



**Independent Scientific Review Panel
Resident Fish,
Data Management, and
Regional Coordination
Category Review
Final Review of Proposals**





Independent Scientific Review Panel

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ISRP Final Review of Proposals for the Resident Fish, Data Management, and Regional Coordination Category

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ISRP Final Review of Proposals for the Resident Fish, Data Management, and Regional Coordination Category

I. Introduction

This report provides the Independent Scientific Review Panel's (ISRP¹) final comments and recommendations on 71 proposals submitted for the Resident Fish, Data Management, and Regional Coordination Category Review to implement the Columbia River Basin Fish and Wildlife Program. For ongoing projects, these ISRP comments include a retrospective evaluation of results. The ISRP finds that 14 proposals meet scientific review criteria, 37 proposals meet criteria with some qualifications, and 3 proposals did not meet criteria. In the preliminary review, the ISRP made a specific programmatic recommendation that applies to the 17 regional coordination proposals. In addition to these 71 proposals, the ISRP considered 9 "contextual" projects that had been reviewed recently but were included in this review for reference because of their relation to the proposals under review.

In addition to individual project reviews, this report contains comments on issues that cut across projects and apply to the Program in general. Topics covered include non-native fish management, trout stocking strategies, monitoring and evaluation, regional coordination, results reporting, and process issues. An attachment to this report contains ISRP feedback on drafts of the Resident Fish Monitoring Strategy (RFMS) and Wildlife Monitoring Implementation Strategy (WMIS). Those strategy documents were used for context in this review.

The Council and Bonneville are using this review to ensure that projects meet the needs and commitments of the 2009 Fish and Wildlife Program, the 2006 U.S. Fish and Wildlife Service *Biological Opinion regarding the effects of Libby Dam operations on the Kootenai River White Sturgeon, Bull Trout and Kootenai Sturgeon Critical Habitat*, and the 2008 Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp). This was not an open solicitation. Only projects specifically identified by Bonneville and the Council were allowed to submit proposals. However, as a result of this review, gaps may be identified that could be filled by proposals submitted through targeted and potentially competitive solicitations.

In general, a central purpose of category reviews is to highlight issues common to similar projects such as relevancy, duplication, coordination, scope, and consistency with the broad basinwide objectives and provisions in the Fish and Wildlife Program. This review specifically focuses on three subcategories. The Council and Bonneville's review objectives for the subcategories are:

¹"ISRP" refers to both ISRP members and Scientific Peer Review Group members.

Resident Fish: Confirm continued and proposed work in this area of the Fish and Wildlife Program and identify gaps for resident fish work for addressing limiting factors affecting fish; research, monitoring, and evaluation; and species propagation and mitigation requirements in the 2006 U.S. Fish and Wildlife Service BiOp.

Data Management: Improve value of the raw and derived data that is collected, maintained, and analyzed under the Program to evaluate program effectiveness and also improve the interconnectivity, usability, accessibility, and dissemination of that data for the region.

Program Coordination: Confirm activities and tasks that directly support Fish and Wildlife Program implementation, reporting, and technical policy development at the *Program* level.

The ISRP continues to be supportive of this review approach. It incorporates some of the best features of past reviews such as site visits, presentations, and a response loop. It also adds some positive new features such as an emphasis on topical reviews (e.g., data management) and a recognition of program commitments.

II. The ISRP Review Process

A. Review Criteria

ISRP reviews are based on criteria provided in the 1996 amendment to the Northwest Power Act. The amended Act directs the ISRP to review projects for consistency with the Council's Fish and Wildlife Program and whether they:

1. are based on sound science principles;
2. benefit fish and wildlife;
3. have clearly defined objectives and outcomes; and
4. contain provisions for monitoring and evaluation of results.

Pursuant to the 1996 amendment, the Council must fully consider ISRP recommendations when making its recommendations regarding funding and provide an explanation in writing where its recommendations diverge from those of the ISRP.

B. Review Steps

In general, ISRP reports provide written recommendations and comments on each proposal that is amenable to scientific review. These reports reflect the ISRP's consensus. To develop preliminary recommendations for this review, the ISRP used a multi-step process:

1. ISRP individual reviews. Three reviewers were assigned to independently review each proposal and provide written evaluations. Individual review comments and records of

discussions are confidential and not available outside the ISRP review teams. The ISRP assigned review teams based on expertise and whether members reviewed the project in the past or participated in site visits.

2. Site visits. In September and October 2011, ISRP review teams made multi-day tours of projects in the Intermountain, Mountain Columbia, Upper Snake provinces. The tours provided the ISRP important on-the-ground context for the review of past efforts and proposed activities. Moreover, the tours demonstrated that the projects are led by dedicated and articulate staff and progress is being made. Specifically, greater understanding and appreciation of the Council's Fish and Wildlife Program goals for native species and ecosystem restoration are evident in the projects the ISRP visited.

3. Project presentations. From January 17-19, 2012, the project sponsors had an opportunity to present their proposals to the ISRP, Council staff, and BPA staff. Time was reserved for questions. These discussions greatly aided the ISRP in clarifying specific concerns and better understanding the projects in general.

4. ISRP group evaluation meeting. Individual reviewer comments were compiled, and following the presentations, review teams met to discuss individual reviews, develop a consensus recommendation for each proposal, and ensure consistency across reviews.

5. Preliminary report completion. After the evaluation meeting, individual and meeting comments were synthesized into a consensus statement on each proposal, which was verified by each of the three reviewers. The full group of ISRP and Peer Review Group reviewers evaluated and edited these draft consensus statements to produce this preliminary report. In the preliminary report, the ISRP found that 10 proposals met scientific review criteria and 14 proposals met criteria with some qualifications. The ISRP made a specific programmatic recommendation that applied to the 17 regional coordination proposals. In addition, the ISRP requested responses on 30 proposals.

6. Response review and completion of the final report. On March 7, 2012, the ISRP received responses for all 30 proposals for which a response was requested. We again followed steps 2 and 4 above. Individual reviewers evaluated responses; those evaluations were compiled; review teams met via teleconference to discuss the evaluations and develop programmatic comments; and a final draft was circulated to confirm ISRP consensus. Of those 30 proposals providing a response, the ISRP found that 4 proposals met scientific review criteria (13%), 23 proposals met criteria with some qualifications (77%), and 3 proposals did not meet criteria (10%). All of these response requests were for resident fish proposals. The ISRP's review of data management and regional coordination proposals was essentially complete in the preliminary review. The ISRP did not revisit their recommendations or comments on those proposals.

Next Review Steps

At the Council's April 2012 meeting, the ISRP will present its findings. At the May and June Council meetings, Council staff anticipates presenting recommendations for Council discussion. At the Council's June and/or July Council meetings, the Council will make recommendations.

C. Recommendation Categories

For each proposal, we provide a recommendation:

- Meets Scientific Review Criteria
- Meets Scientific Review Criteria (Qualified)
- Meets Scientific Review Criteria - In Part
- Meets Scientific Review Criteria - In Part (Qualified)
- Does Not Meet Scientific Review Criteria
- Not Applicable

For preliminary reviews we also used:

- Response Requested

The full definitions for our recommendation categories are:

1. Meets Scientific Review Criteria is assigned to a proposal that substantially meets each of the ISRP criteria. Each proposal does not have to contain tasks that independently meet each of the criteria but can be an integral part of a program that provides the necessary elements. For example, a habitat restoration project may use data from a separate monitoring and evaluation project to measure results as long as such proposals clearly demonstrate this integration. Unless otherwise indicated, a "Meets Scientific Criteria" recommendation is not an indication of the ISRP's view on the priority of the proposal, nor an endorsement to fund the proposal, but rather reflects its scientific merit and compatibility with Program goals.

2. Meets Scientific Review Criteria - In Part is assigned to a proposal that includes some work that substantially meets each of the ISRP criteria and some work that does not. The ISRP specifies which elements do not meet the review criteria. In general, the proposal element that does not meet criteria is adequately described, but that element is not sound, is redundant, or would not benefit fish and wildlife. Required changes to a proposal will be determined by the Council and BPA in consultation with the project sponsors in the final project selection process.

<p>(Qualified) is assigned to recommendations in the two categories above for which additional clarifications and adjustments to methods and objectives by the sponsor are needed to fully justify the entire proposal. The ISRP also uses "Qualified" in two other situations:</p>
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- for proposals that are technically sound but appear to offer marginal or very uncertain benefits to fish and wildlife and
- when further ISRP review of a project’s final implementation plan or analysis of results is needed before the project moves to full implementation. An example is a proposal for both background assessment work and concurrent on-the-ground implementation that cannot be justified before results of the assessment are known. Another example is a proof of concept research project for which methods need to be tested at a pilot scale before full implementation. Please note, in past reviews, some ISRP recommendations to sequence assessment or test phases and full implementation were designated as “In Part” rather than “Qualified.”

The ISRP expects that needed changes to a proposal will be determined by the Council and BPA in consultation with the project sponsor in the final project selection process. Regardless of the Council’s or BPA’s recommendations, the ISRP expects that, if a proposal is funded, subsequent proposals for continued funding will address the ISRP’s comments.

3. Does Not Meet Scientific Review Criteria is assigned to a proposal that is significantly deficient in one or more of the ISRP review criteria. One example is a proposal for an ongoing project that might offer benefits to fish and wildlife, but does not include provisions for monitoring and evaluation or reporting of past results. Another example is a research proposal that is technically sound but does not offer benefits to fish and wildlife because it substantially duplicates past efforts or is not sufficiently linked to management actions. In most cases, proposals that receive this recommendation lack detailed methods or adequate provisions for monitoring and evaluation, and some propose actions that have the potential for significant deleterious effects to non-target fish or wildlife. The ISRP notes that proposals in this category may address needed actions or are an integral part of a planned watershed effort, but the proposed methods or approaches are not scientifically sound. In some cases, a targeted request for proposals may be warranted to address the needed action.

4. Not Applicable is assigned to proposals with objectives that are not amenable to scientific review.

5. Response Requested is assigned to a proposal in a preliminary review that requires a response on specific issues before the ISRP can make its final recommendation. This does not mean that the proposal has failed the review. In general, the ISRP requests responses on a majority of proposals, and a majority of proposals provide sufficient information in the response loop to meet the ISRP’s scientific review criteria.

III. Programmatic Comments

A. Structured Decision Management

In previous ISRP reports the structured decision management (SDM) process has been described and recommended ([ISRP 2008-4](#), [ISRP 2011-25](#)). We briefly mention SDM here to further encourage its application, because this review revealed many situations where SDM could be beneficial. Specifically, the ISRP recommends SDM as a process to identify and evaluate alternatives that engage stakeholders, experts, and decision makers in rigorous analysis and thoughtful dialogue to create a roadmap for planning, analysis, and consultation about resource conservation and restoration decisions. Decision analysis is a useful framework for focusing efforts of members of a diverse multi-stakeholder team and taking their sometimes strongly differing views about hypotheses and uncertainties into account. For example, based on the current resident fish reviews, the decision processes for predator control involving lake trout, walleye, and northern pike; hatchery production goals; resident fish recovery; and program coordination could be enhanced by including stakeholders and agencies through SDM's use. SDM is particularly useful in the early stages of the adaptive management process.

Irwin et al. (2011) provide a useful presentation on the application of SDM to recreational fisheries management. They emphasize the benefits to recreational fisheries of involving stakeholders, explicitly defining objectives and options, and modeling. The lessons are directly applicable to the Council's Fish and Wildlife Program and complementary with the adaptive management process recommended in the Program. While we strongly encourage stakeholder participation, program planners and project sponsors should undertake SDM, even if all stakeholders are not actively involved.

The U.S. Fish and Wildlife Service provides workshops and courses in SDM at their National Conservation Training Center in West Virginia, which includes relating SDM with adaptive management. The course catalog is available at <http://nctc.fws.gov/learn/courses.htm>. Expertise is available through these workshops, by visiting the Institute for Resources, Environment and Sustainability at UBC (<http://structureddecisionmaking.org/Overview.htm>), or by contacting scientists such as Dr. Sarah Converse at Patuxent Wildlife Research Center (sconverse@usgs.gov) or Dr. William Kendall at the Colorado Fish and Wildlife Cooperative Unit at Colorado State University (william.kendall@colostate.edu).

B. Resident Fish

1. The Need for Resident Fish Master Planning Documents

Most of the resident fish programs involve a mix of habitat restoration activities, native trout species management, and non-native stocking programs. Often these efforts have mixed goals including, for example, both streams managed for native fish and closed system ponds stocked with triploid species for providing more immediate harvest. Coordination and cost/time efficiencies might be gained if all resident fish activities were described, coordinated, and categorized by goal within a single umbrella Master Resident Fish Planning document for each area. For example, one topic that might benefit from such a coordinated approach would be the impacts of non-native stocking activities on native fish within the project areas. This approach would draw from the recent subbasin plans to further develop and define management priorities and actions for resident fish at a landscape scale.

2. Resident Fish Projects that Involved Habitat Restoration

As a whole, resident fish proposals utilize habitat restoration methods similar to those used to improve habitats for anadromous fishes. Most of the proposed actions are well known and commonly used methods founded on scientific studies of their general effectiveness. Actions include those that protect or restore stream banks and riparian areas; reduce or eliminate unwanted inputs such as sediment from roads; replace structures that block fish passage such as problem culverts; screen water diversions; and reintroduce large wood and other physical habitat elements to stream channels. Assuming the restoration actions remain as constructed, the ISRP has little reason to doubt that these actions will lead to long-term improvements in habitat for native resident fish populations.

The following programmatic observations regarding habitat restoration apply to the current set of proposals.

- a) While many proposals focus on improving harvest of resident fish in standing waters, most of the proposals dealing with flowing waters are oriented toward habitat conservation and restoration.*

There is a general difference in restoration emphasis between proposals for lakes and reservoirs and proposals for rivers and streams. It is clear from the proposals that the majority of harvest of resident fishes occurs in lakes and reservoirs. A few projects acknowledge that some harvest occurs in rivers and streams, but proposals for enhancing put-and-take fisheries in flowing waters are essentially non-existent, perhaps because stocking fish into open systems without documented homing of fish may not be effective. Instead, most tributary actions deal with restoring watershed processes supporting the production of native resident species. The

ISRP notes that stream stocking programs in other regions of the United States have occasionally led to unwanted consequences such as non-native fish invasions and disease introductions; therefore, we feel the emphasis on native fish conservation in streams is appropriate. In several instances there are habitat improvement proposals that intentionally benefited non-native species such as brook trout, but overall these are rare. Salmonid fishes are the primary focal species for the majority of tributary habitat actions; projects tend to target enhancement of “redband” (interior resident rainbow) trout, cutthroat trout (westslope or Yellowstone), or bull trout habitat. Restoration proposals are generally aimed at improving spawning and rearing habitat or providing access to streams that were blocked by road crossings, small dams, or other anthropogenic barriers.

Most of the projects involving lakes and reservoirs are focused on measures that would directly increase the harvest of resident fishes and, for the most part, did not propose actions that would improve habitat in these water bodies. There are several notable exceptions, including the Twin Lakes Oxygenation proposal that would introduce oxygen directly to the hypolimnion of two trout lakes and several proposals that would improve the quality of substrate for kokanee spawning along lake shorelines. Three proposals focus on adding nutrients to improve productivity in lake, river, and reservoir systems, one a preliminary feasibility investigation in a large natural lake (Pend Oreille), a second to conduct a large-scale test in a river (Kootenai), and a third to enhance zooplankton response and kokanee growth and harvest in a large reservoir (Dworshak).

b) Trout stocking projects are sometimes based on a limited understanding of carrying capacity and the potential effects on other fish species.

The importance of stocking in relation to carrying capacity must be tied to the specific intent of the stocking. Some fish stocking programs do not attempt to evaluate the potential effects of introduced hatchery fish on native salmonid and non-salmonid species. Most of the impacts would be likely to occur through predation or competition for both rearing space and food, but other interactions could take place as well, such as disease or parasite transmission. Additional impacts may occur from incidental bycatch of less productive native fishes when fishing for hatchery fishes. The ISRP suggests that increased attention be given to the possible effect of stocking programs on non-target resident fishes, particularly in streams where spawning and rearing spaces are limited.

For proposals that include planting hatchery fish or fertilized eggs in streams, there is a general lack of analysis of what the natural carrying capacity of the stream is and whether the stocking program would exceed the innate productivity of the drainage system. Although the ability of a stream to support fish varies over time, some streams have a naturally high carrying capacity associated with complex habitats, moderate temperatures, favorable water quality, and rich food webs, while others have a lower carrying capacity related to simplified habitats, very cold or warm temperatures, and limited food resources. Even though the carrying capacity of a stream cannot be known with certainty at any given moment, the relative productivity of the system should be factored into stocking programs, with highly productive streams being able to

support more fish than, for example, cold oligotrophic high elevation streams. The ISRP recommends that estimates of carrying capacity precede hatchery plants so that the ability of a stream to sustain those fish is not exceeded, except for put-and-take or short term harvest enhancement situations. Ecological modeling is a good starting point for estimating relative productivity, but key assumptions in models of habitat carrying capacity, for example Ecosystem Diagnosis and Treatment (EDT), should be verified by field observations.

- c) *Proposed habitat improvement actions should be reviewed not only for their potential for restoring native species but for their potential to facilitate the spread of non-native species.*

While the deliberate, authorized introduction of new non-native fishes is likely to be very closely regulated in the future, unauthorized releases continue to occur. In addition, little attention has been given in the resident fish proposals to the expansion of non-native aquatic invertebrates as well as aquatic and riparian plants, with the exception of the aquatic diatom *Didymosphenia geminata* and Eurasian water milfoil *Myriophyllum spicatum*, which displace other aquatic life. The spread of unwanted non-native species constitutes an underappreciated threat to the effectiveness of habitat restoration projects by re-directing the benefits of habitat improvements to non-target species. Two categories of habitat actions particularly susceptible to facilitating species invasions are migration barrier removals and riparian revegetation efforts. In either case, unwanted plants and animals are provided with unrestricted passage to previously inaccessible habitat or are inadvertently introduced with planting stock. It is impossible to halt the spread of unwanted aquatic and riparian species everywhere, but the ISRP cautions project sponsors to consider the potential for invasive species and exercise great care to prevent unwanted introductions when implementing their habitat restoration projects. For the case of potential invasions by non-native brook trout into native cutthroat trout habitat when barriers are removed, Fausch et al. (2009) discuss the elements of the tradeoffs, and a decision support analysis tool is available via Peterson et al. (2008).

3. Climate Change Considerations

As climate change models become better at predicting stream conditions, such as temperature and food webs, this information needs to be incorporated into planning documents and project actions. It makes sense to consider potential climate change impacts before committing substantial resources to improve habitat or manage invasive species in landscapes or waterscapes that may be inhospitable to the focal species in several decades. In addition, climate change models may identify regions that are overlooked today but might play an important role in providing persistence and resilience for native fishes such as bull trout, west-slope cutthroat trout, and whitefish.

4. Management of Stocked Salmonid Fisheries

Grand Coulee and Hells Canyon dams on the Columbia and Snake Rivers eliminated migration of anadromous salmon into the upper reaches of those watersheds. To compensate for lost fishing opportunities, the Fish and Wildlife Program includes resident fish substitution. Typically, brook char (trout), rainbow and cutthroat trout, and kokanee salmon are substituted for Chinook salmon and steelhead, and often the fisheries are created and maintained using fish stocked from hatcheries. These enhanced trout, char, and kokanee fisheries are also used to mitigate losses attributable to Hungry Horse Dam in Montana. The fish rearing, stocking, and harvest strategies usually are either “put-grow-and-take” or “put-and-take.” In put-grow-and-take, fish 4 to 8 inches long are stocked in a lake, reservoir, or stream where they grow for a few months and then recruit to a fishery. In put-and-take programs fish exceeding the minimum size limit, typically at least 10 inches, are released for immediate angling. In the Fish and Wildlife Program, fish are obtained from hatcheries entirely operated and maintained using BPA funds, obtained from existing state or federal hatcheries contracted using BPA funds, or purchased from commercial trout farms.

To meet the review criteria in the Fish and Wildlife Program, the ISRP expects that proposals would 1) justify the stocking rates and schedules based on ecological conditions² in the lake, reservoir, or stream, 2) have performance metrics and standards for hatchery rearing for those programs with dedicated hatcheries or contracts to state and federal hatcheries, and 3) have post-release performance metrics and standards for all programs. Metrics for hatchery performance should include life-stage survival, food conversion, fish condition, fish health inspections, and any required facility inspections for compliance for water quality discharge, and fish escapement. Performance metrics for post-release evaluations and monitoring should include fish growth and survival, fish condition, and yield to fisheries on a regular schedule, as part of a designed adaptive experimental program. An issue that should be considered is that fish managed for large size and trophy fishery goals might create fishing expectations that could conflict with goals for recovering native fish populations and harvest of those populations. The biological consequences of creating angler expectations by managing for large fish should be given serious consideration.

The ISRP recommends that economic and social measures of benefit from these programs, including Tribal subsistence fisheries, also be developed and reported on a regular basis. For example, the Province of British Columbia provides an economic analysis of rainbow trout lake fisheries every five years. Most hatchery Operations and Maintenance (O&M) proposals, or fish stocking proposals, do not include these essential elements. In some proposals, there is a companion Monitoring and Evaluation (M&E) component that provides post-release performance data, but the ecological conditions in the lake, reservoir, or stream and fishery that guides the stocking should be included.

² Social factors should also be considered. For example, immediate catch rates would be a factor. If a high percentage of put-and-take fish are harvested soon after stocking, and this is documented, the impacts on stocking beyond carrying capacity need to be assessed differently than in a situation with low immediate catch rates.

Monitoring and evaluation for these trout stocking projects is necessary to provide accountability and ensure that scientifically sound operational options are being used appropriately among different ecological and fishery settings. In settings like Lake Roosevelt, Banks Lake, and Lake Rufus Woods, there are dedicated monitoring programs that provide broad monitoring of limnological, fish community, food web, and fishery data. In other programs several lakes or streams are stocked annually and monitoring effort needs to be distributed spatially and temporally in a statistically robust design.

The fish stocking programs should employ ecosystem modeling to improve the justification for stocking programs and explore alternative sampling designs for post-release monitoring and evaluation (Askey 2007). Ecological simulations, such as EcoPath with EcoSim (www.ecopath.org), allow a spatial and temporal-based exploration of system capacities, trophic dynamics, species interactions, effects of regulation changes, alternative stocking strategies, nutrient dynamics, effects of nutrient additions, and other policy options. Such simulations provide tools and workshop-based opportunities to involve stakeholders in the decision management process.

5. Non-native Fish Suppression Programs

A number of projects in the review involved suppression of non-native fish, especially lake trout and northern pike, in efforts to restore or maintain native species. Bioenergetic models are used to forecast how the suppression benefits populations of native species. Techniques to remove non-native fish include commercial gillnetting, bounties, harvesting brook trout to feed cultured fish, and sports fishing derbies. The ISRP observes that there are many common themes for the projects and suggests there is scope for increased coordination among them. Perhaps a special fish suppression meeting is needed to discuss the status of the projects, food web and ecosystem effects of non-native species removal and future orientation of research and monitoring. There is also scope for involvement with the IEAB given the projects are expensive and need funding for long time periods to maintain benefits. In some areas the economics of sport fishing on the non-natives enter into discussions as well.

6. Stock-recruitment in Resident Salmonids

A more thorough understanding of stock-recruitment mechanisms in resident salmonids may benefit management of these fishes in the non-anadromous portions of the Columbia River Basin. Recruitment relationships in resident salmonids that compare fluvial, adfluvial, and lacustrine life history types to recruitment relationships in anadromous salmonids deserve further research and investigation, as do implications to management. Although stock-recruitment mechanisms in anadromous fishes are not completely understood, they are much better defined than for resident fishes, and those anadromous mechanisms may not apply to resident fishes. For example, the shapes of the recruitment curves may differ because of

different density dependent responses in resident than in anadromous fish. At the least, stock-recruitment relationships must be modified to accommodate the additional food and space requirements of resident adult forms, which typically occur in the presence of juveniles.

The key limiting factors for various life stages of resident fish populations in their habitats have not been well defined in the literature. Knapp et al. (1998) note that resident golden trout, *Oncorhynchus mykiss aguabonita*, were limited by available spawning habitat and not rearing habitat for juveniles, as previously assumed. They state that paradigms based largely on data from anadromous species have been widely applied to stream-resident salmonids, even though the processes limiting or regulating stream-resident populations remain poorly understood. Elliott and Hurley (1998) also found a resident trout population in the United Kingdom displayed density dependence in the adult stage, but not in earlier life stages. On the other hand, food and space requirements of juveniles suggest density dependence is of importance (Grant and Kramer 1990, Keeley 2003), indicating that the key limitation is in juvenile rearing habitat. Moreover, in mountain streams with strong snowmelt runoff peaks, these flow pulses can limit native and nonnative trout recruitment in years of high snowpack (Nehring and Anderson 1993, Strange et al. 1992, Fausch et al. 2001). The implications to priorities in habitat management and rehabilitation are substantial.

