



Independent Scientific Review Panel

for the Northwest Power & Conservation Council
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Memorandum (2022-3)

April 22, 2022

To: Guy Norman, Chair, Northwest Power and Conservation Council

From: Stan Gregory, ISRP Chair

Subject: Response Review of Grande Ronde Salmonid Life Cycle Monitoring Project (#1992-026-04)

Background

On March 10, 2022, the ISRP received a response and revised proposal for the Oregon Department of Fish and Wildlife's *Grande Ronde Salmonid Life Cycle Monitoring Project* (#1992-026-04) submitted for the [Anadromous Fish Habitat and Hatchery Review](#). Our review is provided below, using the same format as in our final report for the larger review ([ISRP 2022-1](#)).

199202604 - Grande Ronde Salmonid Life Cycle Monitoring Project

Links to: [Original proposal](#) and [Response and revised proposal \(link to folder\)](#) | [Past reports](#) | [Past reviews](#)

Proponent: Oregon Department of Fish and Wildlife

Province/Subbasin: Blue Mountain/Grande Ronde

Recommendation: Meets Scientific Review Criteria (Conditional)

Final Review Comment:

This project contributes to foundational ecosystem knowledge that supports restoration projects in the Grande Ronde basin. The ISRP recognizes the project's importance for producing: 1) monitoring data for more than 40 restoration projects, 2) regional assessments of SARs for spring Chinook salmon and summer steelhead, 3) data and development of two major life cycle models, and 4) biological data for the Grande Ronde Synthesis Report. Furthermore, the proponents disseminate results and coordinate with other projects by participating in the annual State of the Science Meetings, providing information for the Atlas, contributing

extensively to the development and implementation of the Atlas, and supporting major publications from the Grande Ronde projects as co-authors.

The revised proposal is an improvement over the original submission, but it remains disorganized in places and underrepresents the good work being conducted by this project. We thus recommend the proponents address the following conditions:

Condition 1: Provide data and analysis to support the Grande Ronde Model Watershed (GRMW; project #199202601) Synthesis Report and to satisfy this project's goals for evaluating restoration impacts. The ISRP expects direct contributions from this project, in collaboration with other entities, to the GRMW Synthesis Report, which “should contain a comprehensive analysis of the benefits of restoration actions to restore fish and wildlife, as well as how the GRMW project has addressed limiting factors for key life stages. The Life Cycle Monitoring Project is expected to provide much of the essential data as well as much of the landscape level synthesis and life cycle modeling to establish the benefits to fish and wildlife.” Although the GRMW will lead the Synthesis, and other entities (e.g., CRITFC) will contribute to it, the ISRP expects the report to contain contributions from this ODFW project's analyses. Details are described in the condition for Project 199202601 in our *Final Report: Review of Anadromous Fish Habitat and Hatchery Projects (ISRP 2022-1)*, pages 417-426 and in the Council's April 15, 2022 [recommendation letter](#) to the Bonneville Power Administration: “Complete final response, by May 1, 2022, to ISRP review (ISRP document 2018-11) in regards to the Projects 25-year synthesis review.”

The proponents' response to the ISRP stated, “A 30-year synthesis of landscape level data is a goal this project would like to collaborate with our partners in the basin, however, it would require an additional full-time employee to lead an effort of such magnitude as this.” Rather than this synthesis being construed as an entirely new effort that requires a new full-time position, the ISRP expects, for example, that some of the information in the Progress-To-Date section of the revised proposal will inform this synthesis. In addition, previous analyses produced during the normal course of this project should contribute to this synthesis effort. However, insufficient information on the fish and wildlife responses to restoration actions was provided in the proposal, other than a note saying that an additional person is needed to help with the effort. Such analysis is essential to achieving Goal 2 of this project, independent of its contribution to the synthesis report.

The ISRP acknowledges the effort involved in reformatting historical datasets, as well as the likely need for some additional summary analyses needed to demonstrate contributions and trends from restoration work in the subbasin. The proponents should determine what they can provide to the GRMW project synthesis, what can be addressed with information at hand, and what new analyses will be needed. A detailed description of these analytical tasks and a timeline for providing information for the synthesis report should be provided to the ISRP in a response letter by July 1, 2022.

