



Independent Scientific Review Panel
for the Northwest Power & Conservation Council
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Memorandum (ISRP 2010-3)

January 12, 2010

To: W. Bill Booth, Chair, Northwest Power and Conservation Council

From: Pete Bisson, ISRP Vice-Chair

Subject: Follow-up Review of the Big Canyon Watershed Ecological Restoration Strategy (#1999-015-00 and #1999-016-00)

Background

At the Council's December 3, 2009 request, the ISRP reviewed an updated document for the Nez Perce Tribe's project Protect and Restore Big Canyon Creek Watershed (#1999-016-00) and the Nez Perce Soil and Water Conservation District's project, Big Canyon Fish Habitat (#1999-015-00). This document, *Big Canyon Watershed Ecological Restoration Strategy*, was revised to address concerns raised in earlier Council and ISRP reviews.

This review stems from a set of earlier reviews that began in 2006 with an evaluation of fiscal years (FY) 2007-09 proposals for the Big Canyon and related proposals for Lapwai Creek. The ISRP's FY 2007-09 final comments (ISRP 2006-6; August 31, 2006) can be found at www.nwccouncil.org/library/isrp/isrp2006-6.htm (pages 477-481). The Council's and Bonneville's FY 2007-09 funding decisions were to fund the projects in FY 2007 to complete reports on abundance, habitat status, and a comprehensive presentation of prioritized restoration projects and that Fiscal Year 2008 and 2009 funding for restoration actions is contingent on "favorable ISRP and Council review of a revised proposal linked to completed reports (per ISRP comments)."

In December 2007, the ISRP reviewed an initial version of the *Big Canyon Watershed Ecological Restoration Strategy* (see [ISRP 2007-18](#)). The ISRP summarized their review:

For the two Big Canyon Creek projects (199901500 - Big Canyon Fish Habitat; 199901600 - Protect & Restore Big Canyon Creek Watershed) the ISRP finds that they *Do Not Meet Scientific Criteria*. Reviewers feel the expressed goal of improving 400 stream miles to good or excellent condition is highly unrealistic. The strategy document does not attempt to identify and ameliorate the factors limiting steelhead. It does not incorporate or address the requirements of the three life stages (adult spawning, summer rearing, winter rearing) the fish spend in the watershed, and consequently there is no clear basis to conclude that improved environmental conditions that might result from

restoration actions would yield demonstrable benefits. Steelhead/rainbow trout were clearly more abundant in lower Big Canyon and Little Canyon creeks than in the headwaters, and the upper watershed appeared to have few fish upon which to rebuild the population when habitat is improved. The fish distribution map shows the upper watershed to be nearly devoid of *O. mykiss*. In fact, there appears to be little surface water flowing in much of the drainage network. Furthermore, no information was given in the strategy document as to whether the fish in the upper watershed had adopted a resident rainbow trout life history or in fact were anadromous. Information from other reports documents they are resident fish. Therefore, the ISRP questions whether giving top priority to the headwaters of Big Canyon Creek will be the most effective way (if, in fact, there is any effective way) to rebuild the steelhead population. The Big Canyon Creek monitoring plan is inadequate in its present form. No monitoring program is described for the focal species. Habitat monitoring should be conducted that is sufficient to determine if work elements have achieved improved environmental conditions. In particular, the monitoring programs were inadequately described and limited to a single short paragraph in both strategy documents under the Toward the Future chapters. These paragraphs imply that effectiveness monitoring would take place after 10 years. That interval is much too long for fish populations; more frequent population assessments are needed to evaluate restoration effectiveness. Additionally, habitat assessments are needed that can show whether desired improvements are really taking place.