Some current ISRP-reviewed resident fish projects may shed some light on these stock-recruitment differences between resident and anadromous fish. Current studies, for example project #199004400, where juvenile and adult migrations are sampled in several tributaries of Lake Coeur d'Alene, deserve attention, support, and replication elsewhere since there is promise in revealing the life history and limiting factors of westslope cutthroat trout, which rear as juveniles in these streams and migrate to the lake to mature as adults. Similarly, investigations of kokanee spawning in Lake Roosevelt may shed light on limitations for that life history strategy (199501100). Other work on recruitment in stream fishes on Lake Roosevelt tributaries (199001800) will explore and modify the use of EDT as a life history and habitat model for resident fish. Research on defining the limiting life stage and key limiting factors may need to accompany or precede these studies. The direction for additional research, if needed, will be clarified.

7. Coordination and Direction among Sturgeon Research Projects

White sturgeon research, management, and restoration are at a crossroads in the Columbia Basin precipitated by passage and recruitment issues. Greater coordination among agencies and tribes in goals, objectives, and actions is needed. To this end, White Sturgeon Strategic Planning Workshops for the Lower Columbia and Lower Snake River impoundments were convened in 2009, 2010, and 2011, in part to head toward a clear vision for sturgeon in the Basin. Some progress has been made, but difficult issues remain. Key aspects of sturgeon proposals reviewed in the ISRP's resident fish review reflect differing approaches to addressing the recruitment issue, including recruitment limitation research, habitat restoration, and

hatcheries. The design of the 2012 workshop should use an SDM approach to resolve the difficult issues identified.

C. Monitoring and Evaluation

MonitoringMethods.org: Inclusion of MonitoringMethods.org in the submission and review process is a step toward better documentation of monitoring. However, there is still a need for sponsors to provide details describing how protocols are applied to specific locations. In addition, it would be useful to briefly describe why the method chosen was selected over other plausible and commonly used methods for accomplishing the same objectives, for example fishing gear, tagging technology, and habitat monitoring protocol. In some proposals, it was not evident that updating the methods on MonitoringMethods.org was a high priority, or perhaps the sponsors found it difficult to update the methods.

Angler satisfaction: In addition to using creel surveys to monitor impact of fishery enhancement activities, the ISRP recommends that angler satisfaction be monitored as another metric of project success. Furthermore, since lake fisheries management goals often pertain to both subsistence and recreational fisheries, the two types of fisheries should be evaluated separately as well as jointly. Individual goals for each of these fisheries should be established. Care should be taken to determine the fishery enhancement dimension of angler satisfaction from other social determinants such as being outdoors, socializing with family and friends, and personal enjoyment (Pilcher and Hollingworth 2002). A measure of satisfaction cannot assume that satisfaction is solely determined by fishery enhancement.

Sample size justification: Many proposals now specify target sample sizes, which is a very positive development. In addition to specifying sample sizes, project sponsors should also provide a justification or statistical rationale for the sample size selected. Selecting a sample size that is adequate, but not larger than necessary, facilitates effective project planning.

Assessment opportunities with existing data: Numerous projects have collected data over many years for assessing and monitoring resident fish stock status, thereby meeting original project goals. In some cases long time series of trap results, redd counts, and relative abundance estimates are available. Projects could benefit from not only continued sampling, but from using existing data for hypothesis testing and accompanying intensive data analysis to answer questions of scientific and management relevance in the project area and basinwide, and to better identify information gaps.

In particular, the ISRP believes there are opportunities to improve the analyses of current and past PIT tag data through more robust mark-recapture methods. Many projects aim to measure survival of wild or stocked fish, rates of population increase or decline (λ), rates of movement among different habitats, and fish abundance. All of these parameters can be estimated from mark-recapture data, using a variety of study designs available within the flexible analysis package Program MARK (White and Burnham 1999; White 2008). Several

excellent examples of large-scale programs to estimate population parameters for wild and stocked fish in rivers can be found in Bestgen et al. (2007) and Zelasko et al. (2010). New methods also allow combining data across sites or times to gain statistical power in estimating these parameters (e.g., Saunders et al. 2011). Expertise is available through various workshops (<http://warnercnr.colostate.edu/~gwhite/mark/mark.htm>) and from personnel such as Drs. Gary White (gwhite@cnr.colostate.edu), Paul Lukacs (paul.lukacs@umontana.edu), Paul Conn (Paul.Conn@noaa.gov), and Brett McClintock (Brett.McClintock@noaa.gov).

Reporting results: The ISRP recommends peer-review of all draft reports to improve analysis, highlight hypotheses, and aid in adaptive management. Peer review can be internal, external, independent, and/or through a widely read refereed journal. Dissemination of results to other practitioners and the public through various publication approaches is strongly encouraged. Depending on objectives and circumstances, sharing of results may be accomplished through proposal forms, annual reports, grey literature, web posting, Columbia Basin Bulletin articles, professional conferences, symposia, peer-reviewed journals and/or the popular press. For example, a project that conducts research on key uncertainties or develops restoration approaches with results having regional or international application would be appropriate for pursuit of publication in a refereed journal. This recommendation on reporting results and peer review is consistent with the 2009 Fish and Wildlife Program, the MERR plan, previous ISRP retrospective statements ([ISRP 2005-14](#)), and work elements in Pisces and Taurus.

D. Data Management

Redundancy: When considering activities of the Fish Passage Center, DART, StreamNet, Northwest Habitat Institute, PNAMP, Taurus, and CBFWA's Status of the Resource, the question of redundancy arises. There does not appear to be excessive redundancy. These projects focus on various functions, such as data archiving or data access, and may specialize in particular types of data, or particular types of analyses. Some redundancy may be beneficial for at least two reasons: 1) it increases confidence in the existing data management process when consistent data are found, and 2) when discrepancies are found it calls attention to differences in definitions, procedures, and/or data sources. In order to reduce any creep toward redundancy the ISRP recommends development of a summary matrix by Council staff or the ISRP that identifies characteristics of each data management project. The matrix could be updated as new proposals are evaluated. For example, characteristics could include:

- Species inclusion – anadromous fish, resident fish, wildlife
- Habitat inclusion
- Geographic inclusion/exclusion
- Time series included
- Data type – derived or raw

- Availability of customized analyses and reports
- Constraints on data accessibility

Gaps: Despite the plethora of data management projects, are there gaps in data management that adversely affect the Fish and Wildlife program? While data gaps may exist, these gaps are not the fault of the data management projects. Rather the appropriate data are not being collected or not reported. The situation is improving due to efforts such as the Monitoring, Evaluation, Research and Reporting framework (MERR), Anadromous Salmonid Monitoring Strategy (ASMS), Resident Fish Monitoring Strategy (RFMS), and Wildlife Monitoring Implementation Strategy (WMIS).

Distributed versus Centralized Databases: Some data management projects use, or propose to use, a distributed strategy, while others argue for using a centralized database. The choice of strategy depends on factors specific to the ultimate purpose of the data managed by the project and is best left to project managers after consultation with data management experts.

Data Management Program Considerations: In developing and maintaining an effective data management for the program, several elements should be included:

- A data management working group (or groups) should exist that helps link the various projects. There is great potential for learning and sharing among the specific projects.
- A sufficient percentage of a project's budget should be devoted to data management. For example in the National Science Foundation's LTER program, the percentage at one time was 20-30% but with the Council's programs it seem to be often <10%.
- Advances in hardware, software, and new approaches (e.g., cloud computing) should be factored into program growth. Specific standards should be expected for large or longer term projects.

These suggestions are not exhaustive, and the Program has made efforts to address some of them, such as sponsoring data management working groups.

E. Regional Coordination

Review of regional coordination projects shows many thoughtful and interesting ideas, but little science to evaluate outcomes and learn in an adaptive management framework. Scientific analysis of regional coordination, including the development of meaningful indicators to measure success, could provide ways to effectively and efficiently carry out the objectives of the Fish and Wildlife Program.

The 1996 revisions to the Northwest Power Act require use of "sound scientific principles." This is one of several review criteria and one of many objectives for review of activities supported by

the Council. Regional coordination is a particularly difficult area for proposal proponents, as reflected in reports from previous experience (ISRP 2007-14; Palensky 2007). With respect to regional coordination, sound science is only a portion of the judgment to accept a proposal. It may even be a small proportion of the judgment. Thus, the review of sound science has to be in the context of the overall goals of regional coordination. A proposal may provide excellent coordination but not include sound science.

The 19³ regional coordination proposals in the 2012 review are limited with respect to including sound science designed to evaluate outcomes and lessons learned from coordination activities. No proposal offers a research design to monitor, measure, or study the effectiveness or efficiency of coordination activities.

Examples of emerging coordination science include the Science Coordination Group, Office of Everglades Restoration Initiatives, U.S. Department of the Interior; MIT, Sloan School of Management; and Center for Coordination Science. Unfortunately, the science of coordination is not developed enough, nor focused adequately, to provide help to proposal proponents. Nevertheless, some publications have discussed coordination in the Council context (Northwest Power Act 1982; ISRP 2007-14; Palensky 2007; NPCC 2009-09:64). Many of the proposals cite one or more of these documents.

Each proposal has a statement about the need for coordination activities listed in Table 1. However, a scientific problem statement and research design to assess outcomes are not presented. For the 19 regional coordination proposals, Table 1 presents the average percent of time allocation among the regional coordination activities. Time allocations were quite variable between proposals. One proposal gave no time allocation, and one proposal put all the time in information dissemination. The average number of coordination activities is 6.4 – three fourths of the 8 coordination activities. The greatest percent of time is allocated to “Coordination of projects, programs, and funding sources.” “Developing and tracking biological objectives” and “Project proposal review” had the least percent of time allocated.

Table 1. The average percent of time allocation among the regional coordination activities

Regional Coordination Activities	Average % Time
Data management (storage, management, and reporting)	8.9
Monitoring and evaluation (framework and approach)	15.0
Developing and tracking biological objectives	7.8
Review of technical documents and processes	18.3
Project proposal review	7.9
Coordination of projects, programs, and funding sources within subbasins	33.3

³ These 19 include the Columbia Basin Bulletin and one “contextual” project titled: Policy, Plan and Technical Support of Washington Department of Fish and Wildlife (WDFW)-Yakima/Klickitat Fisheries Project (YKFP).

Facilitating and participating in focus workgroups on Program issues	16.6
Information dissemination (technical, policy, and outreach) w/o Columbia Basin Bulletin	13.7

1. Research Questions and Hypotheses

The proposal proponents identified some key regional coordination questions that should be considered. Each proposal proponent should focus on at least one regional-coordination question and develop a research design to identify outcomes and lessons learned. Sample questions include:

- Does regional coordination result in more effective and efficient use of Fish and Wildlife Program funds? “Effective” can have economic, cultural, social, biological, ecological, and other dimensions.
- Does regional coordination result in better program and project prioritization, implementation, monitoring, and capture of lessons learned that benefit the Fish and Wildlife Program?
- What changes have occurred as a result of regional coordination? Case studies showing effectiveness would be very helpful.
- What are the most efficient and effective regional coordination methods? This would evaluate the contexts in which activities such as face-to-face meetings, video conferencing, workshops, email, and phone conferencing are most effective and efficient.
- What is the best design for effective meetings, for example leadership, facilitation, room setup, and group size? Are meetings used too frequently or not used enough? What are the alternatives to meetings and when should these alternatives be considered?
- Are the most appropriate coordination participants involved? Are all participants with regional coordination interests being heard? Does coordination increase understanding between participants?
- Are outreach messages associated with coordination reaching the proper audiences and being understood as intended? What are the best methods for information dissemination?
- What coordination processes most effectively and efficiently resolve out-of-basin and coupled watershed issues? Have processes like structured decision management been tried? Are these or other processes effective?
- Does funding equity among partners increase effective and efficient regional coordination? Funding equity encourages all parties receiving funding to participate. Does this provide a broader and more diverse analysis of the effectiveness and efficiency of Fish and Wildlife Program actions, regional coordination activities, and new insights about conservation and restoration actions?

- Does regional coordination take money away from pursuing more important Fish and Wildlife Program activities?
- Anadromous species return nutrients to watersheds. Can regional coordination determine an appropriate biological objective for the distribution of returning species between harvest and habitat?

These questions and/or others identified by participants should be placed in a research design framework thereby encouraging efforts to investigate outcomes of regional coordination activities. Many forms of evidence can be used in discussing outcomes. These include both quantitative and qualitative methods of data analysis and statistical and narrative presentation of results. While counting the numbers of participants is important in describing the sample involved in a study, it is only a relevant outcome if there is a goal to include certain groups or types of participants.

2. Sociobiogeographic Regions

The proposals cover a wide variety of scales—individual projects, tribes, and subbasins; tribal regions (upper Snake [USRT], upper Columbia [UCUT], CRITFC, lower Columbia, Intermountain, and Willamette); and state and national governments. Can or should these project scales match up better with ecological provinces, NOAA Salmon Recovery Domains, ESUs, Salmon Recovery Areas, subbasins, watersheds, or other divisions being used to organize fish and wildlife conservation and restoration?

Regions are defined in Palensky (2007): “Coordination must be tied to the individual sovereign and grounded in each sovereign’s equality.” A diagram accompanies this statement shows project, province, and regional scales. A list of regional coordination activities and deliverables follows the figure. Two clarifications should be made to the diagram and list that would be helpful to project proponents. First, how do these levels relate to various regional coordination project and sovereign interests? Clarify the regional coordination “landscape?” Most critical would be to clarify the tribal units and the role of subbasins in regional coordination? Second, a list of observable outcomes should be added to the activities and deliverables. Examples of outcomes could come from the key questions to be associated with regional coordination.

3. Priorities for Policy Coordination

Programs dealing with resident fish, data management, regional coordination, and Fish and Wildlife Program strategies, measures, and plans have legitimate growth needs. They will compete with one another for funding and resources. Looking forward and setting guidelines regarding the distribution of resources and what is expected from each area is an important policy issue for Council coordination.

In the next amendments to the Fish and Wildlife Program, the definition of regional coordination and the overall section on coordination in the Fish and Wildlife Program (see NPCC 2009-09: 63-64, 71) would benefit from additional clarification, taking into account the ISRP's programmatic comments.

For additional overarching comments on regional coordination see the "General Qualification Recommendation for Regional Coordination Proposals" in this report.

F. Proposal Content and Form Improvement

Consider a more holistic proposal format. The new Taurus proposal form serves a number of purposes including documentation for ISRP science review; Council and BPA budget and policy review; and project manager and public examination and comment. The form was created with input from the ISRP, project sponsors, and Council and BPA staff. For the Research, Monitoring and Evaluation and Artificial Production Category Review, the previously separate narrative (science review) and administrative sections of the form were combined into one online form. The combined form was intended to reduce redundancy, make all information readily searchable, facilitate conversion from a proposal to a statement of work, and enable subsequent tracking of project implementation, all while maintaining ISRP review functions.

The revised Taurus form maintains the strengths of the form identified by the ISRP after the Research, Monitoring and Evaluation and Artificial Production Category Review. The new form improves upon ISRP identified weaknesses by reducing redundancy and difficulties in identifying methods used. However, there often remains a need for proponents to provide additional information on how standard methods are applied for a specific project or objective. The revised form has many improvements, and the ISRP proposes to work with the Council, BPA, and the Taurus consultants to further refine the form and the guidelines that accompany it.

In particular, the ISRP would like to work on making the structure of the form and guidelines follow a clear adaptive management framework. For example, the sheer number of proposal sections leads to information requested in one section being described in another proposal section resulting in considerable repetition and exceptionally long proposals.

Impact reporting: Project sponsors should report not only biological and physical results of their projects but the impacts of the project, that is, how have they influenced management, benefited society, and achieved effectiveness and efficiency.

Hypotheses: Many proposals could have benefited from articulation of testable hypotheses. The lack of hypotheses often makes it difficult for reviewers to determine the potential outcomes of the project. What aspects of the problem have been addressed and what gaps remain?

Project evolution, tracking adaptive management: Projects that extensively change focus but maintain an existing project title cause difficulty for reviewers trying to evaluate the aspects of a project taking a new direction. Clear articulation of changes in overall project direction is required. Project titles should be updated to better reflect the project activities. A rationale should be provided for the title change and a “family tree” explaining how the project has evolved over time. In addition, the instructions for the proposal section on history and project accomplishments should ask the sponsor to list specific objectives from the original proposal and progress toward those objectives. Plus, the sponsor should identify objectives that changed completely, including rationale. This would make project changes transparent and facilitate ISRP retrospective reviews.

Subcontractor information: Effective use of subcontracting can lead to stronger project results as more specialized scientific expertise is brought to bear on specific resource and coordination problems. The current Taurus form instructions for Key Personnel asks, “In cases where staff or consultants need to be recruited, that should also be specified and qualifications described.” However, many proposals using subcontractors do not provide adequate descriptions of subcontractor activities. Proponents should provide a summary of subcontractor actions and methods for scientific review.

Project and program fragmentation: The Council, BPA, and project sponsors should consider additional ways to group or combine projects. Although proposals have a Project Relationship section to describe how a set of projects relate, ISRP reviewers often had difficulty understanding how projects fit together and which set of projects constituted a program. The presentations and site visits were very helpful in this regard, but improvement should be made to more clearly group projects. Project groupings need to be real and not simply based on geography. For example, a number of proponents may be studying restoration of different components of the ecosystem in the same reach of a river, and proposals might be grouped in this way. However, unless the proponents are actually working together, the grouping created may be artificial. Although there is good rationale to maintain project identity through time for tracking purposes, there may be ways to maintain this history while developing a system that helps group projects by program, subbasin, province, or topic.

Certain review approaches have been effective in terms of providing needed context and linkage among proposals. The Umatilla Initiative Review and the Lower Snake River Compensation Plan’s Spring Chinook Review are examples that demonstrate context and linkage.

On the other hand, some proposals contain too many diverse activities to be thoroughly described in one proposal. This potentially leads to inconsistent levels of review for various activities under one project or program. For example, stream restoration activities at numerous sites within a basin might be a work element in one proposal for a large program which also includes artificial production and other activities. In another proposal, stream restoration at one site is the entire subject of the proposal. Although the review process is flexible and

appears to work for both sets of projects, discussion on the best ways to group and split projects could benefit future review processes.

G. References and Bibliography

Structured Decision Management Reference

Irwin, B.J., M.J. Wilburg, M.L. Jones, and J.R. Bence. 2011. Applying structured decision making to recreational fisheries management. *Fisheries* 36(3):113-122.

Habitat References

Fausch, K. D., B. E. Rieman, J. B. Dunham, M. K. Young, and D. P. Peterson. 2009. The invasion versus isolation dilemma: tradeoffs in managing native salmonids with barriers to upstream movement. *Conservation Biology* 23:859-870.

Peterson, D. P., B. E. Rieman, J. B. Dunham, K. D. Fausch, and M. K. Young. 2008. Analysis of trade-offs between threats of invasion by nonnative brook trout (*Salvelinus fontinalis*) and intentional isolation for native westslope cutthroat trout (*Oncorhynchus clarkii lewisi*). *Canadian Journal of Fisheries and Aquatic Sciences* 65:557-573.

Fish Stocking Bibliography

Askey, P. J. 2007. Towards optimal management of spatially-structured, recreational fisheries: Linking ecology and angler dynamics in British Columbia Rainbow Trout (*Oncorhynchus mykiss*) Lakes. PhD Thesis, University of Calgary, Calgary, Alberta.

Askey, P. J., J. R. Post, E. A. Parkinson, E. Rivot, A. Paul, and P. A. Biro. 2007. Estimation of gillnet efficiency and selectivity across multiple sampling units: A hierarchical Bayesian analysis using mark-recapture data. *Fisheries Research* 83:162-174.

Askey, P. J., S. A. Richards, J. R. Post, and E. A. Parkinson. 2006. Linking angling quality and learning under catch and release regulations. *North American Journal of Fisheries Management* 26:1020-1029.

Bartholomew, A., and J. A. Bohnsack. 2005. A review of catch-and-release angling mortality with implications for no-take reserves. *Reviews in Fish Biology and Fisheries* 15:129-154.

Biro, P. A., M. V. Abrahams, J. R. Post, and E. A. Parkinson. 2004. Predators select against high growth rates and risk-taking behaviour in domestic trout populations. *Proceedings Of The Royal Society Of London Series B-Biological Sciences* 271:2233-2237.

Cox, S. P. 2000. Angling quality, effort response, and exploitation in recreational fisheries: Field and modeling studies on British Columbia rainbow trout 178 (*Oncorhynchus mykiss*) lakes.

Ph.D. Thesis. University of British Columbia, Vancouver, B.C.

- Cox, S. P., and C. Walters. 2002. Modeling exploitation in recreational fisheries and implications for effort management on British Columbia rainbow trout lakes. *North American Journal of Fisheries Management* 22:21-34.
- Cox, S. P., C. J. Walters, and J. R. Post. 2003. A model-based evaluation of active management of recreational fishing effort. *North American Journal of Fisheries Management* 23:1294-1302.
- Dillon, J. C., D. J. Schill, and D. M. Teuscher. 2000. Relative return to creel of triploid and diploid rainbow trout stocked in eighteen Idaho streams. *North American Journal of Fisheries Management* 20:1-9.
- Koenig, M. K., and K. A. Meyer. 2011. Relative performance of diploid and triploid catchable rainbow trout stocked in Idaho lakes and reservoirs. *North American Journal of Fisheries Management* 31:605-613.
- Koenig, M. K., J. R. Kozfkay, K. A. Meyer, and D. J. Schill. 2011. Performance of diploid and triploid rainbow trout stocked in Idaho alpine lakes. *North American Journal of Fisheries Management* 31:124-133.
- Korman, J., T. M. Webb and E. A. Parkinson. 1993. User's guide to the B.C. large lakes kokanee model: version 2.0. B.C. Fisheries Project Report No. RD35. 70p.
- Korman, J., C. Walters, J.C. Sawada and E. A. Parkinson. 1994. User manual for the small lakes integrated management model: version 2.0. Province of British Columbia, Fisheries Circular No. 95.
- Kozfkay, J. R., J. C. Dillon, and D. J. Schill. 2006. Routine use of sterile fish in salmonid sport fisheries: Are we there yet? *Fisheries* 31:392-400.
- Lewin, W. C., R. Arlinghaus, and T. Mehner. 2006. Documented and potential biological impacts of recreational fishing: Insights for management and conservation. *Reviews in Fisheries Science* 14:305-367.
- Parkinson, E.A., J. Berkowitz, and C.J. Bull. 1988. Sample size requirements for detecting changes in some fisheries statistics from small trout lakes. *North American Journal of Fisheries Management* 8:181-190.
- Parkinson, E.A. 1990. An evaluation of adaptive management and minimal sampling as techniques for optimizing rainbow trout stocking rates. Province of British Columbia Fisheries Management Report 96.
- Parkinson, E. A., J. R. Post, and S. P. Cox. 2004. Linking the dynamics of harvest effort to recruitment dynamics in a multistock, spatially structured fishery. *Canadian Journal of Fisheries and Aquatic Sciences* 61:1658-1670.

Stockner, J. G., and E. A. MacIsaac. 1996. British Columbia lake enrichment programme: Two decades of habitat enhancement for sockeye salmon. *Regulated Rivers-Research & Management* 12:547-561.

Teuscher, D. M., D. J. Schill, D. J. Megargle, and J. C. Dillon. 2003. Relative survival and growth of triploid and diploid rainbow trout in two Idaho reservoirs. *North American Journal of Fisheries Management* 23:983-988.

Wiley, R. W., R. A. Whaley, J. B. Stake, and M. Fowden. 1993. Assessment of stocking hatchery trout: a Wyoming perspective. *North American Journal of Fisheries Management* 13:160-170.

Stock-recruitment References

Elliott, J.M., and M.A. Hurley. 1998. Population regulation in adult, but not juvenile, resident trout (*Salmo trutta*) in a Lake District stream. *Journal of Animal Ecology* 67:280-286.

Fausch, K. D., Y. Taniguchi, S. Nakano, G. D. Grossman, and C. R. Townsend. 2001. Flood disturbance regimes influence rainbow trout invasion success among five Holarctic regions. *Ecological Applications* 11:1438-1455.

Grant, J. W. A., and D. L. Kramer. 1990. Territory size as a predictor of the upper limit to population density of juvenile salmonids in streams. *Canadian Journal of Fisheries and Aquatic Sciences*, 1990, 47:1724-1737.

Keeley, E.R. 2003. An experimental analysis of self-thinning in juvenile steelhead trout. *Oikos* 102: 543–550.

Knapp, Roland A., Vance T. Vredenburg, and Kathleen R. Matthews. 1998. Effects of stream channel morphology on Golden trout spawning habitat and recruitment. *Ecological Applications* 8:1104–1117.

Nehring, R. B., and R. M. Anderson. 1993. Determination of population-limiting critical salmonid habitats in Colorado streams using the Physical Habitat Simulation system. *Rivers* 4:1–19.