Condition 2. Clarify methods for and results of analysis and interpretation regarding habitat conditions and restoration effectiveness. The proposal lacks clarity on the methods used for documenting habitat conditions. The methods for monitoring habitat throughout the basin have changed over time, and the ISRP found it difficult to understand what protocols will be used going forward. Will the HabRate model applied in the Upper Basin, or the HSI models described for the Catherine Creek “exercise,” be applied for all of the former CHAMP sites? All of the restoration sites? More broadly, what is the work plan (i.e., methods, locations, etc.) for evaluating habitat conditions? Since providing descriptions of habitat is a core part of Goal #1, an up-to-date description is needed on the protocols for evaluating the quantity and quality of tributary fish habitat available to salmonids.

Related to this point, the proposal also lacked an overall summary of the existing habitat monitoring and analysis (Goal #2), as well as what monitoring data indicate about habitat treatments and fish abundance, distribution survival, and movement (Goal #1). This is essential content for the Synthesis Report (Condition #1) that should be completed as part of the ongoing efforts of this project. Goal 2 explicitly states that the project provides estimates of juvenile out-migrant abundance for evaluation of restoration project effectiveness in the Grande Ronde River basin. While the ISRP recognizes it is not this project’s responsibility to make recommendations regarding restoration plans and outcomes, the data derived from this project should actively contribute to the evaluation and future adjustment of restoration actions. It is not clear from the proposal what analyses and information are being provided to other projects to inform restoration planning in a timely manner or how the results are shared and discussed with other projects to support their application of the information. The proponents could use some of the information included in the M&E Matrix in the Grande Ronde Model Watershed proposal (Project 199202601) to describe more clearly the transfer of information to associated restoration projects.

The proponents should provide 1) a detailed summary that clarifies the habitat monitoring design and protocols for all components of the project (including methods, locations, applications) and 2) a detailed description of how the project analyzes and communicates its results to inform restoration effectiveness and recommendations (including information contributed to specific projects in the Grande Ronde Basin). This information should be provided to the ISRP in a response letter by July 1, 2022, in addition to the information requested under Condition 1.

Comments on response request items:

Our preliminary review requested a revised proposal and a brief but sufficiently detailed point-by-point response on the topics listed below. While a revised proposal was provided to address review topics, the response document did not directly respond to our list of concerns or provide a guide as to where (e.g., section and page number) new information was added. This made it challenging for the ISRP to identify which concerns were addressed. Moreover, the revised proposal is disorganized in places, and the content within sections is not structured

clearly. The importance of the project's contributions to the GRMW synthesis report amplifies this concern and the critical need for the proponents to address the suggested improvements.

Sustained leadership is essential for effectively linking science to policy decisions, as well as for maintaining important linkages within scientific and restoration networks. Successful long-term programs have clearly articulated plans for leadership development and backup plans for personnel, should an unforeseen event occur that requires internal adjustments of personnel to perform essential tasks. The Grande Ronde Salmonid Life Cycle Monitoring Project generates vitally important information and analyses for salmon recovery in the Grande Ronde Basin. Other projects supported by the Fish and Wildlife Program and government agencies rely on the critical information from this project's monitoring and analysis. The ISRP encourages the proponents to develop an explicit plan for coordinating leadership and program activities among the staff that addresses contingencies that could affect project performance and deliverable schedules (e.g., one or more key personnel are unavailable).

Our final comments, based on the proponent's response and revised proposal, are provided below after each topic. Many of our response requests from our preliminary review were not fully addressed but do not rise to the level of being conditions. However, we expect that the proponents will address our concerns and suggestions in future work plans, annual reports, and proposals:

1. Plan for changes, including climate change

Our preliminary review raised the issue that "climate change and accelerating land use are never mentioned as serious confounding factors, and guiding scientific concepts are not apparent." While the proponents acknowledge that climate change is important, they do not offer ideas on how they will adjust research and monitoring programs and priorities to accommodate for climate change effects. How will monitoring designs and strategies need to be modified in response to new conditions in the basin, including climate change? It will be important for this project to understand and adapt to the new conditions that climate and other changes will create, and to consider the adjustments it will require in their research and monitoring designs. Description of the potential impacts of climate change on the fish and habitat of the Grande Ronde and on their monitoring program, including a plan for adapting the monitoring efforts, should be presented in the next Annual Report. This plan should describe how data related to climate change will be collected, analyzed, and used to guide habitat restoration projects.

2. Goals and SMART objectives

The proponents provided a much-improved list of goals along with a set of informative questions to be addressed and better linkage to objectives associated with each goal. In general, the objectives and research questions are clearer, time bound, and connect to baseline monitoring goals and restoration projects.

