect habitat in upper Beaver Creek are fully considered.

The criteria that are being used for identifying priority roads/segments for decommissioning appear reasonable. It would be useful if the proposal identified the length and percentage of roads proposed to be decommissioned and provided a clarification of Figure 12. Currently the figure only shows roads “open” and “closed” and does not indicate if roads that are identified as “closed” are the ones proposed to be decommissioned. Also, this map shows many “open” road segments that are adjacent to stream channels but does not indicate if any restoration treatments, designed to reduce sediment delivery, are being considered for these road segments. Treating open road segments can be a very important component of sediment control. Such treatments may be critical to reducing sediment delivery to the drainage network since it appears that at least half of the roads in the system will remain open.

Research conducted by the Intermountain Research Station of the Forest Service (Black, T., N. Nelson, C. Luce, R. Cissell. 2012a. Legacy Roads Monitoring Project 2012 Update. USDA, Rocky Mountain Research Station. Boise, ID) may be useful in refining the road treatments associated with this project. This study of road restoration work, conducted by the USDA Forest Service over the last 5 years, found that less than 10% of drain point sites on studied road systems accounted for more than 90% of sediment delivery to streams. This information was used as the basis of an assessment process to identify and prioritize problem road segments for treatment. This tool may be useful for refining site selection and treatment prescriptions for roads in the Beaver Creek project. Additionally, this publication reports the results of research monitoring on the effectiveness of various road treatments for reducing sediment delivery to streams at a number of sites in the Pacific Northwest. The research findings provide insights on the effectiveness of treatments that can be made to roads that may remain open and still reduce their delivery of sediment to streams. Results of this work are summarized in a technical note published by Wildlands CPR (an NGO dealing with road issues; Wildlands CPR Tech Note: Legacy Roads and Trails Remediation Program, Measuring Success, November 2012). A link to this report is:

www.wildlandscpr.org/files/GRAIP%20Report%20Wildlands%20CPR_0.pdf.

Finally, there is also very good information on a variety of potential road treatments in a publication entitled “Low Volume Roads Engineering- Best Management Practices Field” (Keller and Shearer 2003). This publication might serve as a useful source document for the planning of road restoration treatments.

Channel re-connection (includes control of channel head cutting and treatment of downcut/eroding stream banks): Given the significant incision (2-3 meters) and head cutting of the channel on Quartz Creek and past, failed restoration attempts to address channel incision on Coyote Creek, it appears that sophisticated planning and design will likely be required to successfully address these issues. As stated in the previous ISRP review of the proposal (ISRP 2011-27), “it is recommended that they seek outside professional assistance as appropriate. Once details have been developed, it would be helpful for site-specific plans to be peer-reviewed by the ISRP or by a similar group of habitat restoration specialists to provide feedback from others familiar with similar habitat improvement projects.” The revised proposal indicates that the NRCS will assist in planning and design. An additional resource, that may be useful for design assistance or peer review of project designs, is the Restoration Assistance Team of the Pacific Northwest Region of the USDA Forest Service. This Team is comprised of a group of hydrologists, fisheries biologists, soil scientists, and engineers, all with extensive experience in a wide range of watershed restoration treatments throughout Oregon and Washington. The group has been in existence for nearly 10 years and has provided assistance on many projects on and off of National Forest System Lands. A number of team members have experience with meadow restoration and channel re-construction in systems east of the Cascade Mountains. A contact for discussing potential assistance from this group is Scott Peets, a fisheries biologist for the Forest Service, Portland Regional Office. His e-mail is: speets@fs.fed.us and phone is 541 750-7181.