Strange, E. M., P. B. Moyle, and T. C. Foin. 1992. Interactions between stochastic and deterministic processes in stream fish community assembly. *Environmental Biology of Fishes* 36:1–15.

M&E References

Bestgen, K. R., J. A. Hawkins, G. C. White, K. D. Christopherson, J. M. Hudson, M. H. Fuller, D. C. Kitcheyan, R. Brunson, P. Badame, G. B. Haines, J. A. Jackson, C. D. Walford, and T. A.

Sorensen. 2007. Population status of Colorado Pikeminnow in the Green River Basin, Utah and Colorado. *Transactions of the American Fisheries Society* 136:1356 — 1380.

Pitcher, Tony J. and C. E. Hollingworth. 2002, *Recreational fisheries: ecological, economic, and social evaluation*. Oxford: Blackwell Science.

Saunders, W. C., K. D. Fausch, and G. C. White. 2011. Accurate estimation of salmonid abundance in small streams using nighttime removal electrofishing: an evaluation using marked fish. *North American Journal of Fisheries Management* 31:403-415.

White, G. C. 2008. Closed population estimation models and their extensions in Program MARK. *Environmental and Ecological Statistics* 15:89-99.

White, G. C., and K. P. Burnham. 1999. Program MARK: survival estimation from populations of marked animals. *Bird Study* 46:S120-S139.

Zelasko, K. A., K. R. Bestgen, and G. C. White. 2010. Survival rates and movement of hatchery-reared razorback suckers in the Upper Colorado River Basin, Utah and Colorado. *Transactions of the American Fisheries Society* 139:1478 — 1499.

Regional Coordination References

ISRP. 2007-14. Memorandum: "Input on Evaluation of Regional Coordination Projects." (October 2, 2007).

NPCC (Northwest Power and Conservation Council). 2009-09. Columbia River Basin fish and wildlife program: 2009 amendments. Council document no. 2009-09. (27 July 2011; www.nwcouncil.org/library/2009/2009-09/Default.asp).

Palensky, L., November 1, 2007, Memorandum, "Status report on regional coordination definition."

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199700400	Resident Fish above Chief Joseph and Grand Coulee Dams	Kalispel Tribe	Yes (Qualified)	37
200811200	Resident Fish Loss Assessment	Colville Confederated Tribes	Yes (Qualified)	39
198503800	Colville Hatchery Operation and Maintenance (O&M)	Colville Confederated Tribes	No	42
200740500	Rufus Woods Habitat/Passage Improvement, Creel and Triploid Supplementation	Colville Confederated Tribes	Yes (Qualified)	44
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200811100	Twin Lakes Enhancement	Colville Confederated Tribes	In Part (Qualified)	51
200103100	Resident Fish Symposium	Lake Roosevelt Forum	Yes (Qualified)	55
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199104700	Sherman Creek Hatchery Operations and Maintenance (O&M)	Washington Department of Fish and Wildlife (WDFW)	Yes (Qualified)	66
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200201100	Kootenai River Operational Loss Assessment	Kootenai Tribe	Contextual	NA
198806500	Kootenai River Fishery Investigations	Idaho Department of Fish and Game (IDFG)	Yes (Qualified)	122
199500400	Libby Reservoir Mitigation Restoration and Research, Monitoring and Evaluation (RM&E)	Montana Fish, Wildlife and Parks (MFWP)	Yes	125
200600800	Mainstem Columbia Amendments Research at Libby Dam	Montana Fish, Wildlife and Parks (MFWP)	Yes (Qualified)	127
199101903	Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)	Montana Fish, Wildlife and Parks (MFWP)	In Part (Qualified)	130
199101901	Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)	Salish and Kootenai Confederated Tribes	Yes (Qualified)	132
199101904	Hungry Horse Mitigation-Creston Hatchery	US Fish and Wildlife Service (USFWS)	No	140
200200300	Secure and Restore Fish and Wildlife Habitat in Montana	Salish and Kootenai Confederated Tribes	Yes	142
199701900	Evaluate Life History of Native Salmonids in Malheur River Subbasin	Burns-Paiute Tribe	Yes	142
199501500	Duck Valley Reservation Reservoir Fish Stocking Operations and Maintenance (O&M) and Monitoring and Evaluation (M&E)	Shoshone-Paiute Tribes	Yes (Qualified)	149
199701100	Duck Valley Reservation Habitat Enhancement	Shoshone-Paiute Tribes	Yes (Qualified)	151
199201000	Fort Hall Habitat Restoration	Shoshone-Bannock Tribes	Yes (Qualified)	154
200717000	South Fork Snake River Yellowstone Cutthroat Trout Recruitment and Survival Improvement	Idaho Department of Fish and Game (IDFG)	Yes	156
200700300	Dworshak Dam Resident Fish Mitigation	Idaho Department of Fish and Game (IDFG)	In Part	160
199501300	Nez Perce Trout Ponds	Nez Perce Tribe	Yes (Qualified)	162
200715700	Bull Trout Status and Abundance on Warm Springs Reservation	Confederated Tribes Of Warm Springs	Yes (Qualified)	164
200203700	Freshwater Mussel Research and Restoration	Umatilla Confederated Tribes (CTUIR)	Yes	167
200900800	Climate Change Impacts	Columbia River Inter-Tribal Fish Commission (CRITFC)	Yes (Qualified)	169

ID	Title	Sponsor	Meets scientific criteria?	Page
200400200	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	US Geological Survey (USGS)	Yes	172
198810804	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	Pacific States Marine Fisheries Commission (PSMFC)	Yes (Qualified)	173
200850700	Tribal Data Network	Columbia River Inter-Tribal Fish Commission (CRITFC)	Yes (Qualified)	180
200850500	Streamnet Library	Columbia River Inter-Tribal Fish Commission (CRITFC)	Yes (Qualified)	183
199601900	Data Access in Real Time (DART)	University of Washington	Yes	189
200600600	Habitat Evaluation Project	Columbia Basin Fish and Wildlife Authority (CBFWA)	Contextual	NA
200307200	Habitat and Biodiversity Information System for Columbia River Basin	Northwest Habitat Institute	Yes (Qualified)	190
199008000	Columbia Basin Pit-Tag Information	Pacific States Marine Fisheries Commission (PSMFC)	Contextual	NA
199403300	Fish Passage Center	Pacific States Marine Fisheries Commission (PSMFC), Fish Passage Center	Contextual	NA
201007500	Upper Columbia Implementation and Action Effectiveness Monitoring	Upper Columbia Salmon Recovery Board	Contextual	NA
201100600	Columbia Habitat and Monitoring Program - Pilot (CHaMP-P)	NOAA Fisheries	Contextual	NA
199800401	Columbia Basin Bulletin	Intermountain Communications	Yes	192
198906201	Annual Work Plan for Columbia Basin Fish and Wildlife Authority (CBFWA)	Columbia Basin Fish and Wildlife Authority (CBFWA)	Qualified (see Programmatic)	196
199803100	Implement Wy-Kan-Ush-Mi Wa-Kish-Wit	Columbia River Inter-Tribal Fish Commission (CRITFC)	Qualified (see Programmatic)	204
200740700	Upper Snake River Tribe (USRT) Coordination	Upper Snake River Tribes Foundation	Qualified (see Programmatic)	209
200710800	Upper Columbia United Tribes (UCUT) Coordination	Upper Columbia United Tribes (UCUT)	Qualified (see Programmatic)	213
200716200	Kalispel Tribe Coordination	Kalispel Tribe	Qualified (see Programmatic)	218
200710600	Spokane Tribe Coordination	Spokane Tribe	Qualified (see Programmatic)	222
200901000	Coeur d'Alene Tribe Coordination	Coeur d'Alene Tribe	Qualified (see Programmatic)	226
201004400	Colville Regional Coordination	Colville Confederated Tribes	Qualified (see	229

ID	Title	Sponsor	Meets scientific criteria?	Page
			Programmatic)	
201200900	Salish-Kootenai Tribe Coordination	Salish-Kootenai Tribe	Qualified (see Programmatic)	233
200902500	Grand Ronde Tribe Coordination	Confederated Tribes of Grand Ronde	Qualified (see Programmatic)	236
201101200	Cowlitz Tribe Coordination	Cowlitz Tribe	Qualified (see Programmatic)	240
201200500	Siletz Tribe Coordination	Siletz Tribe	Qualified (see Programmatic)	243
201200600	Nez Perce Tribe Coordination	Nez Perce Tribe	Qualified (see Programmatic)	245
201200200	Oregon Regional Coordination	Oregon Department of Fish and Wildlife	Qualified (see Programmatic)	248
201200300	Washington Regional Coordination	Washington Department of Fish and Wildlife (WDFW)	Qualified (see Programmatic)	252
199506425	Policy, Plan and Technical Support of Washington Department of Fish and Wildlife (WDFW)-Yakima/Klickitat Fisheries Project (YKFP)	Washington Department of Fish and Wildlife (WDFW)	Contextual	255
201200400	Idaho Regional Coordination	Idaho Department of Fish and Game	Qualified (see Programmatic)	258
201200800	Montana Regional Coordination	Montana Fish, Wildlife, and Parks	Qualified (see Programmatic)	262

V. ISRP Recommendations and Comments on each Proposal

The ISRP recommendations and comments are unchanged for the 41 proposals that received final recommendations in the ISRP's preliminary review. These are the proposals that the ISRP recommended met criteria, and/or had qualifications, and responses were not requested. This includes all proposals in the data management and regional coordination categories. The 30 proposals that were augmented with responses received new and final ISRP recommendations and comments. These proposals can be identified below by the ISRP recommendation line that reads "ISRP recommendation (response review)."

A. Resident Fish

1. *Banks Lake*

[200102800](#) - Banks Lake Fishery Evaluation

Sponsor: Washington Department of Fish and Wildlife (WDFW)

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

This is a well-written proposal with evidence of learning from past studies and development of a decision tree to guide the work. This is apparently a last ditch effort to provide a kokanee fishery in Banks Lake. The ISRP appreciates how the sponsors have eliminated several candidate factors as major bottlenecks to kokanee recovery. Based on research to date, the sponsors have concluded that competition for food with the very abundant lake whitefish population and reduction of predation from other introduced game fishes, especially walleye, constitute the two most important limiting factors at the present time.

Qualification: Desired outcomes of the whitefish removal and walleye angling regulation change elements should be specified before project implementation. With regard to the whitefish removal element:

1. Identify the target whitefish population density after removal and describe how this density was determined.
2. Justify that this target whitefish population abundance is achievable given the limitations of the staff and equipment, assuming the project is funded.
3. Specify how bycatch of non-target species will be monitored.
4. Determine if the cost of the whitefish reduction program can be partially offset by utilizing removed whitefish as food or some other beneficial use.

5. Document the size of whitefish now and whether that has changed over time. Identify whether whitefish are not taken by anglers due to their size or due to what specific other factors.

With regard to the walleye angling regulation change:

1. Even though regulation changes will be subject to administrative review and approval, specify what regulation changes are being contemplated.
2. Provide evidence that the type of regulation changes being considered will be sufficient to reduce predation on kokanee sufficient to allow desired recovery.
3. Specify the metric for recovery of kokanee and the level of kokanee harvest needed to justify keeping the hatchery production going.
4. Currently the regulations only permit one walleye over 22"; will this limit on larger, more reproductively fecund fish be lifted to reduce walleye recruitment?
5. Identify any new initiatives to be taken to obtain reliable estimates or indicators of walleye population size.

Even if factors limiting kokanee abundance can be controlled (both walleye and lake trout), the cost may prove excessive for trying to bring kokanee back into a system that has changed dramatically with the introduction of several species of fish. The ISRP encourages a more detailed ecosystem model approach (such as www.ecopath.org) to explore the regulation and removal options while kokanee fry release experiments continue. See programmatic comments on fish stocking.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

This unique and beautiful landscape, highly utilized as a recreational area, was formed from the glacial Lake Missoula flood and construction of the Coulee Dam, and innovative engineering foresight to pump water up into a reservoir for storage and irrigation purposes below Dry Falls. A subsequent kokanee fishery collapsed after the 1970s. The purpose of the project is to restore the kokanee fishery in Banks Lake, which is in serious decline and has been depressed since the introduction of non-native smallmouth bass and walleye several decades ago. Past research has shown that the principle constraints on kokanee are predation by these introduced species (mainly walleye) and competition with non-native lake whitefish – a coregonid that was likely introduced to the area in the late 1800s. Kokanee themselves are not technically native to Banks Lake, having entered the lake from Lake Roosevelt when irrigation pumps diverted water to the Columbia Basin Irrigation Project after construction of Grand Coulee Dam.

The proposal adequately describes the significance of the project to regional programs. However, additional explanation would have been appreciated of why so much effort is being dedicated to kokanee restoration when Banks Lake has clearly undergone significant shifts in fish community composition (in addition to the species mentioned above, the lake now contains introduced centrarchids and ictalurids). Apparently there must be considerable pressure to restore a salmonid fishery to Banks Lake and WDFW feels kokanee is the most favorable candidate species, but the obstacles to be overcome in this highly altered ecosystem are formidable. Additional explanation of why kokanee were selected as the focal species would have been helpful, apart from the observation that the lake once supported a thriving kokanee fishery.

There are two strategies under consideration: (1) test alternative hatchery rearing and release approaches, and (2) reduce populations of fish species that compete with kokanee (walleye and lake whitefish). Monitoring will continue for whitefish population abundance, water quality, and zooplankton density. What remains somewhat obscure or inadequately described are the changes in the early 1980s that led to collapse.

As stated, this represents "the last attempt to restore kokanee to Banks Lake." A well-written and referenced presentation proposes a modeled and mechanistic process to improve survival and abundance of kokanee to the creel introduced as fry. Target reference points for abundance were provided (20 to 30 age 2/3 kokanee/hectare), but derivation was obscure, and creel targets are also needed. Models that were or will be applied to the analyses include Fish Bioenergetics 3.0 (Henson et al. 1997) and Fisheries Analysis and Modeling Simulator (Taylor 2011).

Simulation models will be utilized to consider regulation scenarios on introduced walleye (from pumping) and effects of whitefish capture and removal. In addition, fry release experiments will be conducted, comparing shoreline, night, and limnetic releases, with evaluation of adults and creel to 2015. Details on the statistical tests and procedures to be followed were scant. Some important references on Banks Lake could not be located (e.g., McCulloch et al. 2011).

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The history of the project was explained in reasonable detail. Project sponsors presented a logical progression of evidence that examined possible bottlenecks to kokanee abundance including water quality, harvest rates, entrainment during the irrigation season, variable lake level effects on spawning success, and hatchery kokanee release strategies. While all of these factors have had some impact, the weight of evidence supports the hypothesis that predation (primarily by walleye) and competition for zooplankton with lake whitefish are the two factors most likely to be limiting kokanee recovery. WDFW staff did a good job of following the evidence to reach this conclusion.

The best example of adaptive management has been a shift in hatchery releases from spring fry releases to fall fry releases and spring net pen yearling releases. Studies of the survival of otolith-marked fish in these three release groups clearly indicated that spring fry releases had very low survival, and therefore the latter two release strategies are now being implemented.

One important factor that has admittedly not yet been clarified is the actual abundance of walleye in Banks Lake. Based on gill net captures from other large lakes in the region, walleye in Banks Lake are not particularly abundant, yet they are thought to consume up to 90% of the released kokanee fry. As project sponsors point out, developing an improved method of estimating walleye abundance is critical to the project, especially if harvest regulations are changed.

The sponsors have collected data for 10 years and determined: (1) predation by walleye is the primary factor (annually take 90% of fry released based upon modeling scenarios), (2) forage base (zooplankton) is limiting in spring and summer due to lake whitefish competition, (3) entrainment is low, (4) temperature and DO is suitable most of year, and (5) harvest of kokanee is very low. A Walleye Population Index was initiated in 2002 (based on standard technique developed in Ontario) to determine status and to track the population over time. Regarding adaptive management, the above conclusions have resulted in a plan to reduce the lake whitefish population that competes for the zooplankton prey via mechanical means, and to reduce abundance of walleye, a top end predator, by regulation change. Present annual harvest of walleyes at Banks Lake is 16,200. Regulation changes, specifically harvest increases at nearby Moses Lake, resulted in lower walleye annual populations. The sponsors recognize that predator eradication is virtually impossible in large systems, but cite work (Zimmerman and Ward 1999) saying that reduction to levels where impacts are insignificant can be accomplished. However, the Zimmerman and Ward (1999) study involves northern pikeminnow effects on migrating smolts, not resident predators in a lake.

ISRP Retrospective Evaluation of Results

The goal of restoring the kokanee fishery has not been met but monitoring of Banks Lake limnology and biology has been completed successfully. What is required now is a more comprehensive analysis using ecosystem models to facilitate the decision process and document the feasibility of kokanee restoration given the current suite of conditions.

A thorough knowledge and review of local limnology and the related issues of competition and predation were evident, including the review results of lake monitoring to date. These data were presented in a series of traditional figures. Fish bioenergetics models will be included in the future analyses. What may be more helpful are a suite of simulation models that consider the limnology, hydro system operations, fish recruitment for all species and their interactions, harvest, using EcoSim and EcoPath. Such comprehensive modeling could include a structured decision management (SDM) process and a stakeholder-based workshop approach to consider

the proposed and many more scenarios, for example nutrient addition. Indeed, the more comprehensive ecosystem model approach may be more instructive to managers on the feasibility of the overall plan of kokanee restoration, if such modeling is at all possible given the suite of introduced and invasive species and consequent interactions.

Angler preference surveys were not mentioned but could be accommodated by SDM, along with climate change impacts. The latter was considered briefly as likely leading to further decline in kokanee habitat availability. This impact needs to be explored further via modeling.

Examples where more comprehensive EcoSim models have been recently applied to reservoir fisheries are included in the list below. The ISRP encourages the development of a comprehensive resident fish ecosystem model for application in this and several other reservoirs in the Columbia Basin.

Walleye population estimates seemed unavailable or unobtainable, but further exploration and modeling may assist in that quest. The ISRP has previously stated “serious misgivings about the project’s emphasis on creating a kokanee fishery...” due to walleye presence. As a key variable in the kokanee abundance and survival issue, methods of monitoring walleye abundance are needed, particularly if an impact of regulation change is to be effectively monitored. The estimated abundance of whitefish (0.5M) suggests consideration of a small commercial fishery may be worthwhile. This too should be part of the simulations.

See <http://www.ecopath.org/>

Osidele O.O., Beck M.B. 2004. Food web modeling for investigating ecosystem behaviour in large reservoirs of the south-eastern United States: Lessons from Lake Lanier, Georgia. (2004) *Ecological Modeling*, 173 (2-3), pp. 129-158.
<http://www.sciencedirect.com/science/article/pii/S0304380003003831>

Thebault J.M., Salencon M.-J. 1993. Simulation model of a mesotrophic reservoir (Lac de Pareloup, France): biological model.(1993) *Ecological Modeling*, 65 (1-2), pp. 1-30.
<http://www.sciencedirect.com/science/article/pii/030438009390124B>

Laurel Saito, Brett M. Johnson, John Bartholow and R. Blair Hanna. 2000. Assessing Ecosystem Effects of Reservoir Operations Using Food Web–Energy Transfer and Water Quality Models *Ecosystems* Volume 4, Number 2, 105-125.
www.springerlink.com/content/3d871lfmwvpv27x7j/

Angelini Ronaldo, Agostinho Angelo Antonio, Gomes Luiz Carlos. Modeling energy flow in a large Neotropical reservoir: a tool to evaluate fishing and stability. *Neotrop. ichthyol.* [serial on the Internet]. 2006 June [cited 2012 Jan 09] ; 4(2): 253-260. Available from:

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1679-62252006000200011&lng=en. <http://dx.doi.org/10.1590/S1679-62252006000200011>.

Gamito S., Erzini K. 2005. Trophic food web and ecosystem attributes of a water reservoir of the Ria Formosa (south Portugal). (2005) *Ecological Modeling*, 181 (4), pp. 509-520.
<http://www.sciencedirect.com/science/article/pii/S0304380004003849>

Taylor, M.W. 1981. A Generalized Inland Fishery Simulator for Management Biologists. *North American Journal of Fisheries Management* Vol. 1, Iss. 1, 1981

Hanson, P. C., T. B. Johnson, D. E. Schindler, and J. F. Kitchell. 1997. Fish bioenergetics 3.0 software and manual. Sea Grant Institute, Center for Limnology, University of Wisconsin-Madison.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The proposal provides an adequate explanation of its relationships to other projects in the Crab Creek system, and also with the relevant Lake Roosevelt fisheries projects that are related to the work on Banks Lake.

It was encouraging to see that the project is considering the effects of toxins and climate change on the lake ecosystem. Both of these factors could have significant effects on kokanee recovery over time.

This project is 100% RME, and the questions are appropriate for the type of work being proposed. Project relationships were clearly defined in relation to resident fish recovery and mitigation efforts and the Subbasin Plan.

4. Deliverables, Work Elements, Metrics, and Methods

Sufficient details were presented for the majority of the seven deliverables presented and the work elements. Descriptions of methods were uploaded to MonitoringMethods.org, and the project sponsors did an especially good job in this regard.

Additional information is needed on how the success of the two major initiatives proposed here will be assessed. For the lake whitefish removal effort, how will success be defined: by lowering the whitefish abundance to a level that is believed to allow for reduced competition for food resources or by simply documenting an increase in survival and growth of rearing kokanee and assuming improvements have resulted from lake whitefish removal? For the walleye angling regulation change, what parameters are under consideration and what is the anticipated change in the Banks Lake walleye population that is anticipated to result from the changes?

Assuming that near elimination of walleye is not an objective, what is the target number and age distribution of walleye that is believed to be sufficient to reduce the predator cap on kokanee? Given that there does not seem to be an accurate method of measuring walleye abundance in Banks Lake, how will it be possible to determine when success is achieved, especially when lake whitefish removal is occurring simultaneously?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

As stated above, the project sponsors did an excellent job of providing details on their monitoring protocols. Monitoring protocols and methods are appropriate, but additional more comprehensive ecosystem models are required. It seems it will be extremely difficult to maintain a trophy walleye fishery, and at the same time increase the kokanee population to a viable harvestable population. It may be necessary that the harvest of walleye be modified to reduce the predation significantly, and then the lake whitefish must be collected in adequate numbers to reduce the competition with kokanee. This may require continued annual effort in reduction of walleye and whitefish, and monitoring. Further exploration of reductions required is needed.

[200102900](#) - Ford Hatchery Operations and Maintenance (O&M)

Sponsor: Washington Department of Fish and Wildlife (WDFW)

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The harvest of kokanee salmon has been substantially below the program goals. The harvest goal is 10,000 fish, with a catch rate of 0.5 fish/rod/hour and a kokanee density of 20 to 30 adults per hectare. In 2004, 3500 kokanee were harvested, but numbers have declined subsequently. The catch of kokanee in Banks Lake is not large enough to provide data to calculate mortality or expand creel census data to total harvest for the years 2007 to 2011. The Banks Lake Fishery Evaluation Project estimated that survival from fry to mature adult is less than 1%. The working hypothesis is that direct predation by walleye and competition with lake whitefish for *Daphnia* limit kokanee survival and abundance.

The sponsor notes that harvests of kokanee in recent years have been too small to quantify via the creel survey. The monitoring and evaluation program (Banks Lake Fishery Evaluation Project BPA #200102800) should improve the creel methodology so that the harvest goals can be adequately evaluated.

The ISRP's qualifications are to state that the sponsors need to improve the creel methodology and to highlight the ISRP's conclusion that the likelihood this project will meet its kokanee objectives is highly uncertain. Although factors limiting the survival of kokanee have been investigated, it is highly uncertain that the proposed actions will be sufficient to enhance kokanee survival so that harvests might exceed 10,000 kokanee per year.

Comment:

The ISRP requested a summary of the kokanee production at Ford Hatchery for release into Banks Lake, including eggs received, fish hatched, reared, transferred, and released, along with post-release survival and harvest for each year since the last ISRP review. The sponsor provided a detailed, well-organized response to ISRP questions. Their fish production effort is sound, but the kokanee fishery is not successful.

The Ford Hatchery project producing kokanee salmon for release into Banks Lake to provide resident fish substitution for lost anadromous production above Chief Joseph and Grand Coulee dams have established metrics for performance in culture (hatchery and net-pens) including egg collections, egg-to-fry survival, fry-to-release survival, fish health maintenance as well as post-release goals for harvest, and for kokanee broodstock and egg production. The Banks Lake Fishery Evaluation Project (BLFEP, BPA #200102800) is responsible for collecting the appropriate post-release information and summarizing both the artificial culture and harvest information.

ISRP Retrospective Evaluation of Results

Ford Hatchery provides 700,000 kokanee for release into Banks Lake to support a put-grow-and-take salmonid fishery. Ford Hatchery receives 850,000 eyed kokanee eggs from the Lake Whatcom Hatchery; hatch rates of the eggs are anticipated to be 95%, hatch to first feeding survival 95%, from first feeding to release 86%. There have been reported incidents of fish health problems, but overall the hatchery has produced 88% of the anticipated production since 2002. Only in 2008 was production substantially reduced (35% of anticipated production).