However, the ISRP noted areas for improvement: While some objectives met all elements of a SMART Objective, not all objectives were complete enough to meet the criteria. The ISRP recommends that the proponents continue to refine objectives to meet the criteria of SMART objectives. For example, Goal 1, Objective 2 should state how many and what percent of sites will be revisited. Goal 1, Objective 5 should commit to a specific number of PIT tag arrays annually and indicate what reaches will be assessed. For Goal 2, none of the guiding questions addresses restoration project effectiveness, a key component of the Goal. None of the quantitative objectives for Goal 2 provide for statistically valid estimates of juvenile out-migrant abundance for evaluation of population trends and restoration project effectiveness. Related to this point, we encourage the proponents to conduct power analyses to confirm that the sampling strategy is adequate to a) detect ecologically significant changes in the key outputs of the life cycle models and b) provide needed levels of confidence to assess restoration project performance. Refinement of Goals and Objectives should be presented in the next annual report.

3. Application of data for standard fish habitat monitoring methods

This issue was not directly addressed, though some relevant content was added to the Progress-to-Date section. In addition, parts of the proposal appear to be out-of-date and based on previous CHaMP and ISEMP work rather than current efforts. Does the project participate in a specific active effort to implement a standard set of fish habitat monitoring methods in select watershed of the Columbia River Basin? Was this part of the CHaMP project or is it part of ODFW's coordination monitoring of out-migrant abundances in the Grande Ronde, John Day, and Umatilla Basins? This clarification should be addressed in the next annual report and in the next proposal.

4. Application of data for Columbia River Basin evaluation

Similar to the comments under bullet 3, this issue was not addressed in the revised proposal. Was this part of the CHaMP project or is it part of an ongoing coordinated evaluation at the scale of the Columbia River Basin? This should be clarified in the next annual report and proposal.

5. Use of IMWs and CHaMP

To some extent, the information provided under the new subheader CHaMP in Section 3 (Progress to Date) helped clarify how information from the CHaMP project has been used. The proponents have found ways to use the data, including use in the HabRate model and for conducting a WUA analysis. In addition, the edited responses to past ISRP reviews (Section 9) helped clarify the status of IMW aspirations and the role that the Grande Ronde Atlas is playing.

6. Data analysis and management

The proponents explain the methods and strategies for data analyses, data management, and data sharing protocols. They outline the specific responsibilities of the new data analyst for analyses and, to some extent, for life cycle modeling: a) maintaining and updating a new internal database for the juvenile monitoring data that is consistent with regional data workflows, b) attempting to bring historical data into this new database, c) improving and documenting statistical analyses, and d) sharing of raw PIT tag data on the regional PTAGIS database and other data by request, while derived data are shared through StreamNet or provided on request.

The ISRP is unclear about the time and resources that will be required to re-format data sets (collected over many years) to align with the format used in the database for data collected recently. While an essential task, the ISRP anticipates that it will require significant staff time. It is not clear that this effort is planned for completion in a definite timeframe. No date is provided for completing this task, despite its importance in contributing to the GRMW synthesis. The proponents should provide additional information in the annual work plan and annual report about the key tasks, estimated time for completion, and personnel dedicated to reformatting historical datasets.

7. Structured Implementation and Monitoring (SIM) guidance and application

No new information is provided in the revised proposal on how the SIM provides temporal guidance for where and when to aggregate implementation projects. In addition, the proposal does not provide an illustrative example, as requested. This SIM concept is intriguing and potentially useful to other projects, but its intended application needs to be described more thoroughly in the next annual report.

8. Timeline for project period

The proponents provided a revised timeline for the project that is an improvement over the previous one. The new timeline table provides a general sense of what is happening when, but specific details are not provided. It should include more information about subcomponents of the project, including monitoring efforts for specific projects. This information should be provided in future annual reports and work plans.

9. Responses to previous ISRP qualifications

This remains a work-in-progress. While responses to Qualifications 2 and 3 are marginally acceptable, responses to Qualifications 4 and 5 do not fully address the ISRP concerns. In particular, work supporting the goal to provide meaningful interpretation of data to partners is unfinished. Many responses indicated that important products are still in development, especially in terms of data analysis and synthesis. These concerns are reflected in the project conditions described above. The ISRP expects the project to focus on the synthesis of status and

trends and responses to management actions and restoration efforts over the last 30 years in the Grande Ronde basin.