In response to the proponent's submittal and the ISRP's findings, the Council recommended on February 12, 2008 that the Big Canyon Creek projects transition in FY 2008 and 2009 to address only on-the-ground commitments that implement (1) agricultural and livestock practices in the headwaters, and (2) passage and habitat improvement actions that benefit the focal species in the middle and lower reaches of the watershed. The Council further recommended that future funding of projects in Big Canyon Creek will depend on a favorable review. The Council anticipates these projects will be closed out after Fiscal Year 2009, but that their proposed activities could be included in a future proposal. At the November 2009 Budget Oversight Group meeting, the Tribe and District submitted a request for the projects. The Budget Oversight Group determined that an ISRP review was needed before the proposed actions could be funded. Based on this review a funding determination will be made by the Council and Bonneville.

ISRP 2009 Recommendation

Does Not Meet Scientific Criteria

ISRP 2009 Comments

The ISRP understands the need to address the set of problems presented by current habitat conditions in the lower Clearwater A-run steelhead tributaries. The ISRP also appreciates the need to involve private landowners if improvements are to be made.

However, due in large part to the unique nature of the Big Canyon system, we believe the work outlined does not provide compelling evidence that it would benefit steelhead.

Most substantive aspects of the revised proposal appear to remain unchanged from the original 2007 proposal. In relatively few places in the revised proposal are revisions identified or referenced to our requests for additional information.

The revised proposal (dated Spring 2009) includes some additional information and photos, principally:

- A Limiting Factors chapter (#4) that discusses the five limiting factors deemed to have the greatest impact on salmonid fishes throughout the system (see comments below).
- A Support for Restoration Actions chapter (#7).
- Results of the Assessment Unit (AU) Rankings (Table 13 in original, Table 11 in revised) now give a value of 2 for water quality for the Big Canyon Unit 1, vs. a value of 3 in revised proposal. AU rankings are unchanged.
- The indication that data sets for Total Maximum Daily Load (TMDL) metrics and Forward Looking Infrared (FLIR) water temperature are being developed by others, but are not yet available.
- A more realistic description of the restoration challenges posed by lower canyon habitat and geology, and a tightening of restoration focus to the two headwater AUs (see comments below).

The ISRP comments on the original proposal are discussed in Attachment 1 to the proponents' cover letter of 24 November 2009, and that discussion is helpful to our assessment of the revised proposal. Attachment 1 indicates that an extrapolation of stream survey data would suggest the presence of approximately 50,000 to 70,000 juvenile steelhead/rainbow trout within the two downstream-most assessment units. Attachment 1 also identifies the limitations of existing datasets for evaluating limiting factors of various fish life-stages, discusses the need for monitoring and evaluation, and mentions the constraints involved in demonstrating project effectiveness.

The revised proposal did address the concerns in the previous ISRP review regarding the lack of detail on the derivation of information used in the prioritization process. However, the expansion on this point creates some concern about the validity of this approach. A critical assumption that is made in the prioritization process is that restoration priority is equivalent to degree of degradation. This assumption leads to the outcome that the AUs in the worst condition receive the most attention. This approach to prioritization fails to consider whether or not it is feasible to address the factors causing impairment within a given AU. In other words, is it reasonable to expect that the habitat deficiencies can be corrected with the tools at hand, or should attention be focused on those places where problems are correctable and where population benefits are likely? The feasibility of achieving an objective is as important as degree of impairment in prioritizing restoration actions. This factor was not considered in the prioritization

process and could lead to spending resources on restoration efforts with little hope of success.

The Big Canyon Creek Ecological Watershed Strategy document falls short of providing the necessary information for meeting the Scientific Review Criteria under the Power Act and guidelines in the 2009 Fish and Wildlife Program. The first deficiency is the lack of a clear presentation of the status of the focal species, A-run steelhead, *Oncorhynchus mykiss*, together with a biological objective of the status of this focal species in terms of the Viable Salmonid Population (VSP) parameters – abundance, productivity, spatial structure, and diversity. There is a summary of the juvenile *O. mykiss* sampling, but no estimate of adult abundance and productivity, and no end point (biological objective) that the habitat improvements are intended to achieve.