In contrast to the hatchery performance, post-release survival and harvest of kokanee salmon has been substantially below the program goals. The harvest goal is 10,000 fish, with a catch rate of 0.5 fish/rod/hour and a kokanee density of 20 to 30 adults per hectare. In 2004, 3500 kokanee were harvested, but numbers have declined subsequently. The catch of kokanee in Banks Lake is not large enough to provide data to calculate mortality or expand creel census data to total harvest for the years 2007 to 2011. The Banks Lake Fishery Evaluation Project estimated that survival from fry to mature adult is less than 1%. The working hypothesis is that direct predation by walleye and competition with whitefish for *Daphnia* limit kokanee survival and abundance.

2. Intermountain-wide

[199700400](#) - Resident Fish above Chief Joseph and Grand Coulee Dams

Sponsor: Kalispel Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

Redband trout

1. During the contracting process, the sponsors should develop a concise evaluation of what they consider the primary limiting factors, in addition to fish harvest. Predation, habitat disruption, and food requirements are discussed, and these are reasonable suggestions but need additional justification. Some target locations for specific studies are mentioned. The sponsors are encouraged to develop proposals or engage other stakeholders to participate in joint studies on the topics.

2. If entrainment is found to be a significant loss factor for hatchery triploid rainbow trout from Lake Roosevelt, the sponsors need to develop a project, with appropriate partners, addressing how to prevent high entrainment. This part of the ISRP's question was not answered during the response process.

3. A statistical justification for the 10% PIT tagging rate should be provided during the contracting process. Apparently the Lake Roosevelt Fisheries Evaluation Program (LRFEP) used a similar rate for Floy tagging, but it is not clear what their tagging program was for. If it was investigating wild-hatchery trout interactions, the sponsors should discuss how effective the latter rate was for the particular study LRFEP conducted.

Comment:

This proposal is very complex, and includes three major efforts involving different species, different physical settings, and different problems. It is difficult for an outside reviewer, administrator, or new project participant to easily understand its components. To make these organizational problems worse, another project (the Pend Oreille Non-native Fish Suppression Project 200714900 of the Kalispel Tribe) conducts activities that are closely related.

(1) Lake trout in the Priest and Upper Priest lakes

- The Resident Fish Above Chief Joseph and Grand Coulee Dams Project (199700400) proposes to perform preliminary work associated with lake trout removals in Priest Lake (e.g. age structure, identify spawning sites).

- The Pend Oreille Nonnative Fish Suppression Project proposes to continue ongoing netting efforts in Upper Priest Lake and the Thorofare to maintain the minimum numbers of bull trout existing in the Upper Priest Lake watershed.

(2) Northern pike in Box Canyon Reservoir

- The Resident Fish above Chief Joseph and Grand Coulee Dams Project (199700400) will monitor the effectiveness of mechanical removal and other measures by annually monitoring the northern pike population and periodically monitoring the resident warmwater fishery with standardized warmwater fish surveys.
- Mechanical removal of pike will be implemented through the Pend Oreille Non-native Fish Suppression Project.

The response showed considerable effort by the sponsors and clarified several items. The organization of the response into program-by-program sections was helpful.

The JSAP and SPIN components are essentially long-term monitoring programs that provide community and trend indexing. The benefit of such long-term data is that they provide an opportunity to probe the database as questions arise (not necessarily ones that were on the minds of the sponsors when the project was started). Such probing ultimately helps framing (range-finding) of more exact hypotheses rather than a robust approach to test hypotheses. Such tests often require additional or independent tests for such hypotheses.

Redband

Overall the response clarifies many areas but fails to show evidence of critical thinking that reviewers felt would be advantageous at this point in time. The sponsors declined the ISRP's request that they attempt to develop testable hypotheses.

Box Canyon

Overall, the sponsors provided an adequate response and one that shows evidence of some critical thinking. There was good incorporation of results from other studies. The staff seem to be doing the best possible to base efforts on catch per unit effort data in the absence of abundance estimates.

The sponsors plan on engaging a biometrician to refine the statistical basis for the population estimate work, and the ISRP concurs with that approach.

Priest Lake

The response was complete and adequately addressed reviewers' queries.

The ISRP recommends that non-native fish control be examined in the context of a Columbia River Basin discussion of current conditions for all predators and specific control measures applicable to non-native fish. This discussion could take place at a Columbia River Basin Science-Policy forum.

[200811200](#) - Resident Fish Loss Assessment

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The CCT and PNNL have provided information that has helped the ISRP understand the objectives of this project. As stated in the response, actual methods for assessing hydrosystem impacts on resident fishes are under development. Because these methods (including models) have not yet been completed, scientific review would help to ensure that assumptions about hydrosystem impact on resident species are based on the most current available information. Therefore, the qualification is that the ISRP should review the assessment tool(s) when they are finalized in 2013, before field assessments are undertaken.

The development of an advisory team (representative managers) is proposed as a first step, with facilitation and model development to come from PNNL. This approach is important, but in itself may be insufficient. What may be needed is a workshop-based collaborative approach that includes engaged stakeholders, following the procedures of structured decision management, as the ISRP described in our programmatic comments in this report and in our 2011 Retrospective Report (ISRP 2011-25). This is particularly important in projects such as this where the goals are still general and where models and methods remain to be developed. Because the outcome of the assessment is highly uncertain, it is possible the project may generate more questions than it answers. Therefore, it is important that the process lead to specific hypotheses that can be tested in the field, with results being incorporated into future management decisions.

Comment:

The response listed extirpated, native, and non-native fish species present in the blocked area above Chief Joseph and Grand Coulee Dams, and included the note that there was "serious concerns about the status of 11 of these species." Further explanation was not provided, but a

brief list of suspected factors was included. Prominent among these were likely introduced or non-native species and the possibility of toxin-related issues. Separation of hydrosystem impacts from these and other major issues remains a significant challenge. Regardless, the key steps include identification of limitations to production, given a clear definition of the management objectives and vision, followed by development of a program to address these limits, where possible, or "remedy the factors limiting resident fish production." The project is in the very early stages of this process, for example form an advisory team. As such, developing a conceptual approach might prove a productive route initially. The approach should incorporate clear problem definition and current knowledge from the literature to be followed by identification of information gaps and suggested field trials to confirm aspects of sub-models and mitigation approaches. Please see the programmatic comment on structured decision making.

As well, the ISRP requested the following information:

A clear statement of why the project is needed would help frame the proposal, but other than references to historical mitigation agreements it was difficult to fully understand the motivation for the project. Is there something fundamentally missing from the way the current resident fish program is being implemented that is not adequately taking into account continuing and underappreciated harm to resident fishes?

The project sponsor's response was generally adequate. It was helpful to list both the resident native and non-native fishes (Table 1), as well as the potential limiting factors (Table 2). The connection between several of the potential limiting factors in Table 2 and construction and operation of the hydrosystem was not unclear and would have benefited from more explanation.

The reasons for classifying some native resident species as "species of concern" and not others (Table 1) also deserved clarification. Are they considered species of concern because they were traditionally eaten? How does their current status (healthy, threatened, significantly endangered, etc.) affect their priority in this particular assessment effort? Finally, it was not clear if the inclusion of northern pikeminnow on the concern list was that pikeminnows have become too abundant because of hydrosystem development, or that they might be at risk of becoming imperiled.

The proposal needs to provide more information about how the scientific review and modeling work would be carried out. A response should answer the following questions. Will there be a committee of scientific experts, or a management committee referred to in the abstract? In either case, how will they be selected? Will the modeling be contracted out or will project sponsors do it themselves through the work of the expert committee? How will results of the science assessment be used in a general management context, specifically related to setting restoration targets of native fishes? How does this work relate to resident

fish substitution plans whereby some funded species can compete with native species? How will the pre-development condition of the drainage system be characterized to establish baseline conditions prior to dam construction?

Most of the questions were answered satisfactorily. As currently conceived, it appears that scientific input and collaboration will occur through PNNL. The project sponsors may wish to take steps to ensure that the advisory team has sufficient technical representation to provide proper scientific oversight. The response clarified that the goal of the project is to identify environmental stressors related to the hydrosystem and not to set numeric targets for resident species of concern. The response did not address the question related to the potential interaction between resident fish substitution projects and native species. The ISRP hopes this topic will be included in the assessment.

Finally, the ISRP did not understand the basis for the budget request. The proposal requests about \$500K annually for three years, most of which is for salary support. For a project that does not involve field work this amount seems high. Yet the indirect/overhead costs constitute over 50% of the annual budget estimates. Why are overhead costs this high, and how will the funds be used? Were these costs meant to cover contracts to Battelle or other consultants for literature review and modeling? Although this question is not central to the ISRP's scientific review, it is helpful to the ISRP's understanding of the proposal.

The project sponsors provided an adequate explanation for the overhead costs, although some of the organizational overhead costs, for example decontamination and lab supplies, are not likely applicable to this project.

ISRP Retrospective Evaluation of Results

As with many proposals that seek to define the extent of a selected problem, in this case the status and threats to resident fishes above Chief Joseph and Grand Coulee dams, the project sponsors are proposing a steering committee composed of managers that will guide the work of a scientific committee (PNNL) that will build a model, which will in turn provide the basis for restoration actions. We suggest the model should be peer-reviewed by the ISRP and that structured decision making processes should guide each step of the approach. Because the outcome of this project is highly uncertain, in terms of threat identification and restoration priorities, frequent external oversight will help ensure that conclusions are well-supported.

[198503800](#) - Colville Hatchery Operation and Maintenance (O&M)

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Does Not Meet Scientific Review Criteria

Comment:

The recommendation is for Colville Hatchery Operation and Maintenance (198503800) and Rufus Woods Redband Net Pens (200811700). The comments apply to both proposals, although the comments are not identical. Some comments specific to each proposal are provided.

The ISRP appreciates the effort the Colville Tribal Fisheries staff put into the response to the ISRP's preliminary review of the Colville Tribal Hatchery proposal. The sponsors provided an informal description of the resident trout program while attempting to address the ISRP questions. A number of questions from the ISRP's preliminary review were addressed and the panel is better able to understand the scope and details of the project. While the information was interesting, the presentation does not allow one to evaluate the recent performance of the program in terms of harvests by tribal members in relation to numbers of eggs brought into the hatchery and fish stocked in reservation waters.

The sponsor needs to develop a trout stocking master plan which guides the annual stocking, provides a basis for Fish and Wildlife Program proposal review, and provides for evaluation of the success of the program. The plan should generally include information requested in Three Step Master Plans for anadromous hatcheries. The plan should critique the resident fish hatchery program for its ability to provide catchable trout on the reservation while demonstrating efficient and productive practices. The plan should develop hatchery and harvest goals and collect information to evaluate whether these goals are being met. Some documentation of fishing effort is needed on each lake that is stocked; otherwise it is impossible to determine whether the effort is worthwhile. This plan should incorporate the Rufus Woods net pen project and fish purchased and released under the Rufus Woods Habitat/Passage Improvement, Creel, and Triploid Supplementation (200740500).

The ISRP finds that the project does not meet specific review criteria established by the 1996 amendment to the Power Act for NW Power and Conservation Council Fish and Wildlife Program. Those criteria state that projects: 1) are based on sound science principles; 2) benefit fish and wildlife; 3) have clearly defined objectives and outcomes; and 4) have provisions for monitoring and evaluation of results. In particular, documentation addressing ISRP review criteria 1, 3, and 4 are not evident in the proposal, annual reports, or response.

Projects are based on sound science principles. The ISRP is unable to conclude the stocking regime for each body of water has a defensible scientific rationale. Table 7 of the response to the ISRP lists each body of water and identifies the number of fish stocked of each species in

2011, and identifies potential problems in the lakes and streams. A plan is needed that identifies the different species, their size, and their numbers, that could potentially be stocked in each lake or stream and a justification for those species, numbers, and sizes based on empirical stock recruitment information from the lake or stream. The narrative provided in the proposal suggests that some biological information is used to establish a stocking program, but the decision framework is never presented. Stocking brook trout in North and South Twin Lake is an example of the stocking that is inadequately justified. The proposal states that self-sustaining populations of brook trout occupy these lakes. No stock recruitment or harvest data are provided to indicate that hatchery fish are necessary to provide a fishery. What factors led to the stocking of about one million trout into the relatively small Twin Lakes in 2009? What is the justification for the proposed increase of stocked large triploid trout in Rufus Woods Reservoir from 20,000 to 60,000 fish, and what information is available that these additional fish have minimal effects on native fishes. Stocking catchable rainbow trout in streams based on pre-stocking electrofishing surveys of abundance is another example. The justification for why a specific abundance level triggers additional stocking is not provided. Documentation of the stocking decision framework is important for informing future managers and informing this review by the ISRP. Additionally, fish rearing protocols at the net pens should be documented.

The basis for raising specific number of fish and stocking them into the reservation water bodies needs justification beyond the obvious need to provide resident fish harvests for tribal members. The program should demonstrate that its operations are effective and efficient in achieving the ultimate goal of providing harvests.

Projects have clearly defined objectives and outcomes. The ISRP expects there will be established standards for hatchery and net pen production (egg take, eyed egg success, hatching success, and numbers released) for each species, and that the program will explicitly self-evaluate to those established benchmarks. The ISRP expects there will be standards established for fishery yields (CPUE, total harvest in relation to fish stocked, economic and other social benefits) for each body of water and the project as a whole. These standards should be consistent with types of data that can be collected. For example, if CPUE is measured in terms of fish per angler per day, then the standard should also be set using fish per angler per day. Although some fishery goals and evaluation were provided for the net pen project, others were incomplete.

Projects have provisions for monitoring and evaluation. The ISRP concludes that a sufficient monitoring program is not in place. A defined and statistically justified M&E plan is required for the resident fish stocking program that addresses both the biological/chemical/food-web and harvest factors. The ISRP understands and appreciates the difficulty in conducting direct creel surveys in small, remote lakes and streams. Nonetheless, the ISRP believes that effort needs to be made to better document the use of these lakes and the harvest of fish for the intended

purpose of recreational angling or subsistence fishing. The documentation may need to use interview and survey techniques from the social science realm rather than the fisheries field.

ISRP Retrospective Evaluation of Results

Finally, the ISRP expresses concern about the fish culture performance at the hatchery. Hatchery performance data were provided by the sponsors that raised questions, yet there was no evaluation of these production numbers by the sponsors. Table 4 in the response to the ISRP summarizes egg take, eyed eggs, fish ponded, and fish released for brook trout, Lahontan cutthroat trout, rainbow trout, and redband rainbow trout. For brook trout and Lahontan cutthroat trout, the average percent eye-up for the past seven years has been 67% and 54% respectively, and survival to release has been only 36% and 30% respectively. For rainbow trout from Washington Department of Fisheries and Wildlife, the survival from green egg to release averaged only 25% for broodyears 2006 and 2007. This level of success in the fish-rearing phase of the program is in need of investigation and improvement. Why does the number of green eggs vary so much within a species from year to year? The ISRP acknowledges the information provided on water supply challenges. The hatchery production program should be designed around water supply constraints.

3. Lake Rufus Woods

200740500 - Rufus Woods Habitat/Passage Improvement, Creel and Triploid Supplementation

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria - Qualified

Qualifications:

The ISRP appreciates the response of the Colville Tribe to our questions, and we acknowledge that development and management of a trophy trout fishery in Lake Rufus Woods will benefit the Tribe and recreational fishers. Given the long history of unintentional escapes of triploid rainbow trout from the commercial trout farms operating net pens in the reservoir, it is possible that planned releases of smaller hatchery trout will not do much additional harm to species of concern such as native resident rainbow ("redband") trout or kokanee. However, we remain concerned about the ecological footprint of continued fish culture operations on the reservoir, and project sponsors should take all reasonable steps to minimize unwanted effects on the reservoir's ecosystem.

We also believe that important questions remain unanswered and should be addressed at a pilot scale before proceeding to a full-scale hatchery rearing and release program for Lake

Rufus Woods. These questions can largely be answered in a 1-2 year time frame, and having the answers could potentially be cost-effective over the longer term by testing key assumptions about the success of the project before attempting full-scale implementation. We believe development of the management plan should assume top priority and therefore recommend that it be completed as soon as possible. The plan should identify key assumptions regarding trout growth, survival, and harvest rates, followed by procedures for testing and monitoring each assumption, and finally by an adaptive management plan that lays out standards for project success or failure before target trout releases are undertaken.

Therefore, the ISRP finds the project meets scientific criteria with some qualifications. The following project elements are scientifically justified:

1. Completion of the management plan and initiation of a pilot-scale release of smaller (500-1,000g) trout with the objective of evaluating the assumptions about survival and growth of the smaller fish at different release timing.
2. Investigations of the food web in Lake Rufus Woods, including food habits of triploid rainbow trout.
3. Investigations of the survival of released fish, including entrainment rates at Chief Joseph Dam.
4. Studies of the growth of smaller fish, to determine if they attain the target size that will make them attractive to anglers seeking trophy trout.
5. Continued creel sampling, including stomach analysis of caught fish and angler satisfaction with the fishery.

The ISRP suggests that moving directly to target releases of 2,000 fish per release is premature until some basic questions have been addressed, and we recommend that pilot-scale release experiments be conducted first. Our qualifications thus include:

1. Continuation of the limnological investigations of Lake Rufus Woods, coupled with appropriate physiological models of growth and survival (e.g., EASy and EcoSim) to identify testable hypotheses. The EcoAnalysts report and its conclusions should be reviewed by the ISRP.
2. Learn more about early reservoir mortality or other sources of loss such as downstream entrainment, particularly in the smaller sizes of trout that are being considered for the project, before proceeding to full-scale production.
3. Continuation of the creel sampling program, which is based on a sound design, as well as stomach analysis of trout to learn more about what they are eating as they grow larger. The sponsors state "In 2012, stomachs from gill net and angler captured fish will be used. Each month a single 3m x 30m gill net with 4 mesh sizes will be set in three randomly selected locations in Rufus Woods. The nets will be set in the afternoon and hauled the following morning." Digestion of stomach contents, especially if fish are

eating food pellets, could occur overnight and the method should be reconsidered or tested to make sure results are not biased.

4. Production of a report that summarizes overall evidence that releasing relatively large, stable numbers of ~1 pound trout will result in a fishery that yields trophy-size fish, at the anticipated fishing intensity. This report should be completed in 2014 and reviewed by the ISRP and should include a structured decision making process that sets forth standards for measuring project success or failure.
5. An analysis of the ecological impact of the hatchery rearing facility for producing the trout on the ecology of Lake Rufus Woods should be completed, and adjustments made to the fish culture facility if reducing unwanted impacts is possible.

The ISRP requested the following information:

Additional information is needed on the EcoAnalysts study of reservoir productivity. Given current stocking and net pen escape levels, what is the evidence that the fishery goals can be met in this reservoir given that the limnological study revealed “normal” invertebrate abundance? What additional research is needed to show that harvest targets are realistic? An ecosystem model approach such as EcoSim (www.ecopath.org/) would possibly assist management and evaluations. See the programmatic comments on fish stocking.

The response to this question addressed the history of trout escapes and annual variation in flows, but it did not provide the required information. Specifically, the ISRP wants evidence that triploid trout could grow to large size based on the food resources in the reservoir. Unless trout are attaining very large size simply by remaining close to commercial net pens and eating food that passes through the nets, the ISRP has not yet been presented evidence that supports the hypothesis that significant numbers of >5kg fish can be produced in Rufus Woods. Unless the trophic pathways leading to trophy trout are reasonably well understood, the assumption that releasing large numbers of *smaller* fish will ultimately lead to harvestable trophy trout remains untested.

More information is needed on trout survival. What are the alternative working hypotheses that could explain the apparently high loss rate of stocked fish, and how will these be tested?

The response set forth some useful hypotheses; however, it would have been helpful to provide more information on how each of the hypotheses would (or could) be tested. Information was given on what is known about the disappearance of newly-released trout, but it was difficult to understand from the response how the hypotheses regarding fish loss would be approached experimentally. Understanding mortality is important because it will bear on the size, timing, and numbers of deliberate releases. How the target release of 100,000 trout of 500g size was derived was not clear.

Additional information is needed about how food habits will be investigated, including the frequency and location of sampling, the size of trout to be examined, and the analytical methods.

The ISRP is very interested in the stable isotope graph provided in the response. Based on the clustering of trout of Lake Roosevelt origin (group A) and Rufus Woods origin (group B), it appears that Rufus Woods-origin trout still maintain an isotopic signature that suggests a continued reliance on food pellets from the net pens. If this is the case, continued leakage of food from the net pens may be needed to support large-bodied trout, unless there is another food source, for example entrained kokanee from Lake Roosevelt, which is underappreciated.

What will be the procedure for developing the long-term management plan? How will success or failure thresholds be established, and what are the contingency plans if some assumptions do not hold?

The ISRP strongly recommends that the plan include objective criteria for testing hypotheses and adjusting release strategies according to new information. It may be instructive to gradually ramp up hatchery production, beginning with carefully monitored releases of smaller numbers of fish, as well as different sizes and release times, and working up to program goals. The long-term management plan should be reviewed by the ISRP when completed and should include the steps for a structured decision making process.

During the site visit, mats of blue-green algae appeared below the fish pens while a continuous flow of food pellets flowed down pipes and into food hoppers. Does water quality influence high rates of mortality of released triploid trout? Empty stomachs from surveys may also suggest depletion of the reservoir's food supply or simply poor adaptation to the reservoir environment by these fish. How will food depletion or poor adaptation be assessed?

The ecological footprint of net-pen operations could be very significant, and the response to our concerns on this issue was not adequate. A management plan that considers the ecological footprint of fish culture operations needs to derive from the EcoAnalysts report and additional investigations, including further eco-simulations and review.

ISRP Retrospective Evaluation of Results

The ISRP is concerned that this project is headed toward full implementation (releasing large numbers of ~1 lb trout) without sufficient testing of hypotheses regarding growth, survival, and angler harvest. As with some other projects involving fish stocking for harvest, it would appear that pilot-scale testing with limited releases of smaller fish to supplement escaped fish from commercial trout farming operations would facilitate evaluation of the assumptions behind the proposal, and in the long term could save money by reducing management strategies, such as sizes and times of release, that prove to be ineffective.

[200811700](#) - Rufus Woods Redband Net Pens

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Does Not Meet Scientific Review Criteria

Comment:

The recommendation is for Colville Hatchery Operation and Maintenance (198503800) and Rufus Woods Redband Net Pens (200811700). The comments apply to both proposals, although specific comments on the progression of the Net Pens project are provided below.

The ISRP appreciates the effort the Colville Tribal Fisheries staff put into the response to the ISRP's preliminary review of the Colville Tribal Hatchery and the Rufus Woods net pen proposals. The sponsors provided an informal description of the resident trout and net pen programs while attempting to address the ISRP questions. A number of questions from the ISRP's preliminary review were addressed, and the panel is better able to understand the scope and details of the project. While the information was interesting, the presentation does not allow one to evaluate the recent performance of the program in terms of harvests by tribal members in relation to numbers of eggs brought into culture and fish stocked in reservation waters.

The sponsor needs to develop a trout stocking master plan which guides the annual stocking, provides a basis for Fish and Wildlife Program proposal review, and provides for evaluation of the success of the program. The plan should generally include information requested in Three Step Master Plans for anadromous hatcheries. The plan should critique the resident fish hatchery program for its ability to provide catchable trout on the reservation while demonstrating efficient and productive practices. The plan should develop hatchery and harvest goals and collect information to evaluate whether these goals are being met. Some documentation of fishing effort is needed on each lake that is stocked; otherwise it is impossible to determine whether the effort is worthwhile. This plan should incorporate the Rufus Woods net pen project and fish purchased and released under the Rufus Woods Habitat/Passage Improvement, Creel, and Triploid Supplementation (200740500).

The ISRP finds that the project does not meet specific review criteria established by the 1996 amendment to the Power Act for NW Power and Conservation Council Fish and Wildlife Program. Those criteria state that projects: 1) are based on sound science principles; 2) benefit fish and wildlife; 3) have clearly defined objectives and outcomes; and 4) have provisions for monitoring and evaluation of results. In particular, documentation addressing ISRP review criteria 1, 3, and 4 are not evident in the proposal, annual reports, or response.