The proponents have taken some important steps to address previous ISRP conditions, but the actual fulfillment is proposed for the future. The proponents do not estimate a timeframe for completion of major products. The new data analyst should contribute substantially to this area, but it is not clear if the project's capacity is sufficient to meet longstanding project needs. Furthermore, the ISRP encourages the project to use the data analyst's time to support the higher-level needs of the project.

10. M&E matrix - support

This project contributed to the M&E matrix submitted by the Grande Ronde Model Watershed (lead). This project provides biological monitoring data (parr abundance, redd surveys, prespawn survival, smolt abundance, smolt survival) for 42 of the 90 projects in the Grande Ronde, Imnaha, Wallowa, and Lostine subbasins. It also provides data on benthic macroinvertebrates and habitat surveys from a project.

This project and the CRITFC project (200900400) provide most of the monitoring data for the basin. The project proponents are key players and coauthors of the joint Grande Ronde and Catherine Creek Life Cycle Models and the HabRate limiting factors model. The Grande Ronde is one of the few subbasins in the Columbia River Basin that has collaboratively developed many of the components needed to integrate the findings of RM&E efforts and quantitatively evaluate the benefits to fish and wildlife.

Preliminary ISRP report comments: Response Requested *(Provided as a record of the review process. The proponents addressed the ISRP's questions; see response link and final review above.)*

Overall comment:

The Grande Ronde Salmonid Life Cycle Monitoring Project is a critically important project for the Fish and Wildlife Program, regional assessments and life cycle modeling, and ongoing management decisions in the Grande Ronde and Imnaha basins. This project provides essential monitoring data for habitat, juvenile salmonid abundance and distribution, outmigration, survival, and adult returns for spring Chinook salmon and summer steelhead. A large number of habitat restoration projects in the Grande Ronde and Imnaha River basins use the project for monitoring information. The Fish and Wildlife Program relies on this monitoring project to assist the regional Umbrella project by providing specific monitoring information for specific habitat restoration projects. This project also provides specific information to the Grande Ronde Model Watershed that it then uses to evaluate basin-scale responses to restoration actions.

Unfortunately, the proposal does not document the overall outcomes from the project and does not describe the implications for basin-scale restoration or status and trends of spring Chinook salmon and summer steelhead, provide specific objectives, or explain the specific uses for the monitoring data in detail. These issues were raised in prior ISRP reviews. The proponents' responses have not produced a summary of the achievements thus far or how the data are used in the projects being served.

Considering the project's central importance for understanding trends and sustaining Chinook and steelhead populations in the Grande Ronde region, the monitoring activities are essential. Nevertheless, the proposal for activities during the next phase is incomplete and lacks several required sections, an explanation of Progress to Date, as well as tables and appendices referred to in the text. Further, climate change and accelerating land use are never mentioned as serious confounding factors, and guiding scientific concepts are not apparent. The proponents must provide a complete revised proposal for review with detailed responses to specific requests from the ISRP. This project is nearing its third decade, and a scientifically rigorous proposal and synthesis are essential for the Grande Ronde and Imnaha subbasins and the Fish and Wildlife Program overall.

The ISRP requests the proponents to participate in the development of an M&E matrix and to address the following points in a revised proposal and to provide a brief point-by-point response to explain how and where each issue is addressed in the revised proposal:

1. **Goals and SMART objectives.** Develop specific goals for this project, ones aligned to a complete set of SMART objectives (see proposal instructions).