Habitat Monitoring: In the previous review of this proposal, the ISRP suggested, *“More details about the habitat project monitoring efforts are needed. The proposal states that PNAMP protocols will be followed, with physical and biological components of the monitoring constituting separate phases of the monitoring and evaluation work. Each project site should have its own monitoring and evaluation plan, as the specific restoration actions will vary from place to place and will require different habitat and fish population metrics for monitoring purposes. Site-specific monitoring details should be developed and reported as part of annual reporting requirements, and the details should be clear before restoration work begins.”*

This concern has not been fully addressed. The current proposal states “Physical monitoring will be conducted to document spatial and temporal changes of the restoration site. Monitoring parameters will include channel cross-section, longitudinal profiles, photo points, and McNeil core samples as described in the project narrative to track the quality of the spawning habitat.” The habitat monitoring plan would benefit from more specific identification of restoration objectives. Examples might include: Within ___ years after following restoration treatments channel incision and/or head cutting will be eliminated; at least 90% (_____lineal feet) of vertical, actively eroding stream banks will be stabilized; the percentage of fine sediments (6.3 mm or less in diameter) in the channel substrate will meet the IRMP standard of 20% or less. Other quantitative objectives could be developed for vegetative recovery of fenced areas and perhaps wetland function.

Black, T. N. Nelson, C. Luce, R. Cissell. 2012a. Legacy Roads Monitoring Project 2012 Update. USDA Rocky Mountain Research Station. Boise, ID.

Keller, G. and Sherar, J. 2003. Low Volume Roads Engineering-Best Management Practices Field Guide. US Agency for International Aid and USDA Forest Service, International Programs.

2. *Descriptions of how restoration of the site will contribute to improvement in viable salmonid population (VSP) parameters of focal species*
3. *Estimates of the increased carrying capacity of the site following habitat improvement, which can be tracked over time to see if initial assumptions were justified.*

Response to these two ISRP concerns was limited to a general description of the possible effects project actions could have on spawning and rearing habitat (Figures 15-18 and accompanying text). However, no quantitative estimates of the potential improvement on VSP parameters or projections of changes in system carrying capacity for steelhead or spring Chinook are provided. In addition, the response indicates that there are no plans to assess biological response to this project. As noted in the General Comments, above, the ISRP believes there are opportunities for incorporating some level of biological monitoring into this project with only moderate additional effort due to the existing fish-monitoring programs already in place in the project area.

The sponsors' response to these two ISRP concerns was summarized in the statement *"Biological monitoring is beyond the scope of this project... Linking fish response to a site-specific habitat project is extremely difficult and requires a sample design that takes into account a number of variables (e.g., temporal and spatial replication), which are cost prohibitive and logistically impossible."* The ISRP does not agree with this statement as it applies to this project. The proposed habitat actions are not site-specific. Rather a suite of actions will be implemented at multiple locations in upper Beaver, Quartz, and Coyote creeks that have the potential to improve spawning and rearing habitat for a considerable distance downstream from the project area. Assuming the limiting factors in Beaver Creek have been accurately identified, detecting a response by the fish should be feasible. The feasibility of biological monitoring is enhanced by the fact that the fish populations in this watershed are already being measured as part of a basinwide monitoring program. Implementing a monitoring effort for fish response to this project could be accomplished with minimal effort by coordinating with the ongoing monitoring. For example, fish from the improved sites, especially the reconstructed Quartz Creek channel, could be marked and then trapped at existing smolt traps. The assumption that this project will improve spawning habitat in the lower reaches of Beaver Creek could be assessed by comparing the distribution of spawners in the system based on pre-project data with distribution following project implementation. This approach would provide a monitoring element that takes advantage of the fisheries research that is being conducted in the project area.

Mill Creek Recommendation

Meets scientific review criteria (Qualified)

The revised proposal reasonably addressed Qualification 1 from the previous ISRP review but failed to address Qualifications 2 and 3. Therefore, Qualifications 2 and 3 from the original ISRP review still remain and need to be addressed. The ISRP suggests that the sponsors take advantage of the upcoming Geographic Review to engage in discussions, if possible including site visits and presentations, that respond to the ISRP qualifications on any remaining issues raised in this review.