What is needed first is a description of the current status of the focal species, clear indication of the limiting life stage and the limiting factors affecting that life stage (e.g., spawning habitat, rearing habitat over summer or winter, or food), followed by biological objectives for the status of the focal species under restored conditions, a strategy to create the quantity and quality of habitat required to achieve the restored status. The final requirement is some evidence that achieving the habitat restoration is feasible within a defined timeframe. Implementing this course of action needs to include a monitoring plan to identify whether benchmarks are being achieved and the assumptions for population improvements during restoration are realistic.

Finally, the strategy proposes to address habitat conditions in headwater reaches that currently are in very poor condition with little evidence of use by *O. mykiss*. The case made by the proponents that improvements within these reaches will improve the hydrology and instream conditions within the lower reaches inhabited by steelhead is not convincing.

Specific issues raised in the original ISRP review:

1. Unrealistic goal of improving 400 stream miles to good or excellent condition

The revised strategy proposes addressing conditions on 130 miles of stream in the Little Canyon AU 2 and 93 miles on Big Canyon Creek AU 3. There is no indication of the feasibility or requirements for actually implementing these actions within any defined timeframe. Objectives and associated strategies should be framed in terms of what is feasible as well as what is desired. For example, if achieving a good or excellent rating is contingent on addressing the altered flow regimes in the watershed, then a fundamental change in land use will need to occur; this goal cannot readily be achieved with a watershed where nearly 80% of the land is being used for agriculture without a suitable water management plan for ensuring adequate streamflow.

The watershed strategy (biological) objectives are to improve stream reaches such that 90% are good or better using the Stream Visual Assessment Protocol (SVAP) criteria of

the Natural Resources Conservation Service. No basis is provided for assuming that this level of restoration would yield the desired improvement in the status of steelhead in these Assessment Units (AUs).

2. The need to identify and ameliorate the factors limiting steelhead

Limiting factors were not adequately addressed in the revised proposal. The factors identified as limiting steelhead production are generic. These factors are included in virtually every subbasin plan. In order for limiting factors to be useful in a restoration strategy, there needs to be some appreciation for the variation among stream reaches in their relative severity. Attempting to address all possible limiting factors at all possible locations within each of the focal AUs would be very inefficient.

There also is a considerable amount of uncertainty regarding the feasibility of correcting some of the factors hypothesized to be limiting steelhead production. Altered hydrology is indicated as one of, if not the, key factor in reduction of steelhead production in the watershed. However, none of the proposed restoration strategies seem to have much likelihood of correcting, or even substantially improving, the amount of surface flow during low discharge periods. The categories of restoration actions provided in the proposal are:

- Riparian corridor fencing and development of off-site watering: reduces cattle access to streams, reducing soil compaction, trampling and removal of riparian area vegetation, helping to decrease sedimentation and improve water quality
- Riparian corridor plantings: reduces stream temperature through increased riparian canopy cover, filters sediment, livestock waste, herbicides, pesticides and road surface runoff, offers potential source of woody debris/cover and adds nutrients and food sources to stream system
- Sediment sources: reduces the amount of sediment delivered into the stream, increasing quality and quantity of steelhead spawning habitat, juvenile steelhead cover, and macroinvertebrate production
- Stream crossings: addresses fish-passage issues and restores connectivity to streams increasing access to spawning and rearing habitat
- Channel stability: increases habitat complexity, reduces width-depth ratios, increases riparian corridor stability/longevity, and increases rheic to hyporheic flow ratios.