Projects are based on sound science principals. The ISRP is unable to conclude the stocking regime for each body of water has a defensible scientific rationale. Table 7 of the response to

the ISRP lists each body of water and identifies the number of fish stocked of each species in 2011, and identifies potential problems in the lakes and streams. A plan is needed that identifies the different species, their size, and their numbers, that could potentially be stocked in each lake or stream and a justification for those species, numbers, and sizes based on empirical stock recruitment information from the lake or stream. The narrative provided in the proposal suggests that some biological information is used to establish a stocking program, but the decision framework is never presented. Stocking brook trout in North and South Twin Lake is an example of the stocking that is inadequately justified. The proposal states that self-sustaining populations of brook trout occupy these lakes. No stock recruitment or harvest data are provided to indicate that hatchery fish are necessary to provide a fishery. What factors led to the stocking of about one million trout into the relatively small Twin Lakes in 2009? What is the justification for the proposed increased of stocked large triploid trout in Rufus Woods Reservoir from 20,000 to 60,000 fish, and what information is available that these additional fish have minimal effects on native fishes. Stocking catchable rainbow trout in streams based on pre-stocking electrofishing surveys of abundance is another example. The justification for why a specific abundance level triggers additional stocking is not provided. Documentation of the stocking decision framework is important for informing future managers in addition to informing this review by the ISRP. Additionally, fish rearing protocols at the net pens should be documented.

The basis for raising specific number of fish and stocking them into the reservation water bodies needs justification beyond the obvious need to provide resident fish harvests for tribal members. The program should demonstrate that its operations are effective and efficient in achieving the ultimate goal of providing harvests.

Projects have clearly defined objectives and outcomes. The ISRP expects there will be established standards for hatchery and net pen production (egg take, eyed egg success, hatching success, and numbers released) for each species, and that the program will explicitly self-evaluate to those established benchmarks. The ISRP expects there will be standards established for fishery yields (CPUE, total harvest in relation to fish stocked, economic and other social benefits) for each body of water and the project as a whole. These standards should be consistent with types of data that can be collected. For example, if CPUE is measured in terms of fish per angler per day, then the standard should also be set using fish per angler per day. Although some fishery goals and evaluation were provided for the net pen project, others were incomplete.

Projects have provisions for monitoring and evaluation. The ISRP concludes a sufficient monitoring program is not in place. A defined and statistically justified M&E plan is required for the resident fish stocking program that addresses both the biological/chemical/food-web and harvest factors. The ISRP understands and appreciates the difficulty in conducting direct creel surveys in small, remote lakes and streams. Nonetheless, the ISRP believes that effort needs to

be made to better document the use of these lakes and the harvest of fish for the intended purpose of recreational angling or subsistence fishing. The documentation may need to use interview and survey techniques from the social science realm rather than the fisheries field.

The ISRP expresses concern about the fish culture performance at the hatchery. Hatchery performance data were provided by the sponsor that raised questions, yet there was no evaluation of these production numbers by the sponsors. Table 4 in the response to the ISRP summarizes egg take, eyed eggs, fish ponded, and fish released for brook trout, Lahontan cutthroat trout, rainbow trout, and redband rainbow trout. For brook trout and Lahontan cutthroat trout, the average percent eye-up for the past seven years has been 67% and 54% respectively, and survival to release has been only 36% and 30% respectively. For rainbow trout from Washington Department of Fisheries and Wildlife, the survival from green egg to release averaged only 25% for brood years 2006 and 2007. This level of success in the fish-rearing phase of the program is in need of investigation and improvement. Also, why does the number of green eggs vary so much within a species from year to year? The ISRP acknowledges the information provided on water supply challenges. The hatchery production program should be designed around water supply constraints.

The ISRP previously concluded in 2009 that the Rufus Woods Redband Net Pen Project met scientific review criteria with the qualifications that the project be designed as a proof-of-concept test for native redband brood fish management, and that future proposals identify goals and monitoring results that are integrated with the overall Colville resident fish hatchery program. The current proposal indicated that net pen culture of redband trout did not meet the Tribe's needs (see statement below). Although the net pen proposal identified some goals, for example harvest 30% of stocked fish, and provided some observations this information was incomplete, as noted above.

The current proposal reflects major changes in the Rufus Woods Redband Net Pens (200811700) project direction. The original proposal was for rearing redband trout broodstock, and actual stocking of production fish was a minor element with numbers and locations of fish to be stocked unidentified. The sponsor has suggested that redband trout are not suitable for stocking in reservation lakes and perform poorly in the tribal hatchery, although conflicting statements were also provided in the proposal: *"The project successfully reared and released over 16,960 kg of redband rainbow trout into Rufus Woods and reservation lakes. This amount constitutes 76% of the Colville Tribal Resident Fish Hatchery's annual production goal (Shallenberger, E., 2010). Associated project costs calculated out to be less than a quarter of what it would cost to raise these fish at the hatchery. The project has provided a cost effective way to grow much larger fish, alleviate some pressure on the hatchery's current resources and provided a wonderful spring fishery on North and South Twin Lakes and Lake Rufus Woods."* Nevertheless, the sponsor has transitioned this project from rearing redband broodstock to rearing triploid rainbow trout for direct stocking into Lake Rufus Woods, North and South Twin

Lakes, and unspecified reservation streams. Justification for this production is needed in a Master Plan. The ISRP is unable to determine why triploid rainbow trout from the net pens are needed for Lake Rufus Woods since project 200740500 is purchasing triploid fish from net pen operators for stocking.

ISRP Retrospective Evaluation of Results

The original goal of the Rufus Woods Net Pens project (200811700) was to raise native redband trout broodstock and reduce capacity issues at the Colville Tribal Hatchery. After implementing the project, the sponsor stated that *“the project successfully reared and released over 16,960 kg of redband rainbow trout into Rufus Woods and reservation lakes. This amount constitutes 76% of the Colville Tribal Resident Fish Hatchery’s annual production goal (Shallenberger, E., 2010). Associated project costs calculated out to be less than a quarter of what it would cost to raise these fish at the hatchery. The project has provided a cost effective way to grow much larger fish, alleviate some pressure on the hatchery’s current resources and provided a wonderful spring fishery on North and South Twin Lakes and Lake Rufus Woods.”* Nevertheless, in the most recent proposal, the sponsor concluded that the performance of redband trout in the hatchery and Rufus Woods net pens was insufficient to meet program needs. Stocking native redband trout was deleted as a key objective in the 2011 proposal.

The project has transitioned to rearing and releasing triploid rainbow trout. The goal in 2011 was to release 20,000 large triploid trout into the Twin Lakes and 20,000 trout into Rufus Woods for tribal and sport harvests. A reported 10,000 trout were stocked into South Twin Lake, but no values were presented for North Twin Lake or Rufus Woods. In 2011, approximately 1,769 rainbow trout were harvested in Rufus Woods and 15,477 trout were captured in the Twin Lakes. This project needs to be incorporated into a resident fish hatchery Master Plan, improve upon its stocking plan, and carefully evaluate whether the project is achieving specific goals such as catch per hour or percentage of stocked fish harvested.

[200811100](#) - Twin Lakes Enhancement

Sponsor: Colville Confederated Tribes

ISRP recommendation: Meets Scientific Review Criteria - In Part (Qualified)

Qualifications:

In Part: While initial results of the oxygenation of North Twin Lake are promising, the ISRP believes that additional time is needed to fully characterize the costs and benefits of this fishery enhancement effort. One to two years of data may not be enough to adequately characterize the whole-lake response to a restoration at this scale, especially in view of several confounding

factors identified below, which occurred during the initial phase of the study. For this reason we feel that proceeding with an oxygen generation plant for both lakes is not scientifically justified at this time. Provided that sufficient oxygen can be obtained from local suppliers for North Twin, additional data should be collected comparing oxygenated North Twin versus non-oxygenated South Twin. Project staff should obtain statistical assistance to determine the point at which results clearly demonstrate that oxygenation is cost-effective before committing to oxygenating both lakes on a regular basis.

Qualified: In the last review, the ISRP requested specific results indicating that external nutrient loading was being reduced, but these results were not included in the proposal or in the last annual report. An update should be added to the proposal quantitatively summarizing the reduction of discharge into the lakes. Has the concept of large tanks that are periodically pumped and hauled away been considered, instead of using septic fields that eventually drain into the lakes?

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The project sponsors cite that the project goals follow those in several subbasin plans including the Upper Columbia and Columbia River plans, the CCT Fish and Wildlife Management Plan, and the MERR document guidelines when monitoring and evaluating fish planting strategies. The project is adequately described in the context of regional trout enhancement efforts. In the Annual Report for 2010 (April 2011), one of the goals of this project is stated to be enhancement of the population of interior rainbow ("redband") trout in both North and South Twin lakes so that they can support a sustainable fishery without the need for hatchery augmentation. However, at present both lakes are stocked with hatchery rainbow trout, and the decision to switch from redband trout to rainbow trout needs to be included here.

The objectives (below) are straightforward and measurable - when linked with deliverables.

OBJ-1: Improve the trout fishery in North and South Twin Lakes

OBJ-2: Oxygenate North and South Twin Lakes

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The proposal itself presents several graphs pertaining to limnological investigations and net captures, but figure captions and an adequate discussion of the data they portray are needed. More details are in the 2010 annual report. Results indicate that the two lakes are similar in some respects but somewhat different in others. For this reason, the response of fishes and aquatic invertebrates to the proposed oxygenation of South Twin Lake, which was not oxygenated in the past, cannot be predicted with certainty. Results do show, however, that oxygenating North Twin Lake has created conditions more suitable for benthic invertebrates and that trout now use the cool hypolimnion during warm summer months.

It would be easy to assume that increased angler catch rates with oxygenation would make North Twin Lake a better place to fish; however, Table 6 and Table 7 suggest that catch per unit effort in South Twin exceeded that of North Twin in some months, even with the higher carryover rate of trout in North Twin. This raises the question of how stocking has been carried out in the lakes and how hatchery supplementation has influenced harvest during the initial period of oxygenation. It also raises the more general question: will the relatively high cost of oxygenation, especially if the oxygen generating plant is constructed, result in enough fish and/or enough larger fish to justify the expense?

The work in 2009, 2010, and 2011 clearly showed that once North Twin Lake was oxygenated, fish utilized the hypolimnion and survived at a higher rate than at South Twin Lake. Differences were statistically significant. As a result of the success at North Twin Lake, stocking strategies changed which confounds the growth rate and condition factor data collected during the study. Angling pressure, catch-per-unit-effort, survivability of marked release groups of trout, growth and condition of fish have been measured to establish if goals of project have been met. As a result stocking numbers have been reduced by 60%, but the size of fish caught has increased from 230g to 435g, while reducing CPUE by only 10%. The percentage of carryover fish increased by five times and angler satisfaction has increased.

A short paragraph on adaptive management only indicates that the management changes which have occurred have been adjustment of stocking numbers in response to oxygenation effects. However, during the project site visit we were told that a switch in type of fish planted from redband stock to triploid rainbow occurred because the redbands were emigrating from the lakes. This discussion plus the rationale for the switch could/should also be added as an example of adaptive management.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

In general, the project sponsors have made progress in addressing the questions posed by the ISRP. Additional research to understand the limnological processes in the two lakes will be very helpful. One emerging factor that deserves more discussion is the presence of non-native largemouth bass and golden shiners in the lakes. What is being done to monitor the effects of oxygenation on these species?

Several long-term issues are of concern: (1) what are the long-term effects on macroinvertebrates and will changes effect fish growth, and (2) hypolimnetic anoxia is a result of sediment oxygen demand (SOD) and now that external nutrient loading has been reduced, will SOD be reduced as the hypolimnion continues to be oxygenated and will future oxygen supplementation continue to be required? Some evidence indicates that SOD will be reduced, but this needs to be monitored and documented for a longer period of time. Mercury analyses from the two lakes have been confusing to date. More information is needed over time.

Another issue of concern is how will the oxygenation affect uptake of methylmercury in fish. Present levels are below EPA cautionary guidelines.

4. Deliverables, Work Elements, Metrics, and Methods

The project should consider expanding the number of sites for continuous oxygen measurements in the lakes. According to the descriptions of the sampling program in [MonitoringMethods.org](#), only a single site from each lake will be continuously monitored. More sampling locations are needed, especially if trout prefer different places in the lakes over the course of a year.

4a. Specific comments on protocols and methods described in [MonitoringMethods.org](#)

The methods published in [MonitoringMethods.org](#) have sufficient detail for the most part but should also include the stocking regimes for the two lakes, including species and size at release. Additional details on the benthic and plankton surveys would also be helpful.

4. General Comment on Lake Roosevelt Fisheries Management

A structured decision management approach, as described in the ISRP's programmatic comments, should be employed to guide stocking strategies, resolve conflicting goals on the walleye fishery, establish a framework for determining whether a viable hatchery kokanee program is possible, and address questions concerning interaction of net pen and native redband rainbow trout, and hatchery and wild kokanee. A Resident Fish Symposium engaging all the major sponsors working on this problem in other blocked subbasins including Flathead Lake and Upper Priest Lake could be useful in developing a decision support process.

The ISRP's comments on a number of the proposals pertaining to Lake Roosevelt contain statements and suggestions that could apply to this set of projects and could require coordination among project sponsors.

5. Lake Roosevelt and Tributaries

200103100 - Resident Fish Symposium

Sponsor: Lake Roosevelt Forum

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

The Resident Fish Symposium project is a useful forum with evidence of participant satisfaction. The proposal describes a worthwhile process that facilitates communication and coordination among managers and interest groups in the blocked area of the Columbia above Grand Coulee Dam.

The qualification is for the sponsors to include an interactive modeling workshop in a symposium in the near future to implement steps toward a Structured Decision Making process for resident fish in Columbia reservoirs. See the programmatic comments on fish stocking, Structured Decision Making, and regional coordination contained in this report. See also the ISRP Retrospective Report 2011 (ISRP 2011-25) and Harvey and Kareiva (2004): www.ecopath.org/sites/default/files/ecopath_models/papers/harvey_kareiva_2005.pdf

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The symposium meets the need for coordination and dissemination of information among fish and wildlife managers and various interest groups about project results, best management practices, limiting factors, and long term challenges within the blocked area of the Columbia above Grand Coulee Dam. The symposium is well justified. It provides a forum for coordination

of activities comparable to those for salmon downstream of the blocked areas. The objectives are straightforward, and there is little doubt they can be accomplished, as they have in the past.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The symposium has a good track record of success and is highly rated by participants. Attendees are from throughout the Northwest and Canada and include not only agency managers but also tribal representatives, interest groups, stakeholders, and university personnel. Conference organizers have continued to improve the symposium through suggestions and comments by the participants.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Topics addressing Emerging Limiting Factors have become part of the symposium. As an example, the sponsors cite sessions by University of Washington faculty on results of modeling climate change in the upper Columbia.

4. Deliverables, Work Elements, Metrics, and Methods

The Deliverables address planning and conduct of symposia in each of four years (2013-2018). These Deliverables are appropriate for this type of proposal.

[199404300](#) - Lake Roosevelt Data Collection

Sponsor: Spokane Tribe

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

1. The sponsors should establish a scientifically justified timeline, decision points, and criteria for determining whether a viable hatchery kokanee fishery can be established lake-wide, or if the goals of the hatchery kokanee program should be modified. A decision tree should be developed to aid in this process.
2. Similarly, the sponsors should establish a scientifically justified timeline, decision points, and criteria for determining whether a mixed stock/mixed species fishery can be established lake-wide. A decision tree should be developed to aid in this process.
3. The sponsors should clarify the differences between Deliverables 3 and 4.
4. The creel survey should include an inquiry about whether the angler is a tribal member. Data for subsistence and recreational fisheries should be analyzed and presented

separately to determine whether the goal of creating a subsistence fishery is being achieved.

See the ISRP's programmatic comments on fish stocking.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The sponsors face the daunting task of establishing a mixed stock/mixed species subsistence and recreational fishery for hatchery and wild kokanee and rainbow trout as well as walleye and smallmouth bass. They have had to deal with a multitude of complex and interacting problems having to do with unpredictable hydro-operations and high rates of predation on juvenile kokanee and trout by walleye and smallmouth bass.

The sponsors have tried to improve the fishery by using different parental stocks of kokanee and rainbow trout, and changing the timing, location and size of fish released. Despite these efforts, success has been largely limited to establishment of a put-and-take fishery for hatchery kokanee in one area of the reservoir and increased returns in some years of spawners to one tributary. Rearing rainbow trout in net pens, however, has augmented the fishery.

Furthermore, the sponsors have had little success in establishing naturally reproducing runs of redband rainbow trout and kokanee which was one of their objectives. The sponsors candidly acknowledge that, after nearly 20 years of trying, they have as yet been unable to achieve their goal of establishing a viable hatchery kokanee fishery: "The goals of developing a fishery that could be utilized for subsistence and recreational purposes as well as be self-sustaining had not been reached, despite extensive monitoring and adaptive management based on study results." In the ISRP's 2007-09 review of this project and follow-up review of the Lake Roosevelt Guidance Document (ISRP 2009-16), we expressed concern about whether it is reasonable to establish a viable kokanee fishery lake-wide given the complex problems limiting kokanee in the reservoir. The ISRP's concern is still largely valid.

The ISRP fully appreciates the desire of the tribes to maintain a salmon fishery for spiritual, cultural, and subsistence purposes, and the political and public pressures on managers. We commend the sponsors for their effort in trying to deal with the multitude of problems encumbering establishment of a kokanee fishery. We recommend, however, that the sponsors objectively assess their successes and lack of success, and establish a reasonable, scientifically justified timeline, decision points and criteria for determining whether a viable hatchery kokanee fishery as well as a mixed stock/mixed species fishery can be established lake-wide, or whether the goals of the hatchery kokanee program should be modified. In other words, how long will the current hatchery kokanee program continue until a decision is made

about whether it can succeed? The ISRP made a similar recommendation in our 2007-09 review.

Given the above caveats, the objectives seem reasonable and will allow the sponsors to continue to assess harvest, fish abundance and distribution, and limnological conditions in the reservoir, all of which will help determine whether their goals can be met. Restoration of naturally spawning kokanee and redband rainbow trout is worth trying although success to date has been limited. Objective 4, "Complete a baseline assessment of mussel populations in Lake Roosevelt," is well justified as this mollusk was once an important food resource for Native Americans and little is known about its distribution and abundance.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The presentation of results was detailed, thoughtfully prepared, and very long. In future proposals the presentation should be more concise but still be comprehensive. Data should be presented in tables and figures, as was done in the project presentation, rather than in the body of the text. This would make it easier for reviewers to examine data trends. Results should be organized around objectives for each stock or species. Major conclusions should be stated clearly and succinctly, and be supported by data.

Predation by walleye and smallmouth bass appears to be a major source of mortality of juvenile salmonids. Success of the hatchery program depends in large part on whether the predator control program is effective. The sponsors should be given the opportunity to pursue a predator control strategy. The ISRP, however, feels that a more aggressive predator control program than the one currently in place is needed. Less restrictive regulations on walleye have been instituted by WDFW but as yet they have not met the annual harvest goal estimated to be needed to control the walleye population. A more aggressive approach such as that instituted by the Colville Tribes is a step in the right direction. The sponsors should be able to demonstrate substantial progress in significantly reducing the walleye population and increasing fry survival within the next five years.

The sponsors state that the purpose of the more liberalized regulations for walleye and smallmouth bass harvest is "to achieve balance between predators and non-native and focal fish." The sponsors should clearly explain what they mean "balance" and quantitatively how it will be assessed.

We recognize the problems in estimating actual abundance of fish species in a large reservoir, and so we can understand the sponsors' reliance on relative abundance estimates. But relative abundance is of limited value and even can be misleading because it may not relate directly to actual abundance of a species. The ISRP in their 2007-09 review expressed a similar concern. We suggest that, in lieu of actual abundance estimates, the sponsors present, preferably in

figures or tabular form, total catch and CPUE as well as relative abundance for both survey and angler catches.

There have been many "adjustments" or adaptive management switches over the years as a result of the findings of this project. Various adaptive modifications in the program have been made in an attempt to establish a viable salmonid fishery.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The sponsors are addressing the emerging limiting factor of non-native fish impacts by instituting predator control measures. They state that their monitoring program will allow them to detect effects of climate change, but they do not discuss how this will be done. They also do not discuss possible climate change impacts on reservoir limnology and fish populations. It seems that climate change could exacerbate non-native predator fish problems.

The M&E program is designed to monitor changes in fish abundance and distribution as well as limnological conditions in the reservoir. The sponsors are collecting a large amount of data. It would be helpful if they explained how the data will be analyzed and related to changes in fish abundance. The redband assessment is emphasized more than in previous efforts. The sponsors should make sure data gathered addresses critical issues and avoid gathering data only to fill data gaps.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverable 1 pertains to collection of creel data. One of the major goals of this project is to establish a subsistence fishery for tribal members. The creel survey should include an inquiry about whether the angler is a tribal member. Data for subsistence and recreational fisheries should be analyzed and presented separately to determine whether the goal of creating a subsistence fishery is being achieved.

Deliverables 3 and 4 appear to be very similar. Both propose to collect fish and limnological data, although Deliverable 4 also mentions specific methods for sampling walleye and pike. The differences between these two Deliverables should be clarified.

Regarding the mussel abundance portion of the project (Deliverable 5), the sponsors plan to use a standard AFS Monograph protocol; and regarding genetics, sponsors plan to use the approach and design used successfully by Brim-Box et al. for the Umatilla River.

[199104600](#) - Spokane Tribal Hatchery Operations and Maintenance (O&M)

Sponsor: Spokane Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

These Qualifications and Comments apply to the following projects:

Spokane Tribal Hatchery (199104600)

Sherman Creek Hatchery (199104700)

Lake Roosevelt Net-Pens (199500900) - Please note that comments for rainbow trout only, not kokanee, apply to this project.

The harvests of both net-pen reared yearling rainbow trout and kokanee fry and yearlings are substantially below the program goals. For rainbow trout the harvest goal is 50,000 to 150,000 fish. Over the period 2007-2010, this goal has been achieved only in 2010. The other three years had harvest of 11,547, 18,333, and 31,204. Kokanee have fared even worse. The kokanee goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Harvests from yearling hatchery production from 2007 to 2010 were 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearlings.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure is unsuitable for rainbow trout and kokanee survival to the levels desired.

The project sponsors should continue efforts to evaluate why harvest rates are so low on stocked trout and kokanee. The sponsors need to develop future plans for revising harvest goals for kokanee due to the continuing low harvest rates or provide plans for addressing their two major limiting factors: entrainment and predation by invasive non-native species (specifically walleye). Furthermore, in view of the partial success, developing plans for experimental fish culture work (even if modest) as part of the hatchery program to address post-release shortcomings needs consideration. Some effort to understand variation in past return to creel results would also be useful, including an assessment of past practices and their results (positive or negative). Such a scientific addition to this work could add a valuable and non-routine, adaptive management dimension to the fish-rearing.

They should also continue to evaluate whether wild redband and kokanee can withstand the harvest rates they encounter in response to harvests on hatchery fish. The attempt to fin clip 100% of yearling kokanee and trout should be evaluated after all fish have been presumably marked, because poorly marked fish may cause bias in fish metrics.

Our opinion from the current set of results with kokanee is essentially the same as our last review of the Lake Roosevelt Guiding Document. With entrainment and predation, the kokanee goals are just not being met. The kokanee stocking likely provides a forage base for predatory non-native fish in Lake Roosevelt. The ISRP believes there is a need to take a hard look at whether kokanee are a scientifically realistic fish to attempt to produce a mitigation fishery, despite past kokanee production in Lake Roosevelt and cultural values.

An economic analysis of the various stocking efforts in Lake Roosevelt and the harvest benefits would be useful. This might be a good task for the IEAB or the sponsors.

Comment:

The ISRP requested a succinct summary of the fish rearing program for Lake Roosevelt since it involves three projects that rear fish, and a fourth project that is responsible for evaluating post-release survival, growth, and harvest. Sponsors of the Spokane Tribal Hatchery (1991-046-00), Sherman Creek Hatchery (1991-047-00), and Lake Roosevelt Trout Net Pen (1995-009-00) projects responded to ISRP questions in a single document and provided adequate information. Ideally, the sponsors would have text and data tables such as those in the response in concise annual reports.

The projects producing rainbow trout and kokanee for release into Lake Roosevelt to provide resident fish substitution for lost anadromous production above Chief Joseph and Grand Coulee dams have established metrics for performance in culture (hatchery and net-pens) including egg collections, egg-to-fry survival, fry-to-release survival, fish health maintenance as well as post-release monitoring to collect survival and harvest information. Since the last review in 2006 (2007/2009 review) the co-managers have developed harvest objectives for kokanee and rainbow trout and a decision tree for kokanee egg production from Lake Roosevelt hatchery kokanee collected at Hawk Creek. The decision tree includes performance thresholds that would terminate the effort.

The data show that performance in the hatchery and net pens is adequate for both trout and kokanee. However, the percentages of released rainbow trout and yearling kokanee that are harvested are very low, averaging only 4.6% and 0.3%, respectively. These harvest levels are much lower than the harvest goals. Presumably, the harvest rate of kokanee resulting from fry releases is much lower. Are the low harvest rates associated with low survival after release, low angler effort, or both? While the hatchery program has released numerous trout and kokanee and has contributed to harvests of resident fishes, it is not clear that the program has “greatly enhanced Lake Roosevelt fishing opportunities” as stated on page 35 of the sponsor response.