The revised proposal provides substantial specificity on the project design and an initial estimate of expected habitat response to restoration actions. However, the sponsors do not describe how this project fits into the regional habitat M&E effectiveness effort on fish response. It is not clear how this project will use fish-monitoring programs already in place to generate information about the response of focal species to habitat improvements from this project. Monitoring of juvenile salmon and steelhead density and spawner abundance has been conducted at the project site for some time. Given the availability of this baseline information, a monitoring system to assess fish response to the project should be relatively simple and affordable by taking advantage of the existing fish monitoring efforts. The possible monitoring approaches provided in the comments on the Beaver Creek project also apply to this project.

Comments

1. Quantitative habitat information on existing conditions and improvements expected after restoration

It is apparent that a good deal of thought and effort went into the development of the comprehensive project design, including details on the sequencing of individual work activities for construction. In addition, a detailed, quantitative listing of current and anticipated, post restoration, habitat conditions is provided in Table 1. It is not clear how habitat improvement, expected after restoration, was estimated. It appears likely that the expected habitat response was estimated from the engineering surveys and project design. Some additional discussion as to how this was accomplished would have facilitated the ISRP review. Additional detail, such as predicted pool depth, volume, and cover as well as alcove and pond depth and cover would have been useful to help evaluate the quality of restored habitat in addition to its areal extent.

There is no discussion regarding future beaver activity in the restoration area and its possible effects on the function of planned restoration treatments. It seems likely that the treatments for creating side channels, alcoves, and ponds and adding in-channel wood are likely to attract beaver, especially after riparian plantings have become established.

The fact that there have been multiple, unsuccessful restoration attempts at this site over the last 20 years is of concern. There is little discussion about the design of projects implemented in the late 1980's other than the statements that "The existing berms and gabions installed during

previous habitat improvement are eroding banks and increasing sediment delivery to the channel” and “In 1987, efforts included installation of 155 boulder structures.....Efforts to stabilize the bank using rock gabions and riparian planting were ultimately unsuccessful to create pools, increase stream depth and increase habitat diversity.” There is no discussion of possible causes for past failures or whether lessons learned from these “failed” restoration actions were used to inform the current design of the proposed project.

2. *Descriptions of how restoration of the site will contribute to improvement in viable salmonid population (VSP) parameters of focal species*
3. *Estimates of the increased carrying capacity of the site following habitat improvement, which can be tracked over time to see if initial assumptions were justified.*

Regarding these two elements of the ISRP’s qualifications, discussion in the response is limited to very general statements such as “we expect an increase in juvenile densities after restoration activities are completed.” However, no quantitative estimates of improvement in VSP parameters or carrying capacity expected as a result of the improved habitat conditions created by the project are provided.

The sponsors state that “*Biological monitoring is beyond the scope of this project... Linking fish response to a site-specific habitat project is extremely difficult and requires a sample design that takes into account a number of variables (e.g., temporal and spatial replication), which are cost prohibitive and logistically impossible.*” The ISRP disagrees with this assessment, especially since there is a significant amount of pre-treatment fish data available. In fact, the proposal states that “Chinook and steelhead density surveys are conducted yearly, during summer.... comparisons can be made among reaches within streams, among streams, and years.” This statement clearly indicates that the project sponsors do appreciate that existing data can be used to assess differences in these parameters among sites. As some of these sites are located in the project area and one of the expected outcomes is improved rearing habitat quality and quantity, continuation of the parr density sampling should provide some indication of project effectiveness. This possibility was not discussed in the proposal. Spawner density and distribution data are also apparently collected within the project area. If the project improves spawning habitat quality, this enhancement should be reflected with a change in spawner distribution among the monitored sites, with a higher proportion utilizing the project area than prior to implementation. As with the Beaver Creek Restoration Project, implementing a monitoring effort for fish response to this project could be accomplished with minimal effort by coordinating with ongoing monitoring projects. Given the magnitude of the proposed habitat alteration associated with this project, monitoring fish response would seem essential, especially given that past efforts at restoration at this location have failed.