Among these actions, the only one that specifically addresses the issue of hydrologic alterations is the suggestion that removing noxious weeds from riparian areas and replacing with native species would “be beneficial in increasing surface water retention and prolonging ground water recharge.” However, no indication of why native species would be more beneficial in surface water retention is provided or how affecting this

change on a very small proportion of the watershed (riparian only) would be sufficient to alter the flow regime. The proposal also suggests that the flow issues could be addressed through a change in agricultural practices in the focal AUs. The proposal suggests an increase in rotation from 2 years to 3 years and a change in seeding methodology. These changes may have some impact on hydrology, as agriculture dominates land use in these AUs. But it seems unlikely that the project proponents will be able to convince farmers to accept a 33% decrease in production without some substantial incentive. Therefore, these actions are not likely to have sufficient influence on water yield, peak flows, or the seasonality of flow to impact steelhead productivity. Restoration of functional hydrologic conditions for steelhead would likely require a fundamental change in land cover within the highest priority AUs. As the likelihood of altering land use patterns in the drainage is low, it would be more fruitful to focus efforts in areas currently supporting steelhead populations.

3. Lack of fish presence, specifically steelhead, in the upper watershed and the priority of work in that area

The primary problem with this proposal remains the fact that the areas where the project proponents propose to focus their activities are far from the locations that currently support the highest density of steelhead. Reviewers' statements on the original proposal are still very pertinent:

“Another major issue is the fact that headwater AUs containing low densities of only resident rainbow trout received top restoration priority. Such a prioritization significantly perplexed reviewers.... Steelhead/rainbow trout were more abundant in lower Big Canyon and Little Canyon creeks than in the headwaters, and the upper watershed appeared to have few fish upon which to rebuild the population if habitat was to be improved. The fish distribution map shows the upper watershed to be nearly devoid of *O. mykiss*; in fact, there appears to be little surface water flowing in much of the drainage network. Furthermore, no information was given in the strategy document as to whether the fish in the upper watershed had adopted a resident rainbow trout life history or in fact were anadromous. Information from other reports documents they are resident fish. Therefore, the ISRP questions whether giving top priority to the headwaters of Big Canyon Creek will be the most effective way (indeed, an effective way at all) to rebuild the steelhead population.”

The upper AU of Big Canyon Creek is separated from the lowest unit (where adult steelhead cluster to spawn in spring) by 7 miles (less in Little Canyon) of habitat that is dry in summer, with water level up to 12 feet below the substrate. Although adult steelhead can move through and above that 7 miles in the spring of some years, judging by the paucity of juveniles upstream they appear to do so in very limited numbers. In order for upstream rearing habitat improvement (as proposed) to be realized, adult steelhead must swim up there – a topic not addressed in the proposal.

4. Inadequate monitoring and evaluation, including habitat assessment

The monitoring proposed for this project is inadequate to determine whether the individual projects are achieving their desired effect at a site scale or if the fish are actually responding at the watershed scale. The primary assessment activity appears to be a re-measurement of habitat conditions (using SVAP) at 55 sites sometime over the next 10 years. The concerns expressed in the paragraph below, from the last ISRP review, have not been addressed:

“The Big Canyon Creek monitoring plan is inadequate in its present form. No monitoring program is described for the focal species. Habitat monitoring should be conducted that is sufficient to determine if work elements have achieved improved environmental conditions. In particular, the monitoring programs were inadequately described and limited to a single short paragraph in the strategy document under the Toward the Future chapter. This paragraph implies that effectiveness monitoring would take place after 10 years. That interval is much too long for fish populations; more frequent population assessments are needed to evaluate restoration effectiveness. Additionally, habitat assessments are needed that can show whether desired improvements are really taking place. A systematic collection of habitat site photography at a series of photo-points, conducted at the same time each year, would be essential and require little effort. For some types of projects, assessments are not required each year, but for others such as increasing instream flows, frequent measurements are necessary to document improvements. The ISRP recommends that more detailed monitoring programs be developed, with an emphasis on demonstrating restoration effectiveness.”

For suggestions on what implementation and effectiveness monitoring metrics would be appropriate, please see pages 8-16 in the ISRP’s “Review of Project Reporting Metrics for the Columbia River Basin Fish and Wildlife Program” ([ISRP 2008-7](#))¹.

¹ <http://www.nwcouncil.org/library/isrp/isrp2008-7.pdf>