2. **Application of data for standard fish habitat monitoring methods.** Clarify how the data are being used to help implement a standard set of fish habitat monitoring methods in select watersheds of the Columbia River basin.
3. **Application of data for Columbia River Basin evaluation.** Explain how the data will be used to evaluate the quantity and quality of tributary fish habitat available to salmonids across the Columbia River Basin, as indicated in the proposal.
4. **Use of IMWs and CHaMP.** Clarify the confusion about the use of IMWs (implementing a tributary habitat action effectiveness strategy) and CHaMP (systematic habitat status and trends) in this project.
5. **Data analysis and management.** Describe the methods and strategies for data analyses, data management, and data sharing protocols. Indicate the specific responsibilities of the new data analyst for data analyses, life cycle modeling, and preparation of a comprehensive synthesis of fish and wildlife responses to previous restoration actions.
6. **SIM guidance and application.** Describe how the SIM provides temporal guidance for where and when to aggregate implementation projects and provide an illustrative example.
7. **Timeline for project period.** Provide a comprehensive timeline in terms of tasks and years.
8. **Responses to previous ISRP qualifications.** Describe how the project has responded to qualifications from previous ISRP reviews. Provide detailed responses or documentation of previous responses to each qualification.
9. **M&E matrix - support.** As habitat projects and monitoring projects are not presented as part of an integrated proposal or plan, the need for a crosswalk to identify the linkages between implementation and monitoring is extremely important for basins or geographic areas. The ISRP is requesting a response from the Grande Ronde Model Watershed Project (199202601) to summarize the linkages between implementation and monitoring projects in the Grande Ronde and Imnaha geographic area. The proponents of the Grande Ronde Salmonid Life Cycle Monitoring Project and the GRMW recognize that more analysis and synthesis are needed. As requested in the ISRP review of the GRMW Synthesis Report, the final synthesis should contain a comprehensive analysis of the benefits of restoration actions to restore fish and wildlife, as well as how the GRMW project has addressed limiting factors for key life stages. The Life Cycle Monitoring Project is expected to provide much of the essential data as well as much of the landscape level synthesis and life cycle modeling to establish the benefits to fish and wildlife. Consequently, we ask this project to assist them in creating the summary and provide information to them about what is being monitored by this project and where and when the monitoring occurs. A map or maps of locations of monitoring actions would be helpful in this regard.

Q1: Clearly defined objectives and outcomes

The Grande Ronde Salmonid Life Cycle Monitoring Project has an overall goal to investigate the habitat and ecology of spring Chinook salmon and summer steelhead in the Grande Ronde and Imnaha River subbasins. Specific goals are not presented in the proposal but should be developed as a framework for aligning goals with a series of objectives. The objectives in the proposal are essentially implementation objectives for the monitoring effort. While the ISRP has encountered similar types of objectives in other basin monitoring projects and specific SMART biological and physical objectives may be evident in regional recovery plans and some habitat restoration projects, generally monitoring projects only provide information about basin characteristics and trends in targeted fish populations and habitat. Nonetheless, basin-scale RM&E projects, such as the Life Cycle Project, are expected to develop more specific and semi-quantitative objectives, such as numbers, locations, and geographic extent of monitoring locations, specific quantitative inputs to models (e.g., Catherine Creek life cycle model), and information required by regional biological strategies. Revising objectives to be more quantitative would make assessment of the project's achievements simpler and more informative.

The outcome of the activities appears to be the data collected. However, the proponents allude (p. 4) to the data being used to cooperate with the implementation of a standard set of fish habitat monitoring methods in select watersheds of the Columbia River Basin. They indicate that the fish habitat monitoring methods have been developed to capture habitat features driving fish population dynamics. In addition, the proponents state that the 26 selected watersheds maximize the contrast in current habitat conditions and represent a temporal gradient of expected change in condition through planned habitat actions. However, they do not indicate where this is documented or who is funding the activity. They also indicate that data from this project will be used to evaluate the quantity and quality of tributary fish habitat available to salmonids across the Columbia River Basin, but no reference or further information is provided. The proponents also indicate involvement in implementing a tributary habitat action effectiveness strategy across the Columbia River basin (p. 4) using Intensively Monitored Watersheds (IMW). However, they have recently deleted the IMW from their strategy in favor of another approach (see p. 34). All of these issues should be clarified in a revised proposal to clarify the collective confusion about how the project is contributing to these efforts.

The proposal also states that CHaMP will result in systematic habitat status and trends information. The information will be used to assess basin-wide habitat condition and correlated with biological response indicators to evaluate habitat management strategies. The proposal describes support for CHaMP collaborators, which is confusing because CHaMP has been discontinued. The "TABLE" referred to in the text on page 5, as well as all other tables cited in the proposal, are not included in the proposal. The text may be residual unintended text from prior proposals or documents, but an explanation is required for the ISRP to understand what is being described and what role the project plays in the effort.

Q2: Methods

The project has thoroughly documented the methods in previous reports, in MonitoringResources.org, and in this proposal. The described methods appear acceptable and well suited to the specific activities. Specific calculations are adequately described. Note, however, that methods and strategies for data analyses are not described, nor are data management and sharing protocols.