The Lake Roosevelt Evaluation Project has done a good job in RME for these projects and has provided the post release metrics for these projects. Information on the harvest of wild

redband trout and actions to minimize harvests of wild kokanee through harvest regulations is appreciated.

ISRP Retrospective Evaluation of Results

Collectively, the Spokane Tribal Hatchery (199104600), WDFW Sherman Creek Hatchery (199104700), and Lake Roosevelt Net Pens (199500900) plan to rear 750,000 yearling rainbow trout (5/lb) for release into Lake Roosevelt in May after draw-down is complete. Rainbow trout will grow in the reservoir and recruit to the fishery the following fall and winter. These projects also rear 2 to 3 million kokanee fry (300/lb) and 250,000 kokanee yearlings (7/lb) for release into the reservoir. Kokanee broodstock from Lake Roosevelt are being developed using Hawk Creek as a broodstock collection location. For rainbow trout, triploid eyed eggs are obtained from the Washington Department of Fish and Wildlife's (WDFW) Spokane Hatchery. For kokanee, Meadow Creek stock eggs are obtained from British Columbia (based on availability), and Lake Whatcom stock eggs are obtained from WDFW. Kokanee egg availability is dependent on adult run size in the source locations and is a limiting factor for achieving fry and yearling release goals.

For rainbow trout, eggs are incubated at the Spokane Tribal hatchery, and fry split between the Spokane Tribal Hatchery and Sherman Creek Hatchery. In October juvenile rainbow trout are transferred to net pens for production rearing for eventual release the following May. For kokanee, eggs are received at the WDFW Spokane Hatchery for thermal marking. Kokanee fry releases are hatched and reared at the Spokane Tribal Hatchery. Kokanee yearling releases are hatched at the Spokane Tribal Hatchery and split and reared at both the Spokane Tribal Hatchery and Sherman Creek Hatchery.

These projects have life-stage survival goals of 80% egg survival to feeding fry, 90% survival from fry to fingerlings, and 90% survival from fingerlings to yearlings.

For rainbow trout, at the Sherman Creek Hatchery there have been unaccounted losses of juvenile fish ranging from 13.5% to 19.1%. The source of these losses needs to be identified, and efforts to remedy them are warranted. The Lake Roosevelt Trout Net Pen Project released, on average, 638,000 triploid trout per year, which is slightly under the goal of 750,000 trout as a result of low numbers of fish (259,000) released in 2007.

For kokanee the release numbers have been variable with shortfall in release numbers owing to the unavailability of eggs.

Survival from release to harvest has not meet program goals. The co-managers and stakeholders express satisfaction with the rainbow trout program despite not having achieved the harvest targets. For rainbow trout the harvest goal is 50,000 to 150,000 fish; this has only been achieved in 2010 for the four years 2007 to 2010. The other three years had harvest of

11,547, 18,333, and 31,204. Approximately 28,200 trout have been harvested each year; the percentage of released trout that are harvested is low, averaging 4.6%. For kokanee, the goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Table 9 in the response provided kokanee harvest for yearling hatchery production of 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearling kokanee. The harvest of wild redband trout has averaged 3,270 trout per year.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure are unsuitable for rainbow trout and kokanee survival to the levels desired.

[199500900](#) - Lake Roosevelt Rainbow Trout Net Pens

Sponsor: Lake Roosevelt Development Association

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

These Qualifications and Comments apply to the following projects:

Spokane Tribal Hatchery (199104600)

Sherman Creek Hatchery (199104700)

Lake Roosevelt Net-Pens (199500900) - Please note that comments for rainbow trout only, not kokanee, apply to this project.

The harvests of both net-pen reared yearling rainbow trout and kokanee fry and yearlings are substantially below the program goals. For rainbow trout the harvest goal is 50,000 to 150,000 fish. Over the period 2007-2010, this goal has been achieved only in 2010. The other three years had harvest of 11,547, 18,333, and 31,204. Kokanee have fared even worse. The kokanee goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Harvests from yearling hatchery production from 2007 to 2010 were 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearlings.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure is unsuitable for rainbow trout and kokanee survival to the levels desired.

The project sponsors should continue efforts to evaluate why harvest rates are so low on stocked trout and kokanee. The sponsors need to develop future plans for revising harvest

goals for kokanee due to the continuing low harvest rates or provide plans for addressing their two major limiting factors: entrainment and predation by invasive non-native species (specifically walleye). Furthermore, in view of the partial success, developing plans for experimental fish culture work (even if modest) as part of the hatchery program to address post-release shortcomings needs consideration. Some effort to understand variation in past return to creel results would also be useful, including an assessment of past practices and their results (positive or negative). Such a scientific addition to this work could add a valuable and non-routine, adaptive management dimension to the fish-rearing.

They should also continue to evaluate whether wild redband and kokanee can withstand the harvest rates they encounter in response to harvests on hatchery fish. The attempt to fin clip 100% of yearling kokanee and trout should be evaluated after all fish have been presumably marked, because poorly marked fish may cause bias in fish metrics.

Our opinion from the current set of results with kokanee is essentially the same as our last review of the Lake Roosevelt Guiding Document. With entrainment and predation, the kokanee goals are just not being met. The kokanee stocking likely provides a forage base for predatory non-native fish in Lake Roosevelt. The ISRP believes there is a need to take a hard look at whether kokanee are a scientifically realistic fish to attempt to produce a mitigation fishery, despite past kokanee production in Lake Roosevelt and cultural values.

An economic analysis of the various stocking efforts in Lake Roosevelt and the harvest benefits would be useful. This might be a good task for the IEAB or the sponsors.

Comment:

The ISRP requested a succinct summary of the fish rearing program for Lake Roosevelt since it involves three projects that rear fish, and a fourth project that is responsible for evaluating post-release survival, growth, and harvest. Sponsors of the Spokane Tribal Hatchery (1991-046-00), Sherman Creek Hatchery (1991-047-00), and Lake Roosevelt Trout Net Pen (1995-009-00) projects responded to ISRP questions in a single document and provided adequate information. Ideally, the sponsors would have text and data tables such as those in the response in concise annual reports.

The projects producing rainbow trout and kokanee for release into Lake Roosevelt to provide resident fish substitution for lost anadromous production above Chief Joseph and Grand Coulee dams have established metrics for performance in culture (hatchery and net-pens) including egg collections, egg-to-fry survival, fry-to-release survival, fish health maintenance as well as post-release monitoring to collect survival and harvest information. Since the last review in 2006 (2007/2009 review) the co-managers have developed harvest objectives for kokanee and rainbow trout and a decision tree for kokanee egg production from Lake Roosevelt hatchery

kokanee collected at Hawk Creek. The decision tree includes performance thresholds that would terminate the effort.

The data show that performance in the hatchery and net pens is adequate for both trout and kokanee. However, the percentages of released rainbow trout and yearling kokanee that are harvested are very low, averaging only 4.6% and 0.3%, respectively. These harvest levels are much lower than the harvest goals. Presumably, the harvest rate of kokanee resulting from fry releases is much lower. Are the low harvest rates associated with low survival after release, low angler effort, or both? While the hatchery program has released numerous trout and kokanee and has contributed to harvests of resident fishes, it is not clear that the program has “greatly enhanced Lake Roosevelt fishing opportunities” as stated on page 35 of the sponsor response.

The Lake Roosevelt Evaluation Project has done a good job in RME for these projects and has provided the post release metrics for these projects. Information on the harvest of wild redband trout and actions to minimize harvests of wild kokanee through harvest regulations is appreciated.

ISRP Retrospective Evaluation of Results

Collectively, the Spokane Tribal Hatchery (199104600), WDFW Sherman Creek Hatchery (199104700), and Lake Roosevelt Net Pens (199500900) plan to rear 750,000 yearling rainbow trout (5/lb) for release into Lake Roosevelt in May after draw-down is complete. Rainbow trout will grow in the reservoir and recruit to the fishery the following fall and winter. These projects also rear 2 to 3 million kokanee fry (300/lb) and 250,000 kokanee yearlings (7/lb) for release into the reservoir. Kokanee broodstock from Lake Roosevelt are being developed using Hawk Creek as a broodstock collection location. For rainbow trout, triploid eyed eggs are obtained from the Washington Department of Fish and Wildlife’s (WDFW) Spokane Hatchery. For kokanee, Meadow Creek stock eggs are obtained from British Columbia (based on availability), and Lake Whatcom stock eggs are obtained from WDFW. Kokanee egg availability is dependent on adult run size in the source locations and is a limiting factor for achieving fry and yearling release goals.

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For rainbow trout, at the Sherman Creek Hatchery there have been unaccounted losses of juvenile fish ranging from 13.5% to 19.1%. The source of these losses needs to be identified, and efforts to remedy them are warranted. The Lake Roosevelt Trout Net Pen Project released, on average, 638,000 triploid trout per year, which is slightly under the goal of 750,000 trout as a result of low numbers of fish (259,000) released in 2007.

For kokanee the release numbers have been variable with shortfall in release numbers owing to the unavailability of eggs.

Survival from release to harvest has not meet program goals. The co-managers and stakeholders express satisfaction with the rainbow trout program despite not having achieved the harvest targets. For rainbow trout the harvest goal is 50,000 to 150,000 fish; this has only been achieved in 2010 for the four years 2007 to 2010. The other three years had harvest of 11,547, 18,333, and 31,204. Approximately 28,200 trout have been harvested each year; the percentage of released trout that are harvested is low, averaging 4.6%. For kokanee, the goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Table 9 in the response provided kokanee harvest for yearling hatchery production of 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearling kokanee. The harvest of wild redband trout has averaged 3,270 trout per year.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure are unsuitable for rainbow trout and kokanee survival to the levels desired.

[199104700](#) - Sherman Creek Hatchery Operations and Maintenance (O&M)

Sponsor: Washington Department of Fish and Wildlife (WDFW)

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

These Qualifications and Comments apply to the following projects:

Spokane Tribal Hatchery (199104600)

Sherman Creek Hatchery (199104700)

Lake Roosevelt Net-Pens (199500900) - Please note that comments for rainbow trout only, not kokanee, apply to this project.

The harvests of both net-pen reared yearling rainbow trout and kokanee fry and yearlings are substantially below the program goals. For rainbow trout the harvest goal is 50,000 to 150,000 fish. Over the period 2007-2010, this goal has been achieved only in 2010. The other three years had harvest of 11,547, 18,333, and 31,204. Kokanee have fared even worse. The kokanee goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Harvests from yearling hatchery production from 2007 to 2010 were 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearlings.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure is unsuitable for rainbow trout and kokanee survival to the levels desired.

The project sponsors should continue efforts to evaluate why harvest rates are so low on stocked trout and kokanee. The sponsors need to develop future plans for revising harvest goals for kokanee due to the continuing low harvest rates or provide plans for addressing their two major limiting factors: entrainment and predation by invasive non-native species (specifically walleye). Furthermore, in view of the partial success, developing plans for experimental fish culture work (even if modest) as part of the hatchery program to address post-release shortcomings needs consideration. Some effort to understand variation in past return to creel results would also be useful, including an assessment of past practices and their results (positive or negative). Such a scientific addition to this work could add a valuable and non-routine, adaptive management dimension to the fish-rearing.

They should also continue to evaluate whether wild redband and kokanee can withstand the harvest rates they encounter in response to harvests on hatchery fish. The attempt to fin clip 100% of yearling kokanee and trout should be evaluated after all fish have been presumably marked, because poorly marked fish may cause bias in fish metrics.

Our opinion from the current set of results with kokanee is essentially the same as our last review of the Lake Roosevelt Guiding Document. With entrainment and predation, the kokanee goals are just not being met. The kokanee stocking likely provides a forage base for predatory non-native fish in Lake Roosevelt. The ISRP believes there is a need to take a hard look at whether kokanee are a scientifically realistic fish to attempt to produce a mitigation fishery, despite past kokanee production in Lake Roosevelt and cultural values.

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Comment:

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post-release survival, growth, and harvest. Sponsors of the Spokane Tribal Hatchery (1991-046-00), Sherman Creek Hatchery (1991-047-00), and Lake Roosevelt Trout Net Pen (1995-009-00) projects responded to ISRP questions in a single document and provided adequate information. Ideally, the sponsors would have text and data tables such as those in the response in concise annual reports.

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The Lake Roosevelt Evaluation Project has done a good job in RME for these projects and has provided the post release metrics for these projects. Information on the harvest of wild redband trout and actions to minimize harvests of wild kokanee through harvest regulations is appreciated.

ISRP Retrospective Evaluation of Results

Collectively, the Spokane Tribal Hatchery (199104600), WDFW Sherman Creek Hatchery (199104700), and Lake Roosevelt Net Pens (199500900) plan to rear 750,000 yearling rainbow trout (5/lb) for release into Lake Roosevelt in May after draw-down is complete. Rainbow trout will grow in the reservoir and recruit to the fishery the following fall and winter. These projects also rear 2 to 3 million kokanee fry (300/lb) and 250,000 kokanee yearlings (7/lb) for release into the reservoir. Kokanee broodstock from Lake Roosevelt are being developed using Hawk Creek as a broodstock collection location. For rainbow trout, triploid eyed eggs are obtained from the Washington Department of Fish and Wildlife’s (WDFW) Spokane Hatchery. For kokanee, Meadow Creek stock eggs are obtained from British Columbia (based on availability), and Lake Whatcom stock eggs are obtained from WDFW. Kokanee egg availability is dependent

on adult run size in the source locations and is a limiting factor for achieving fry and yearling release goals.

For rainbow trout, eggs are incubated at the Spokane Tribal hatchery, and fry split between the Spokane Tribal Hatchery and Sherman Creek Hatchery. In October juvenile rainbow trout are transferred to net pens for production rearing for eventual release the following May. For kokanee, eggs are received at the WDFW Spokane Hatchery for thermal marking. Kokanee fry releases are hatched and reared at the Spokane Tribal Hatchery. Kokanee yearling releases are hatched at the Spokane Tribal Hatchery and split and reared at both the Spokane Tribal Hatchery and Sherman Creek Hatchery.

These projects have life-stage survival goals of 80% egg survival to feeding fry, 90% survival from fry to fingerlings, and 90% survival from fingerlings to yearlings.

For rainbow trout, at the Sherman Creek Hatchery there have been unaccounted losses of juvenile fish ranging from 13.5% to 19.1%. The source of these losses needs to be identified, and efforts to remedy them are warranted. The Lake Roosevelt Trout Net Pen Project released, on average, 638,000 triploid trout per year, which is slightly under the goal of 750,000 trout as a result of low numbers of fish (259,000) released in 2007.

For kokanee the release numbers have been variable with shortfall in release numbers owing to the unavailability of eggs.

Survival from release to harvest has not meet program goals. The co-managers and stakeholders express satisfaction with the rainbow trout program despite not having achieved the harvest targets. For rainbow trout the harvest goal is 50,000 to 150,000 fish; this has only been achieved in 2010 for the four years 2007 to 2010. The other three years had harvest of 11,547, 18,333, and 31,204. Approximately 28,200 trout have been harvested each year; the percentage of released trout that are harvested is low, averaging 4.6%. For kokanee, the goal is 18,500 fish from stocking fry and 12,500 from stocking yearlings. Table 9 in the response provided kokanee harvest for yearling hatchery production of 122; 368; 1,086; and 1,842 fish. This is a harvest yield ranging from 0.04% to 0.80%, well below the 5% goal for yearling kokanee. The harvest of wild redband trout has averaged 3,270 trout per year.

It is likely that reservoir environmental conditions including operational constraints and the biological community structure are unsuitable for rainbow trout and kokanee survival to the levels desired.

[199501100](#) - Chief Joseph Kokanee Habitat Enhancement

Sponsor: Colville Confederated Tribes

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The proposal is well written and well organized. The objectives and deliverables are clearly explained and pertinent results are presented in a logical and interesting manner. The project has made some real improvements over the last decade and with the help of key guidance documents appears poised to provide further insight into the question of whether naturally spawning kokanee provide adequate mitigation for loss of salmon and steelhead. This worthy suite of projects could benefit from an updated and more comprehensive ecosystem-based approach.

The title of the project is slightly misleading as this is a predator control and deep water spawning research project that includes some stream spawning investigations.

See the programmatic comments on fish stocking, Lake Roosevelt projects, and comments related to ecosystem models.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The project sponsor, Colville Confederated Tribes, argues that the kokanee population in Lake Roosevelt should be enhanced to mitigate for the loss of anadromous salmonids when Grand Coulee and Chief Joseph Dams were constructed. Because the reach of the Upper Columbia now occupied by Lake Rufus Woods and Lake Roosevelt was a free flowing river before dam construction, it is unlikely that they contained kokanee in any significant numbers. Therefore, the kokanee now inhabiting Lake Roosevelt are either naturally spawning fish that are apparently aligned with the downstream Nespelem River stock or artificially produced fish that have been propagated in the tribal hatchery. In either case, they face a formidable obstacle in the form of introduced percid (walleye) and centrarchid (smallmouth bass) species, which prey heavily on fry and yearling kokanee. The Tribe maintains that kokanee are the most appropriate substitute for lost salmon and steelhead, and continue to seek support to promote naturally spawning kokanee populations in the Chief Joseph and Grand Coulee area. The primary emphasis of this proposal is to build wild kokanee runs in two streams on the Colville Reservation – the Sanpoil River and Barnaby Creek.

The technical background and objectives of the project are, in general, adequately described. An important development since the Fiscal 2007-09 project review process was the completion of a Lake Roosevelt Fisheries Guiding Document, which considers both habitat and harvest

issues in the context of multiple interests. The ISRP reviewed a draft of the Guiding Document in 2009 (ISRP 2009-16) and found that it did not address the limiting factors that may be impeding establishment of a successful kokanee fishery. Following completion and review of this plan, the Tribe contracted with LGL to develop the Lake Roosevelt Kokanee Management Plan, which is the basis for actions proposed here. The project therefore appears to have the concurrence of the majority of regional stakeholders (although possibly excluding the recreational walleye and bass fishers) and is consistent with the subbasin plan and other planning documents. However, the ISRP has not conducted an in-depth review of the Lake Roosevelt Kokanee Management Plan.

The proposal is consistent with the biological objectives of the Fish and Wildlife Program, MERR, the Intermountain Subbasin Plan, the Sanpoil River Subbasin Plan, the Lake Roosevelt Comprehensive Management Plan (2010), and the Five Year Implementation Plan.

The sponsors approach for establishing a viable kokanee fishery has been, first, to conduct studies to quantify factors limiting kokanee and then, based on the knowledge gained from these studies, to implement actions addressing these factors. This is a logical approach and has yielded some important results. The technical background provides a clear, concise, and well organized discussion of the work that has been done to date.

The objectives are led by planning documents, mainly the Lake Roosevelt Guiding Document and the recent Lake Roosevelt Comprehensive Kokanee Management Plan (2010), as well as previous ISRP reviews. Kokanee restoration is proposed for Sanpoil River and Barnaby Creek through protection, enhancement, and investigations in the reservoir. Surveys have indicated plentiful spawning habitat in Sanpoil River, and a major culvert project should result in access to several more miles of spawning and rearing habitat in Barnaby Creek. The latter is augmented with egg plants, studies on egg-to-fry survival, escapement monitoring, as well as pilot studies on predator reduction and the monitoring of harvest. Investigations in the reservoir include shore spawning studies including hydroacoustic and ROV surveys, and genetic stock status. This proposal is well written and provides a comprehensive justification and history of works leading to these priority projects.

Entrainment of kokanee was noted as high and a key limiting factor for kokanee and rainbow trout in the reservoir. While studies to reduce entrainment were summarized, for example through use of strobe lights, these proved ineffective. It seems that entrainment remains a key limiting factor. A guiding document, recommended to be developed by the ISRP, was followed to address quantification of entrainment, predation loss, natural kokanee spawning and available habitat – all completed by 2009. Recently, fry stocking in the Sanpoil River was tried, but mortality from predation, primarily from walleye and smallmouth bass, exceeded 95%. Egg planting in artificial tubes is proposed for the Sanpoil River to evaluate egg-fry survival, which the sponsors think may be an additional limiting factor. This study will be followed by fry-

emigrant survival studies in the next 5 years. There was mention of the use of kokanee eggs from Meadow Creek in Canada, but it was not clear why this choice was made rather than use endemic stock or Spokane Hatchery kokanee. Post-smolt kokanee yearlings will be supplied by Spokane and released in Sanpoil River annually to 2015, to support a put-and-take fishery. Escapement monitoring may provide further information on the fate of these fish.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Over the years, the project has engaged in several attempts to build an abundant naturally spawning kokanee population in the Sanpoil River. Many of these efforts have involved the infusion of large numbers of hatchery fish, but few have shown success. Research, however, has been able to identify key problems and limitations. The most significant problem appears to be a gauntlet of predators that inhabits the Sanpoil arm of Lake Roosevelt when hatchery released fry and yearlings migrate to the lake. Once the predator bottleneck was recognized, a walleye and smallmouth bass removal program was instituted. Another problem appeared to be poor survival of kokanee eggs in spawning gravels, and to remedy this, additional reaches of potentially favorable spawning areas have been opened up through culvert replacement.

However, the most interesting new finding has been that kokanee may be spawning in deepwater areas of Lake Roosevelt itself. If that is the case, it is possible that exposure to non-native predators may be lessened as emergent fry from deep water spawning sites do not have to run a gauntlet of predators. It is notable that the CCT has concluded, based on field studies and modeling, that the availability of spawning habitat in the Sanpoil River is adequate, and therefore a kokanee spawning channel is not needed; this is a good example of adaptive management.

In the past, the ISRP has been somewhat critical of the heavy reliance on artificial production to support the Lake Roosevelt kokanee fishery. The proposal's emphasis on understanding kokanee life cycle and behavior, and on building naturally spawning populations on the Colville Reservation, is a move in the right direction. However, the proposal is still unclear about how natural and artificial production will be balanced in the future. There is a need to clarify whether hatchery fish will continue to be planted for a put-and-take fishery. Releases of hatchery fish may attract predators that could also prey upon naturally spawned fish, and requires further exploration. Hopefully, the thermal-marked otolith and adipose clip marking programs will help reveal the fate of hatchery and wild kokanee.

ISRP Retrospective Evaluation of Results

In summary, the project's accomplishments to date are significant, and results are clearly and concisely presented. The studies conducted so far, and those proposed, seem well designed. The sponsors' studies show that predation by walleye and smallmouth bass on fry and yearlings may be one of the major limiting factors for kokanee in the Sanpoil River. They have begun a

localized predator control program, and while catch of predators has been high, the sponsors did not provide information on actual predator abundance, which would have been helpful. It seems that unless predators are controlled reservoir-wide they could continue to recruit to the Sanpoil and diminish the effectiveness of predator control in the river.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The questions addressed by the project are appropriate, and the methods for the most part seem adequate. The project has made progress over the last decade in identifying the factors limiting naturally spawning kokanee recruitment. More work is needed on the behavior and life history of wild versus hatchery fish, but the current proposal does include some elements that address this issue.

Entrainment of young kokanee by Grand Coulee Dam has long been known as a major source of loss from Lake Roosevelt; however, there is little in the proposal that deals with the problem. The strobe light experiment did not significantly reduce entrainment, but there may be other measures that can help prevent fish loss at the dam.

The project sponsors are not relying on BPA for sole funding for the project. Additional funds have apparently been obtained to purchase kokanee eggs for the planting tube experiment. If egg tubes are successful, the Tribe intends to use them as a means of releasing hatchery fish in tributaries. Little of this type research is being done elsewhere in the Upper Columbia. Several of the work elements, for example harvest monitoring, involve collaboration with other organizations such as WDFW and the Spokane Tribe.

The project coordinates with the Lake Roosevelt Fisheries Evaluation Project (LRFEP: 1994-043-00), the Spokane Tribe Hatchery (1991-046-00), and the Sherman Creek Hatchery (1991-047-00). The sponsors provided a discussion of the possible impacts of climate change which could be favorable for non-native species and harm salmonids. They do not indicate how their work will help to alleviate these potential problems. Lacking also was an indication or recognition of the common issues and initiatives shared by managers in other resident fish reservoirs of the Columbia Basin. A need for collaboration among other resident fish / reservoir managers is evident.

4. Deliverables, Work Elements, Metrics, and Methods

The Deliverables are straightforward and appear accomplishable. Deliverables 1 and 2 are experimental, using egg tubes implanted in the spawning gravel in the Sanpoil River to determine egg to fry survival. If successful, the sponsors hope egg tube incubation can be used to establish a viable naturally spawning kokanee population. It is unclear, however, whether implanting egg tubes will continue indefinitely or only until the adult escapement goal is

achieved. Success in returning spawners to the river will depend heavily on how well predators are controlled. For the egg-fry survival studies, the sponsors may want to consider placing some egg tubes in a hatchery environment to serve as a “control” of sorts for comparison with survival measures from the tubes placed in the river.

The three objectives and six deliverables are adequately described and most of the work elements have been developed in sufficient detail for the project to go forward. The use of microchemical analysis of otoliths with laser ablation to determine spawning preferences of wild kokanee is being investigated and project sponsors state that whether it will be suitable has not yet been determined.

Complete methods for the predator reduction program have been uploaded to MonitoringMethods.org; however, the ISRP cautions that bycatch must be carefully monitored. In the presentation to the ISRP, the project sponsors emphasized that every fish captured in the predator removal program would be identified and measured. Whether by gillnetting or electrofishing, the removal methods will be generally non-selective and the possibility exists that native fishes may be killed in significant numbers. These could include some species of concern such as interior redband trout.

Thorough assessment of kokanee use of newly available spawning habitat, for example the Barnaby Creek culvert replacement project, will be needed to document colonization of streams where kokanee have not spawned previously.

The inclusion of a deliverable calling for development of a resident fish database is an excellent idea.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The description of predator reduction methods is reasonably complete, but more details are needed on data collection from captured fish. Other than length and presumably species, the methods make no mention of dietary analysis, which is crucial to determining whether the program is effective. As mentioned above, careful recording of non-target bycatch should be continued.

An investigation of the feasibility of using live capture techniques other than gillnets in the bottleneck area for predator control should be explored. This may have the advantage of not only live release of kokanee and others, but also allow biological sampling and fish marking. See www.doorcountywhitefish.com/content/11024.

[199001800](#) - Lake Roosevelt Rainbow Trout Habitat and Passage Improvement

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria

Comment:

The sponsors were responsive to ISRP review comments and have provided reasonable and clear explanations and adjustments to their plans that incorporate evaluations.

The ISRP is pleased that the sponsors decided to carry out habitat effectiveness monitoring as a part of their project. Although the monitoring and evaluation (M&E) component will reduce the number of restoration projects that the sponsors may implement, we feel that this effort will be worthwhile for determining whether the habitat enhancement actions have succeeded in improving habitat conditions.

It is unfortunate that limited funding does not directly allow status and trends monitoring as well. Although the sponsors did not provide much detail about the design of the monitoring plan and metrics, which is understandable given the time frame for preparation of the response, the thoughtful and systematic way the habitat improvement project was designed gives the ISRP every reason to believe the sponsors will develop a scientifically valid design for effectiveness monitoring. The response did provide adequate information on the habitat M&E plan for representative sites.

The plan provides evidence of coordination with the Tribal fish M&E program, and details were given of the evaluation that the monitoring project provides. The sponsors will work closely with the Colville Tribe's RM&E efforts to assess effectiveness of habitat enhancement actions, coordinating with Project 200810900 (Resident Fish Research, Monitoring, and Evaluation [RM&E]). This project will undertake status and trends monitoring of juvenile and adult rainbow trout. Nonetheless, the sponsors expressed some uncertainty about whether information obtained from the fish monitoring project can be used in conjunction with habitat monitoring information to determine whether habitat enhancement is benefiting fish, an important consideration since the primary purpose of the habitat work is to improve fish populations. Both are very fine projects, but at this point there seems to be little functional relationship between them. The ISRP encourages the sponsors of both projects to work together to determine how fish and habitat sampling can be coordinated to address the critical question of whether habitat enhancement is benefiting focal species. Both projects also need to focus on the unraveling of resident trout life history and recruitment mechanisms, as well as life-history-based limits to production, to assure (i.e., experimentally test) that these limits will be adequately addressed with rehabilitations. See the programmatic comments on life history research needs.

6. Lake Roosevelt White Sturgeon and Burbot

200811600 - White Sturgeon Enhancement

Sponsor: Colville Confederated Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. For the predation and food web components of the project, the sponsor needs to identify and hire the subcontractor, identify qualified staffing additions to conduct the work, and develop detailed methodologies, including the starvation approach. The ISRP should review the specific objectives and methodologies prior to implementation.
2. The sponsor needs to develop a plausible rebuilding schedule for the stock with production and cohort/age structure goals during contracting. Similar work by other entities, including the Kootenai Tribe, should be reviewed for applicability.
3. High quality annual reports need to be completed and updated.

Comment:

The sponsor's response was very informative. It included a detailed description of how this project relates to and coordinates with project #199502700, and several detailed diagrams indicating project functions and roles for all significant tasks. It also included likely approaches and methods for several of the tasks to be performed by subcontractors including physical mapping/modeling and contaminant monitoring.

The sponsors provided reasonable justification for subcontractors and identified subcontractors when possible at this time. Although no final contractors have been selected, the list of those to be invited includes highly qualified entities. The sponsors have assembled the specifications for approaches and methodologies for the RFPs which indicate many of the detailed methods to be used. However, some methodologies cannot be identified or developed until the subcontractors are hired. The sponsors should provide information about the subcontractor who is conducting the work and what specific methods will be used. At that point the ISRP wishes to review the specific objectives and methods.

The sponsors previously described, and in the response clearly stated, the trial approach of the broadband sonar work for sturgeon.

[199502700](#) - Lake Roosevelt Sturgeon Recovery

Sponsor: Spokane Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. For the predation and food web components of the project, the sponsor needs to identify and hire the subcontractor, identify qualified staffing additions to conduct the work, and develop detailed methodologies, including the starvation approach. The ISRP should review the specific objectives and methodologies prior to implementation.
2. The sponsor needs to develop a plausible rebuilding schedule for the stock with production and cohort/age structure goals during contracting. Similar work by other entities, including the Kootenai Tribe, should be reviewed for applicability.
3. High quality annual reports need to be completed and updated.

Comment:

Most of the responses to ISRP questions were adequate. Positive responses from the sponsors included summary updates for project results (2009-2011) and a description of expertise and roles of existing project personnel.

The sponsors provided detailed information, including a good diagram, of how this project relates to and coordinates with project #200811600. It has now been made clearer to the ISRP which entities are leading the work in various areas.

The ISRP had requested additional information on criteria for identifying stock rebuilding. However, no additional information was provided. The objective is simply to stock plenty of fish, and if it turns out to be too many, fish can be thinned through harvest. This is one approach, but a more plausible scientifically-based rebuilding schedule needs to be formulated.

The ISRP requested more detailed methods and approaches for several tasks outlined in the proposal, including methods for determining (1) if predation on juvenile sturgeon was cause for recruitment failure and (2) if lack of proper food was the cause of starvation and recruitment failure. These were not included in the response. Instead, the sponsor's response was *"The LRSRP appreciates that the ISRP recognizes the complexity of the recruitment failure issue in the transboundary reach and the difficulties associated with identifying the limiting factors. The LRSRP recognizes the importance of designing detailed study approaches in order to objectively answer recruitment failure questions. The LRSRP plans to retain a subcontractor with appropriate expertise to assist with study design including detailed methods and implementation of the predation and food habits components of this project. The completion of this work is contingent upon funding."*

The sponsor stated that it plans to hire a subcontractor when funded to assist with study design and methodology involving predation and food web components of the project. A specific subcontractor was not identified in the proposal. It is highly desirable for a scientific proposal to identify key individuals or groups that would be responsible for such a major contribution to the study, to indicate that they had been contacted, and for them to perhaps provide some indication of hypotheses and appropriate methodologies used to test the hypotheses.

[200737200](#) - Lake Roosevelt Sturgeon Hatchery

Sponsor: Spokane Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. Step 1 of the Step Review should include a full description of the actual and projected production capacity, including Sherman Creek Hatchery.
2. Revisit the need for additional white sturgeon rearing capacity after the genetic analyses are completed in the summer of 2012. The ISRP will review as part of the Step Review Process.

Comment:

Although the sponsors have clearly demonstrated the recruitment limitations affecting white sturgeon in this river reach, they have not provided any further scientific justification for the initiation of a Three-Step Review. They note that: *"the first step of the process includes a feasibility study component that includes a comprehensive evaluation of existing facilities, (including Sherman Creek Hatchery), to determine if renovation of an existing facility will meet our needs, or if a new facility must be built."* Existing information provided to the ISRP did not yet clearly indicate the need for additional hatchery capacity beyond the existing capacity.

The sponsors indicate that *"Sherman Creek Hatchery is currently meeting our aquaculture needs on an interim basis to support larval sturgeon rearing and to assist the upper Columbia/Lake Roosevelt fisheries co-managers in meeting goals to preserve and protect white sturgeon...Sherman Creek Hatchery has adequate space and production amenities to support current interim hatchery operations."* They appropriately note that *conservation aquaculture facility needs may change* and that *"identifying a dedicated facility that better meets evolving needs may become critical to meeting white sturgeon recovery goals,"* and that *"recruitment failure hypotheses testing research and hatchery monitoring could potentially impact aquaculture production needs in the near future (within the 5 year funding cycle)."* They note that *"The ultimate goal of the LRWSCH 3-Step Project is not to specifically increase current production of white sturgeon, but to ensure the availability of an adequate aquaculture rearing*

facility in the long-term, as well as support potential changes to production goals in the near-term.” No information, however preliminary, is provided on how existing capacity would be inadequate to meet stocking goals, or what those preliminary goals might be as they relate to the need for a new hatchery. No basic numerical information is provided for the ISRP to understand how the need for a hatchery is present or imminent. This sort of information is requested in Step 1.

Because of the uncompleted state of the revised White Sturgeon Recovery Plan (outside the control of the sponsors), it is also difficult to determine how critical a proposed hatchery is to meet recovery goals and specific production objectives at a larger scale. It remains unclear how this work is coordinated with WDFW Sherman Hatchery experimental work and the Colville Tribes. For a Step review, demonstration of agreement and integration among the various entities on management and restoration of Lake Roosevelt sturgeon should be presented. The current production at Sherman Creek, to be part of the Fish and Wildlife Program, also needs to be part of the Step Review and Master Plan development.

[200811500](#) - Lake Roosevelt Burbot Population Assessment

Sponsor: Colville Confederated Tribes

ISRP recommendation: Meets Scientific Review Criteria - In Part

Qualifications:

In Part - The full proposal is not yet justified. Deliverable 1 should proceed. Previous and ongoing burbot data collection in Lake Roosevelt from WDFW Fall Walleye Index Netting (FWIN) should be fully examined and analyzed to determine if it is adequate for evaluating the status of burbot before exerting significant additional sampling effort in the lake. Evaluation based on Deliverable 1 should be used to design field sampling efforts, if needed, beyond existing efforts as a means to meet project goals. The ISRP should review a subsequent revised proposal that builds on results from Deliverable 1. The design should consider other ISRP comments noted below.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Significance to Regional Programs: The sponsor refers to several regional programs, including the Spokane Subbasin plan, the Columbia River Basin Research Plan, the Lake Roosevelt Guiding Document, MERR, and the NPPC Fish and Wildlife Program 2009. The declining status of burbot in many southerly portions of their range is a valid concern to resident fish managers.

Technical Background: The proposal provides decent technical background information on sampling and status of burbot, although additional gray literature might be available on burbot sampling.

Key information involving the ultimate goal of the proposal was missing until the presentation by the sponsor. During the presentation, the sponsor noted that current harvest levels of burbot are low because fishing gear is now limited to hook and line since set lines were banned in 2006. No sport or subsistence catch data was provided. According to WDFW regulations, the daily bag limit for burbot is currently five fish, but the state also recommends that women of child bearing years and children not consume more than one meal of burbot per week because the fish are contaminated. The sponsor cited a 10-year old WDFW report suggesting the Lake Roosevelt burbot population was “healthy” based on stable electrofishing and catch per effort sampling. Given the reportedly low catch rates of burbot by fishermen and the apparent healthy status of the population, the ultimate goal of this project seems to be whether the population of burbot could withstand a higher harvest rate, possibly through changes in gear regulation. If so, this would be a potential benefit to subsistence and recreational anglers. If changing harvest and gear regulations is an ultimate goal of this effort, then metrics and benchmarks for making this decision should be developed.

Objectives: The goal is reasonable: a healthy and harvestable burbot population. The objective is reasonable: to monitor and facilitate management to achieve the goal. Specific target levels to define “healthy population” and harvest levels are needed.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

This is a new project so no accomplishments, adaptive management, or results.

However, the ISRP thought the sponsor should have analyzed the existing Fall Walleye Index Netting data (FWIN) prior to developing this proposal to conduct extensive field effort. Analysis of the existing FWIN data may be sufficient to evaluate status of burbot relative to previous sampling efforts (e.g., Bonar study), and this analysis could be used to inform the sampling design if it was determined that an extensive field effort was needed in addition to ongoing FWIN sampling and creel survey efforts.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project Relationships: The proposal described how this project was related to four other projects: Lake Roosevelt Data Collection Project, Kootenai River Resident Fish Mitigation, CCT Chief Joseph Kokanee, and CCT White Sturgeon Enhancement Project. Four BPA projects are listed that this project will coordinate with and share data.

Emerging limiting factors: Climate change, chemical contamination, and potential impacts by non-native predators are discussed.

Tailored questions: The sponsor addressed the PIT tag study to develop population estimates. They plan to tag and release all viable burbot, approximately 2200 fish per year based on assumptions. The sponsor notes that they do not know if the proposed sample size is adequate for estimating burbot population size, but they suggest this is not needed since the project is a pilot study. The ISRP notes that prior to the proposed field effort, the sponsor should examine “what if” scenarios to determine whether tagging of 1100 fish twice per year might be sufficient to detect population trends over time in this very large reservoir. Also, the sponsor should develop criteria for determining whether captured burbot are suitable for tag and release even though previous studies suggested mortality in trammel nets was low. Tagging of burbot that die from capture and tagging operations would significantly bias population estimates if not properly accounted for. The sponsor did describe how they would classify the health of burbot captured in traps. The sponsor notes that a biometrician would be consulted.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables are adequate.

The sponsor did a good job describing methods in MonitoringMethods.org. However, presenting methods on separate web pages makes it difficult to evaluate how the overall sampling program fits together.

Additional information on metrics should have been provided. Age and year class strength are key metrics when assessing population status of fishes, yet it was not clear how age of burbot captured in traps, trammel nets, or gillnets (FWIN) will be assessed and incorporated into the analysis. Burbot are relatively long-lived (up to ~15 years) and could be susceptible to high harvest rates. Each gear type will have its own selectivity for size and age of burbot; how will selectivity be evaluated?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The sponsor did a good job describing methods in MonitoringMethods.org. Estimates of growth will be based on recaptured burbot, but growth estimates may be few. Were other approaches considered and excluded for estimating growth?

7. *Coeur d'Alene Subbasin*

[199004400](#) - Coeur d'Alene Reservation Fisheries Habitat

Sponsor: Coeur d'Alene Tribe

ISRP recommendation: Meets Scientific Review Criteria

Comment:

This proposal is truly transformational from previous work by the Coeur d'Alene Tribe. They are taking the approach that subbasin planning envisioned. This is good solid work that needs to be published; some of the principal investigators have a record of this. The CDA Fisheries project is a model for an approach for the problem. Additional sampling work may allow investigators to find out some important aspects of native trout life histories. Some telemetry work will be informative. The ISRP compliments Angelo Vitale and John Firehammer for the clear presentations and for their efforts to combine wildlife and fisheries activities, in Benewah Creek as well as in the Hangman watershed.

Overall, this proposal represents excellent planning, analysis, synthesis, and progress toward the goal of restoring adfluvial westslope cutthroat trout to CDA Lake and its tributaries. The factors affecting these fish are many, ranging from large-scale landscape-level habitat processes to non-native species invasions. The investigators have done a very good job of studying each of these, or developing plans to do so, and integrating and prioritizing restoration actions to optimize management. Likewise, the outreach and education activities planned are helping local landowners understand and support the projects.

Several aspects of the analysis of cutthroat trout survival and production might be improved by using state-of-the-art methods and software (Program MARK), if these are not already planned. Likewise, further consideration of brook trout invasions at a riverscape scale could yield important insights in their control.

The proposal was very long (61 pages), which detracted from the review; however, many of the project findings were summarized in the proposal which is good. A number of appropriate metrics are being collected along with the habitat restoration effort, for example, adfluvial juveniles per spawner and juvenile-to-spawner survival rates. The ultimate success of the program for adfluvial trout may hinge on the ability to identify and control factors limiting survival from the juvenile-to-adult stage, such as predation by non-native fishes. The overall annual cost of the project is high relative to the eventual native fish population size, but the project is diverse with many activities and areas of focus.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

This is an ongoing project designed to address the highest priority objective in the Coeur d'Alene Subbasin: to protect and restore remaining stocks of native resident westslope cutthroat trout (*Oncorhynchus clarki lewisi*) to ensure their continued existence in the basin and provide harvestable surpluses of naturally reproducing adfluvial adult fish in Lake Coeur d'Alene and in Lake and Benewah creeks, with stable or increasing population trends for resident life history types in Evans and Alder creeks.

This is a well-designed and well-presented proposal that systematically documents linkages to regional planning documents such as the Coeur d'Alene Subbasin Plan, past ISAB and ISRP reviews and guiding documents, and to regional strategies for recovering tributary habitats. The investigators provide excellent and detailed information about how their project relates to the Fish and Wildlife Program, and seven other programs in the Columbia River Basin. The work is clearly well integrated with current plans.

Technical background in the proposal is thorough and systematic, leading logically to the proposed and ongoing objectives and actions. The proposal clearly states that the main goal is to increase production and survival of adfluvial and resident westslope cutthroat trout (WCT) to make up for lost production of anadromous salmonids. The technical background needed to understand the myriad factors that affect these WCT is almost always very well detailed. Some earlier proposals focused on using artificial production to increase westslope cutthroat trout in Benewah Creek and in Lake Coeur d'Alene without adequately considering and attempting to address limiting factors. In contrast, this proposal describes known and potential factors that appear to be inhibiting cutthroat trout production. These include sediment input from past land use practices along Benewah Creek, lack of coarse woody debris, barriers to fish movement and migrations, and competition with non-native brook trout.

Strategies, objectives, and actions flow logically from this discussion and analysis. The five stated main objectives appear sound, clear, and measurable, though several will be very challenging to accomplish because of the spatial scale over which WCT complete their life cycle in this stream-lake ecosystem. Objectives include improving stream habitat, reconnecting old floodplain meadow sections, evaluation of habitat restoration actions, and reduce brook trout abundance and densities. Objectives seem well matched to the discussion of limiting factors in the proposal. The project objectives are tiered to the Intermountain Province Objectives 2A1-2A4 and to the Columbia River Basin Goal 2A that addresses resident fish substitution for anadromous fish losses (Intermountain Province Subbasin Plan 2004). Project objectives are: 1) improve stream habitats; 2) track trends in salmonid demographics and population structure; 3) evaluate effectiveness of habitat restoration; 4) address impacts from non-native introduced fishes; and 5) increase cooperation and coordination among stakeholders.

Several emerging limiting factors, such as predation by non-native fishes, are objectives of the proposal. Other project objectives, such as increasing habitat complexity and connectivity, are well integrated to help ameliorate the impending changes in climate variability. No formal modeling was done, however, and would likely be premature.

The proposal also includes objectives for understanding the lacustrine portion of the adfluvial westslope cutthroat trout life history and the impact that non-native northern pike may be having on the survival of WSCT, particularly during their first year outmigration into the shallow southern littoral zone of Lake CDA where northern pike are abundant. This portion of the proposal seems the least well developed at this time; however, the approach and proposed actions are again, logical and deserving of investigation.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

History: The CDA approach to management of Benewah Creek and its cutthroat trout has evolved over time and now appears to be solidly grounded in modern ecological and restoration science. A fundamental goal of the Coeur d'Alene Tribe Fisheries Program is to identify restoration and enhancement needs and opportunities in areas that have the greatest potential to improve habitat and translate into positive biological responses to recover depressed native cutthroat trout populations.

The approach attempts to translate watershed analyses, resource inventories and assessments and monitoring results into the management actions needed to achieve project goals. The recent project history reflects a shift from opportunistic implementation of restoration projects to a more systematic approach for prioritizing management actions consistent with the refugia approach described by Reeves et al (1995) and Frissell and Bayles (1996) and a multispecies, analytical approach (Beechie and Bolton 1999). The approach attempts to protect the best first and expand restoration outward from areas of relatively intact habitats and populations. The multispecies analytical approach has been implemented as more detailed knowledge of factors limiting recovery have been developed. Actions focus on suites of landscape processes considered necessary to conserve multiple species.

Accomplishments: The ISRP was impressed by the careful formal planning and prioritization of restoration developed in this proposal. The investigators take a highly integrated approach to understand the historical habitat conditions, and ecosystem disturbances and processes that create and sustain habitat for WCT in this basin. They integrate knowledge of ecohydrology and channel-floodplain-riparian vegetation linkages in their work, which is uncommon. From this, they develop goals for instream habitat restoration that are in line with these natural processes, such as encouraging "ecosystem engineering" by beavers to create suitable habitat for WCT. All of this is a result of accomplishments in past data collection, analysis, and further research and synthesis based on these results, which appears to have been very well done, overall.

Second, it appears that the investigators have fairly recently realized that they will need a comprehensive mark-recapture program using PIT tags to develop robust estimates of production and survival of WCT by life stage, in order to understand which suite of factors are limiting their numbers and vital rates, and where in the river-lake system these bottlenecks occur. As such, we wondered whether employing a sophisticated tool like Program MARK would be most useful (see website of Dr. Gary White, Colorado State University), which can be used to estimate capture probabilities, abundance, survival, movement, and parameters like temporary emigration of fish using state-of-the-art analysis and testing methods.

Third, we were impressed with the approach the investigators are using to consider effects of non-native species at riverscape and lakescape scales. Clearly, like WCT, brook trout in streams also will use habitat in a spatially dynamic way, as will northern pike and smallmouth bass in CDA Lake. Understanding these dynamics may allow intercepting the non-native fish using traps or other gear at key locations where they spawn, or past which they move, leading to more cost-effective control methods in this situation where complete removal is likely impossible.

Results: This section features a nicely described logical sequence from restoration objectives (Table 1), moving through prioritizations (Table 2), into watershed functions and processes, which are tied to specific assessment techniques and procedures (Table 3). Tables 4 and 5 work through site-specific restoration actions and priorities. This is a very nice and defensible approach. For example, since 2004, 6.8 km of habitats have been made accessible through removal of passage barriers, 457 m of stream habitats have been treated with additions of coarse wood, and 6.2 km of degraded mainstem and tributary habitats and 20.3 hectares of associated floodplain have been treated through large-scale channel restoration. Although we have yet to see direct evidence of a significant response by cutthroat trout, we observed more pronounced positive trajectories in abundance in tributaries of Benewah Creek compared to the watersheds that have received less management intervention in recent years.

Investigators are working to understand the entire life history of adfluvial westslope cutthroat trout in Benewah and Lake creeks. Given that recent PIT-tag data suggest that adfluvial juvenile-to-spawner return rates are exceptionally low in their monitored systems, they are placing a stronger emphasis on understanding the processes and mechanisms that are impacting the suitability of rearing habitats in Lake Coeur d'Alene. As an initial step toward this management goal, a collaborative study with the University of Idaho is currently underway to better understand whether predation by northern pike and smallmouth bass is a predominant mechanism regulating juvenile in-lake survival rates.

It would be good to know what percentage of available degraded versus adequate habitat has been addressed by these activities since 2004, as a means to evaluate how far the effort has progressed. The collection of recruits per spawner (R/S) data and the change in objectives based on the low survival of juvenile to adult stage is good. The proposal has embraced the

ISAB recommendation to use an Intensive Watershed Management approach, which involves use of treatment control sites to better identify factors affecting the resident fish.

Adaptive Management: This project is well conceived and appears well executed. It is rich in data slides and tables, which demonstrate results from the last 7 years that feed directly into the adaptive management section. The changes made in light of new information were clearly described, including 1) developing a new understanding about how stream-riparian habitat is formed and inundated during floods, 2) adjusting removal strategies for non-native brook trout to account for their patchy distribution and vulnerability in spawning habitat, and 3) developing a new study to address potential for non-native fishes in Lake CDA to be an important limiting factor. The proposal and study are grounded in fisheries, conservation, and stream restoration literature and emphasizes data collection through monitoring in order to evaluate progress and modify, if needed, project goals and actions. This is the essence of adaptive management.

Response to past ISRP and Council comments and recommendations: The authors have apparently responded to a main comment about the potential for non-native fishes in CDA Lake to reduce WCT survival. The goal of testing these effects, in part through a graduate student project, and the actions proposed based on these findings including developing new hypotheses, were clearly laid out and logical. The authors have also paid close attention to ISRP and ISAB studies and recommendations about habitat restoration, landscape and watershed scale activities, and the role of monitoring in adaptive management as evidenced by the proposal itself.

ISRP Retrospective Evaluation of Results

The CDA approach to management of Benewah Creek and its cutthroat trout has evolved over time and now appears to be solidly grounded in modern ecological and restoration science. The CDA Fisheries Habitat Project has considerable monitoring, evaluation and reporting associated with it. Results show progress toward overall project goals. The system in place also sets the stage well for the use of adaptive management. A fundamental goal of the Coeur d'Alene Tribe Fisheries Program is to identify restoration and enhancement needs and opportunities in areas that have the greatest potential to improve habitat and translate into positive biological responses to recover depressed native cutthroat trout populations.