Q3: Provisions for M&E

The project participates actively and effectively in the adaptive evaluation processes in the Grande Ronde basin and regional management programs. Their work with the Grande Ronde Model Watershed, the Atlas, the GRMW database, CRITFC, Comparative Survival Study, NOAA life cycle models, and many other regional programs is exemplary. The review and adjustment processes are strengths of the program, as is the level of dissemination and outreach that is occurring under this RM&E project.

An illustrative example would have been useful to understand how the SIM provides temporal guidance for where and when to aggregate implementation projects. The ISRP is not sure how aggregating these projects (where possible) in a more temporally compressed fashion allows the proponents to structure monitoring to detect changes most effectively.

Some very general information was provided in the section on Relationships to Other Projects, but it was not enough to assess the how these data from this project are actually supporting the implementation of restoration or otherwise informing decisions.

The proposal does not adequately address potential confounding factors, especially those that could affect future monitoring effectiveness and success of salmon and steelhead recovery programs. It briefly mentions a list of factors (i.e., predation from birds and warm water fishes, point and non-point source pollution, the unique hydrography of the spring run-off due to the state ditch and its relationship to Catherine Creek) but provides little or no further discussion or explanation. As well, while detecting change in stream temperature and quantitatively incorporating it into assessments of salmonid population productivity in freshwater is important, it is not clear how the proponents are incorporating these data into the assessments. An illustrative example would improve the ISRP's understanding of the project's future approach to existing and emerging confounding factors.

The ISRP commends the proponents for publishing monitoring results, using the Grande Ronde as a case study (White et al. 2021).

The timeline is truncated in terms of tasks and years but should include all major elements of the project and the full time period for the proposed work elements.

Q4: Results – benefits to fish and wildlife

This project produces essential monitoring data for the Fish and Wildlife Program, life cycle models, VSP assessments, SARs assessments, and regional biological strategies. The project has been productive, producing eight peer-reviewed publications and several informative annual reports from 2016 to 2021. However, the proposal simply provides 12 pages of graphs of trend data for the Grande Ronde and Imnaha basins with no discussion or explanation. These essentially are provided in previous annual reports, publications, and proposals. Unfortunately, the proposal does not synthesize the information nor describe the biological relevance for targeted populations in the Grande Ronde and Imnaha subbasins. The project should explain the trends in spawner abundance and distribution, smolt abundance, smolts-per-spawner, smolt survival, life history characteristics (age, size, timing of migration), juvenile abundance and distribution, and habitat characteristics, as well as the relationships between these trends, rather than just inserting a series of graphs without text or discussion.

The 2010 ISRP Review called for these analyses and evaluations of trends and success of supplementation.

“This major project, ongoing since 1994, seems to have substantial accomplishments, but this was not evident from the results presented in the proposal. There were tables and graphs on timing of movements of juvenile steelhead and Chinook and on smolts per redd for spring Chinook, but the proponents presented little explanation and interpretation of the data. They often stated what they did, and then referred the reviewer to a table or graph with little interpretation of what those results mean, no general conclusions being drawn. Also, it would have been helpful for the proponents to present tables in more concise and understandable form. The oral presentation provided interpretation that alleviated some of the interpretive deficiency. The ISRP requests that future proposals contain narrative interpretation and discussion of the project’s data.”

This proposal, as well as previous reports, continue to lack narrative interpretation and discussion of the project’s data. How do their data inform the region about limiting factors and effectiveness of past management actions? Has the supplementation program been successful? In cases where populations are declining, does that mean that supplementation and restoration have been ineffective, or would the declines have been worse without these actions? While the information is valuable by itself, a program in operation since 1994 should have provided comprehensive analyses and interpretations and offered suggestions as to how the trends might be reversed.

These same syntheses were also requested as part of the Grande Ronde Model Watershed Synthesis. The ISRP concluded that the Synthesis that was eventually produced did not provide evidence that “actions and associated changes in the physical habitat have contributed to addressing limiting factors.” This project produces the most relevant data to assess the contribution of past restoration actions to reducing the effects of limiting factors, but the proposal provides no evidence of such progress. It is clear from their role in regional

assessments and peer-reviewed publications that they are conducting rigorous monitoring, but they have not told the story of what it means, either in this proposal or in an overall synthesis. Given the long history of the project and its valuable data, a complete and coherent proposal and a comprehensive synthesis are critical.

Overall, the responses to comments from previous ISRP reviews are meager. Many central issues and questions from previous reviews are not addressed, in spite of the wealth of information and synthetic collaborations with other projects (e.g., life cycle models, landscape assessments). This needs to be rectified in the very near future.