The approach attempts to translate watershed analyses, resource inventories and assessments and monitoring results into the management actions needed to achieve project goals. The recent project history reflects a shift from opportunistic implementation of restoration projects to a more systematic approach for prioritizing management actions consistent with a refugia approach and a multispecies, analytical approach.

The approach first protects the best then expands restoration outward into other habitats and populations. Actions are focused on suites of landscape processes considered necessary to conserve multiple species.

The project shows evidence of careful formal planning and prioritization of restoration activities using an integrated approach to understand the historical habitat conditions, and ecosystem disturbances and processes that create and sustain habitat for WCT in this basin. All of this is a result of accomplishments in past data collection, analysis, and further research and synthesis based on these results, which appears to have been very well done, overall.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Very well done, as described above. The Additional Relationships described in the proposal show that this project is well integrated into other mitigation and watershed projects, leading to synergistic and "value added" effects of coordination among projects. With respect to limiting factors, the sponsors recognize the importance of the low survival of the adfluvial juvenile to adult stage and are attempting to identify factors such as predation in the lake. Predation may constrain population increase.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverable Description: The deliverables were clearly laid out, overall. Those most clear were for 1) Habitat restoration, 3A&B) Responses to habitat restoration, 4) Non-native species control, and 5) Community outreach and education. The deliverables associated with 2) Abundance and production of WCT were less clear in some cases and might be expanded or considered further as outlined below. The project's recent (2005-present) deliverable status has an average completion rate of 94% (170 of 180 deliverables). Incomplete deliverables have generally been carried forward into subsequent contracts and have been completed in nearly all instances.

Study Design: The study design was quite comprehensive, sophisticated, and well planned overall. We were very impressed with how well integrated the many components were. Specific points to consider that might improve the study results are:

A. As described above, estimates of spawner abundance, juvenile production, survival in the lake, juvenile abundance, survival rates in streams, and movements among habitat types might be more fully integrated using a design that could be analyzed in Program MARK as one large integrated analysis. In fact, data from two systems (Benawah Creek and Lake Creek) might be analyzed together, even if processes differ between them, and allow data to be "shared" across systems, increasing power to detect important effects (see Saunders et al. 2011 NAJFM for such an analysis of stream trout abundance estimates).

B. We were unclear about whether rainbow trout are native in this watershed, and if not, what the status of rainbow trout invasion is. Could climate change potentially trigger new invasions? Work by Clint Muhlfeld in Glacier National Park seems to be showing the potential danger of such invasions, and how management might be used to reduce them.

C. Untreated controls are very useful, but it is not clear that they were selected at random. This is very difficult in such a large-scale study. However, one should describe how they were selected, how potential bias was reduced, and acknowledge that the comparison is useful but not a true treatment-control comparison. Several books like those by Brian Manly may help couch these comparisons in appropriate terms.

D. We had some concerns about the use of single-pass electrofishing to estimate CPUE across stream sites. The deliverable is:

DELV-2D: Indices of cutthroat trout abundance in stream reaches: Indices of cutthroat trout abundance in tributary and mainstem habitats in Lake, Benewah, Alder, and Evans creek watersheds will be annually computed employing single pass electroshocking at established 200 ft index sites. These annually computed indices will be used to track trends in cutthroat trout abundance at various spatial scales within watersheds, and to evaluate changes in the spatial distribution of cutthroat trout within mainstem and tributary reaches.

The authors justify the use of single-pass sampling based on a high correlation between the number of WCT captured on the first pass and the number of marked fish released the previous day after one-pass sampling. They state that the number estimated the second day from multiple-pass sampling underestimated the "true abundance" of marked fish released, and that this is likely due to biases inherent in depletion sampling described in two papers (Peterson et al. 2004; Rosenberger and Dunham 2005).

Given that no block nets were used to enclose the marked fish, might the lower number estimated the second day be at least partly due to emigration of marked fish after their release the first day? Saunders et al. (2011, NAJFM) showed that depletion estimates can be accurate, based on a similar study design using fences, and a more complete analysis.

More importantly, the use of single-pass estimates as CPUE rests on the critical assumption that capture probabilities are equal across sites, years, and different crews, which may not be strictly true, or even similar. Thus, if single-pass estimates are to be used to reduce work load and therefore increase the spatial distribution of sampling, which is a good thing in this case, then it would seem wise to validate these capture probabilities on a systematic or probabilistic design. Otherwise, a large amount of data will likely not stand the rigors of scientific review, and hence conclusions could be discounted by others.

One practical point is that it appears that this deliverable currently requires only about 3% of the total funding for the project. Therefore, if the data to be generated are considered critical to the decisions made, then more funding and emphasis could be placed on generating estimates that can stand the rigor of review.

E. Under Deliverable 2E, we wondered whether analysis of age from scales could underestimate true ages. If so, it seems wise to validate these ages for a subsample of fishes using otoliths. Again, conclusions should rest on data that have been validated. In high-altitude streams, cutthroat trout may not grow enough the first year to create an annulus, for example. Likewise, older fish may resorb edges of scales, making annuli difficult to distinguish, and also leading to underestimates.

F. The Priority rankings in Table 6 are identical to the Management Sensitivity rankings, so it was unclear what new information is gained beyond this? Neither fish abundance nor wood abundance seems to influence priority.

G. In Table 7, it was unclear on what estimator these abundance estimates are based, and what is the level of confidence for the interval?

H. Is visibility sufficient to use snorkeling to determine whether WCT are using deep restored pools during summer?

I. We agree that an important hypothesis to test is whether adfluvial CT life histories can resist BK invasion better than isolated resident ones. If the study can be designed to measure this, the results would be very important, and should be published.

J. Along with the ideas being considered for control of brook trout, would it be cost effective to run several weirs to intercept moving brook trout, which tend to move as runoff is coming down, and for spawning (see Gowan and Fausch 1996 and Peterson and Fausch 2003, both in CJFAS)?

K. As support for increasing the complexity and resiliency of habitats to ameliorate climate change, and the potential for brook trout to be influenced more strongly than WCT, see the new paper by Wenger et al. (2011; Proceedings National Academy of Sciences). These findings are reported there.

4a. Specific comments on protocols and methods described in MonitoringMethods.org:

See comments above.

[200702400](#) - Coeur d'Alene Trout Ponds

Sponsor: Coeur d'Alene Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. The sponsors should develop a creel census monitoring program as part of contracting. Please see comments for further suggestions.

2. Although the pond systems are sufficiently isolated from other water bodies that the probability of escapes is low, the ISRP is still concerned that the 95% sterility rates on the planted triploid fish leaves the potential for many viable fish that could produce in the wild and interact with native fish. The project sponsors should be on the watch for escape and the potential for introgression. Planning for this could be done through a risk assessment. See the programmatic comments on resident fish "master plans" and see the ISAB's Non-native Impacts Report's section on risk assessment ([ISAB 2008-4](#), Page 45). Plans for evaluating escapement and an assessment of the potential for introgression should be presented and justified during contracting.

Comment:

Creel Census. The project sponsors should consider alternative creel census approaches to the proposed approach and attempt to get data on all three ponds, rather than just one. There may be benefits to a plan with tribal representatives/biologists conducting the creel census and interacting with the public. The project sponsors can get help through the Fish and Wildlife Program to develop a creel census as was done through the Lake Rufus Woods project with assistance from John Skalski. They also can confer with the Nez Perce Tribe on how they are monitoring their trout ponds.

The use of a remote camera to measure angler visits is interesting but might be perceived as too intrusive. Its use includes both social and scientific issues that would need to be addressed by the project sponsors. Also, based on reviewers' experience, analysis of the digital tapes still requires many hours of post-processing time. In addition, it is not clear that data on how many fish were kept, or their sizes, could be measured from these tapes. Nevertheless, it could answer questions about angler use, at least for one pond.

Sterility of stocked fish. The sponsor's response on sterility of triploid fish is useful to aid in understanding, although not fully satisfying. One in 20 fish is perhaps not sterile, and only a few are needed to breed elsewhere and start a new population. The cost of eradicating this invading population in the future would be very large, and large enough to call for expensive measures to prevent fish from escaping. The fact that other agencies are doing the same thing

is not a good reason, although it is clear that escapes from private ponds are a much larger problem.

It seems clear that additional ponds could be used to offer more opportunities to more anglers, if the risk of release of reproductively viable fish could be addressed.

8. Spokane Subbasin

[200103300](#) - Hangman Creek Wildlife Restoration

Sponsor: Coeur d'Alene Tribe

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The proposal contains good background information and is well prepared. The project has identified priority habitats and activities. The sponsors have responded to previous ISRP concerns. This is a long-term project the sponsors have provided good results from the initial work. The sponsors are purchasing properties with Avista mitigation money from Albeni Falls, encouraging beaver activity and learning from work in John Day, Coeur d'Alene, and Colorado. One question remains: Is the intent to rebuild resident populations for Tribal harvest or for conservation purposes only?

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Recovery of redband trout is clearly an appropriate restoration priority, and the efforts implemented under this project to date have been focused in areas that are high priority for these fish in the Hangman Creek watershed. The existing project sites are in riparian areas with potential to contribute to groundwater recharge and located near existing populations of redband trout. This project is designed to address landscape issues that limit base flow at the streams in the project area and is responsible for landscape restoration as a precursor to the work done in stream and near stream to establish a redband trout fishery. This project was submitted in conjunction with 200103200 which studies instream fish habitats in the same area. The project focuses on increasing base stream flows by obtaining access to land in several ways, such as, land acquisition, conservation easements, leases and landowner agreements. This project provides dual benefits, (1) credits against HU ledger of wildlife habitat lost from Albeni Falls Dam, and (2) crucial habitat for redband trout (NPCC established a resident fish substitution policy in areas blocked from anadromous fish passage).

Once restored, stream channels within the mitigation property will expand the isolated redband population in Sheep Creek and increase the probability of that population's interactions with the other isolated populations of the Upper Hangman Watershed. This Project will focus on monitoring changes in ground water and provide funding for stream flow monitoring.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The project history was described in detail. Restoration efforts target the impaired aquatic and riparian ecosystem processes supported by several citations in a previous limiting factor analysis which included hydraulic modeling. High stream temperatures documented (2004-2007), along with low summer flows, high sediment levels and inadequate DO yielded suboptimal rearing conditions for fish. A genetic analysis of isolated redband trout populations in the project area showed a cohesive group and suggests that historically there was movement among subpopulations in the area. Genetic information now suggests that either substantial inbreeding has occurred or each subpopulation experienced a recent genetic bottleneck. Collectively, results suggest increasing connectivity of tributary subpopulations would promote a more robust and resilient population structure. Also, redband trout are relatively pure in spite of rainbow trout introduced regularly in the Spokane River (1933-2002).

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

This project is closely related to 200103200 which is the CDA Fisheries Enhancement for the same project area. The ISEMP Bridge Creek Watershed Study provided the direction for addressing large-scale landscape issues associated with entrenched stream channels and low base flows. From 2004 to 2007, high stream temperatures during the spawning/incubation period of early summer (Figure 4) and low flows (e.g., isolated pools and dewatered reaches) coupled with inadequate dissolved oxygen levels (i.e., < 7 mg/L) during summer base flow periods presented suboptimal rearing conditions for redband trout in the lower elevational portions of the Project Area that are heavily impacted by agriculture. These findings join a growing body of evidence that indicate the ubiquitous distribution of the low base flows, lack of oxygen, high summer stream temperatures and high sediment loads in the larger, lower elevation streams of the Project Area have relegated the remnant populations of native redband trout to the isolated, higher elevation, forested stream reaches of the Project Area.

The sponsors also recognized issues involving climate change on ground water tables and noxious weeds. They suggest that restoration of natural vegetation along the riparian zone will help offset these issues. A noxious weed issue has been identified in the agricultural lands associated with native vegetation planting, and control measures, including mowing, burning, and herbicides are being evaluated. In addition to the riparian habitat work, they are assisting the beavers with their dams by providing materials suitable for dam construction.

4. Deliverables, Work Elements, Metrics, and Methods

Four deliverables were mentioned: (1) Access to priority habitats: some priority land has been acquired, with more needed, (2) Riparian/Floodplain Management: decommissioned artificial drainage networks in the agricultural, (3) Create beaver dams that withstand high flows and

persist and (4) Develop indices indicating increase in duration of shallow groundwater storage in flood. Initially, three 40 foot wells were established in 2006 at confluence of Hangman and Sheep Creek where water depth did not vary from year to year. Regarding beaver dams, 82 small dams were found in a 2009 survey, and with improvement of dam material, they believe the dams can store considerably more water for the project. Storing water in the area is believed to be a critically important component of achieving restoration goals, and the ISRP agrees. The ongoing project only completed 71% of the contract deliverables, but many of these failures were due to quarterly reports. Annual reports have been on time.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

Data collected for this project is limited because the fish and aquatic habitat RME work is covered in a different project (200103200). But project relationships are clearly described. Data collected for this project includes the success of the establishment of native vegetation planted, beaver dam surveys, and the evaluation of shallow groundwater level at 2-week intervals in 18 shallow wells. Interesting data from these wells was provided in the proposal to illustrate baseline patterns of groundwater loss during summer. A USGS gauging station and several others are used to monitor surface flow.

The past ISRP review had concerns about "ongoing pattern of climate and stream flow" not being addressed. The response to this concern was "groundwater modeling" completed in 2007 that demonstrated drain tile removal would assist in maintaining base flows. Also, studies suggest that watershed changes could be brought about with construction and maintenance of beaver dams that would rebuild floodplain connectivity.

Earlier, the ISRP had concerns about explaining the difference between this project and the associated fisheries project. The sponsors responded that this project involves landscape level issues that limit in stream fish habitat dealing with agricultural methods, management rights, riparian management, and terrestrial habitat restoration. Other information regarding M&E is covered in the fisheries project.

[200103200](#) - Coeur d'Alene Fisheries Enhancement-Hangman Creek

Sponsor: Coeur d'Alene Tribe

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

In the Council's decision and BPA contracting process for developing a final statement of work the sponsors should:

1. develop a better design for using the data generated from PIT tags along the lines of the suggestions made in the ISRP comments.
2. consider alternative ways to collect spatially extensive data on rearing juveniles, perhaps using occupancy sampling.

Comment:

The sponsors prepared a comprehensive, well-written proposal that addresses important issues involving restoration of fluvial and resident redband trout populations and their habitat in the Hangman Creek area of the Spokane subbasin. The sponsors demonstrate that they have good knowledge of the watershed and they have conducted sufficient studies that enable prioritization of ongoing efforts. These studies indicate the benefits of working with beaver to achieve desired stream habitat conditions, such as deeper, cooler pools. The project compliments a habitat acquisition project that also attempts to improve ground water and stream flow conditions.

The proposal uses a whole-systems approach to address migration barriers such as habitat forming processes including floods, LWD recruitment, and floodplain connections, as well as water temperature, and sedimentation. Pilot data have been collected to show where the work needs to be done. Migrant traps, PIT tags, and antenna arrays will provide important data about the life histories of these potentially mobile trout and could also provide useful data on their abundance, survival, and movement probabilities.

In order to make the most of the substantial investment in PIT tags, traps, antennas, and electrofishing surveys, we suggest that the sponsor consider integrating all of these into a comprehensive design and analysis using Program MARK. This would allow robust estimates of detection probabilities, survival, movement, and abundance, and the uncertainty in these parameters. In turn, this would provide a solid basis for future management. It may also be possible to develop a better method of less intensive "occupancy" sampling, which would allow better understanding of distribution of fish over larger areas using less effort in the field.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Significance to Regional Programs: The investigators provide a clear statement for why the work is significant to regional programs.

Background: Overall, the proposal gives very good background information about the ecology of redband trout and the problems with habitat that are perceived to be the main limiting factors. The information was well integrated throughout the proposal.

Objectives: The investigators propose several actions to address the main limiting factors for the fluvial and resident redband trout in the Hangman Creek basin, which apparently have migratory life histories and use tributaries for spawning and rearing.

Overall, the objectives are a useful mix of short-term strategies such as LWD installation and long-term strategies such as aggrading channels by encouraging beavers to build dams to improve habitat for a wide-ranging species like fluvial redband trout. The objectives also involve monitoring to determine the response of redband trout to the habitat restoration activities.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Major Accomplishments: To date, it appears that the investigators have made a good start at improving habitat conditions for redband trout throughout the basin.

Response to past ISRP and Council comments and recommendations: The investigators are interested in measuring spatial distribution, abundance, and vital rates of 1) the redband trout rearing in tributaries and 2) the adults migrating into tributaries to spawn. However, they report not having sufficient time to conduct multi-pass electrofishing to achieve #1.

Given that fish will be marked using PIT tags in both migrant traps and during tributary surveys, this project might benefit by integrating all of these results using Program MARK (see web page of Dr. Gary White, Colorado State University), which the Hangman Project Team has considered. This highly flexible analysis program would allow estimates of abundance, survival, and movement among tributaries, as well as "temporary emigration" of fish from tributaries which they may not visit every year. It allows using "model selection and inference" to test treatment-control effects as well as trends through time. Overall, it would likely allow much more robust inference than could be achieved with the current analysis protocol.

Secondly, if one-pass sampling is to be useful for measuring CPUE indices of abundance, then capture probabilities should be either always high, or at least very similar across years, reaches, and crews. This may not be the case and cannot be supported unless data are collected to test it. The Project Team should consider using previous multi-pass data collected in the watershed (Table 6) to validate capture probabilities when changing to a one-pass approach that is

appropriately randomized and stratified across sites or of different size and complexity. Otherwise, it might be better to develop an "occupancy sampling" approach where a less intensive sampling protocol could be developed to place fish abundance into, say, four categories of high, moderate, low, and absent. This would allow a wide spatial distribution of sampling, to determine habitats that fish are using seasonally. Analysis tools for these methods are also included in MARK. Regional experts who might be able to help develop these methods include Dr. Paul Lukacs at U of MT, and Drs. Gary White, Kevin Bestgen, Larissa Bailey, Bill Kendall, and Paul Doherty at Colorado State University, and Dr. Jim Peterson at Oregon State University (Coop Unit).

Adaptive management: The investigators appear to have made good choices to adapt their management to key uncertainties in riparian planting survival and the role of beavers in improving floodplain and instream habitat.

ISRP Retrospective Evaluation of Results

The Coeur d'Alene Tribe has acquired much of the land surrounding the Hangman Creek watershed. These acquisitions significantly facilitate the habitat restoration and redband trout population recovery activities. Previous assessments conducted by this project identified factors that may be most limiting to redband trout recovery, and identified reaches where these factors predominate across the southern section of the upper Hangman watershed so that restoration actions can be prioritized. Within the mainstem of Hangman Creek, the results of modeling indicated that the most effective method to increase suitable habitats for redband trout would be to improve rearing temperatures by increasing the amount of stream shading. Further, the sponsor identified the mainstem of Hangman Creek to be a restoration priority given that these reaches likely provide the potential to serve as both critical rearing habitat, such as overwintering, and as migratory corridors that would increase population connectivity. Results from watershed assessments indicate that increasing the quantity of usable physical habitat for redband trout in tributaries would be best accomplished by increasing pool depth. Based on earlier findings, the project proposed to accelerate the trajectory for recovering habitat by utilizing restoration approaches that emulate the ecosystem engineering effects of beaver and enhancing the stability of natural dams or pool habitat where they exist in the watershed.

The sponsor has adaptively managed the restoration project. The initial poor results for survival of riparian plants during 2005-7 forced the project to evaluate and adapt the methods to both the limited financial resources available and the conditions in the watershed. Major channel reconstruction was originally considered as a restoration alternative for several mainstem reaches in the upper Hangman watershed. However, this approach was deemed largely infeasible due to the costs. The project is now using beaver as a means to improve stream conditions, and recent evidence indicates beaver activities are helping the sponsors achieve

their objectives. The sponsor has implemented an interesting and beneficial habitat and redband trout restoration plan. Project elements are in place to document implementation effectiveness in the coming years. As described in the ISRP retrospective report (ISRP 2011-25), the full benefits of habitat restoration activities such as these will require many years.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The project complements an associated restoration effort that acquires land for protection and restoration and improves groundwater and instream flow conditions. The main emerging limiting factor of climate change, causing increased temperature, decreased baseflows, and more variable flow and temperature conditions, would be ameliorated by the proposed habitat work.

4. Deliverables, Work Elements, Metrics, and Methods

The project's deliverable status has an average completion rate of 82% (132 of 161 deliverables). Annual report writing accounts for 10 of the total 29 incomplete deliverables. Most of these report deliverables are expected to be complete by early 2012. The information provided to date has been very good.

The investigators seem well positioned to make good progress on increasing LWD, and its recruitment over the long term, to increase deep pools and aggrade channels to provide floodplain connections. Likewise, they have completed pilot work to improve methods of riparian plantings that will provide shade and materials for beavers to build dams. However, it was unclear whether any of these stream segments are subject to cattle grazing, and whether this could also be a limiting factor.

Several fish migration barriers have been removed, and two are slated to be retrofit, but two more will remain. Are there no plans for these remaining two barriers? This is a concern since one poorly-located barrier could potentially disrupt access to habitat for fish from throughout much of the important stream segments.

As described above, one-pass estimates of trout abundance for assessing trends in CPUE through time will not withstand scientific review, and so will not be useful to support management, unless they are validated. Likewise, ageing fish with scales will likely not be useful unless these are also validated against otoliths over the range of sizes and years collected. Scales may underestimate age, especially if YOY trout do not lay down an annulus especially in cold reaches or adults live long but grow relatively slowly in later years so that scales are resorbed each year at the margin.

The staircase design looks suitable and appears to incorporate a number of random effects for time and site. It is important that appropriate error structures be tested for this mixed effects model, to ensure robust inference.

Temperature loggers are apparently in place only March to October, but winter conditions can be as important as summer for fish. Temperatures during winter can be very useful measures of groundwater inflow, since pools without it can freeze, potentially to the bottom in harsh winters. Monitoring temperatures year round is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The sponsors developed seven protocols and about 40 methods within these protocols, and documented these in MonitoringMethods.org. The descriptions were very good. The sponsor probably spent considerable time developing text for this web site. However, the ISRP did not find it useful for this proposal review to have methods split into many separate web pages. The continuity of what the project was trying to do was lost when it was split into many separate sections.

9. Pend Oreille Subbasin

[199404700](#) - Lake Pend Oreille Kokanee Mitigation

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation (response review): Meets Scientific Review Criteria

Comment:

The response was very thorough and well organized. Each issue raised in the previous ISRP review was explicitly addressed. The additional information on previous studies that have been conducted as part of the effort to restore the focal fish species in Lake Pend Oreille was especially helpful in clarifying the questions raised by the ISRP in the previous review.

The ISRP agrees that working in this large natural lake poses many difficult challenges, but the responses indicate that IDFG is making a good faith effort to incorporate the latest information into their studies and have enlisted the help of very qualified specialists. The ISRP appreciates that additional details about the results of previous investigations have been incorporated into the proposal. Links to annual reports and other reports summarizing data are useful, but they do add to the difficulty of assessing scientific merit when a link must be followed. Where possible, concise summaries of main findings, in addition to the links, are very much appreciated and make the review process more efficient. We also appreciate that the field methods pertaining to this study in [Monitoringmethods.org](#) have been reclassified so that details are now accessible.

Overall, the ISRP is satisfied that this project will continue to generate useful data on the management of Lake Pend Oreille and its fisheries, and are confident that the sponsors have thought carefully about addressing these issues in this complex lentic ecosystem.

ISRP Retrospective Evaluation of Results

The Lake Pend Oreille Kokanee Mitigation project is a good example of a study where project staff has done an excellent job of seeking outside assistance in tackling a very tough scientific problem. While the project title suggests that it focuses on kokanee, it is clear that the project's scope has broadened to other fishes as well as the limnological dynamics of the Pend Oreille ecosystem itself. This project is almost 20 years old, and a publication summarizing what has been learned over the last two decades would be a valuable contribution, as well as useful in informing fishery managers in other large lake systems.

[200714900](#) - Non-Native fish Suppression in Graham Creek

Sponsor: Kalispel Tribe

ISRP recommendation: Meets Scientific Review Criteria - In Part (Qualified)

Qualifications:

The sponsors are to be commended for undertaking the difficult but necessary task of suppressing non-native species in the Pend Oreille basin. Their success so far, particularly in suppressing brook trout in tributary streams, is encouraging. The ISRP fully support their effort to control brook trout populations and northern pike in Box Canyon reservoir. Despite a serious effort, little success has been demonstrated in suppressing lake trout in Upper Priest Lake. The ISRP does not believe that continuation of this component of the project is justified.

In Part: Objective 3, "Maintain stable or reduced lake trout numbers" and Deliverable 3 do not meet scientific criteria. Based on the apparent lack of success of past efforts to decrease lake trout and increase bull trout abundance, and the problems posed by recreational activities to trapping lake trout in the Thorofare, success of future efforts is highly uncertain.

Qualification: A report on progress in northern pike suppression in Box Canyon reservoir should be provided to the ISRP for review in three years.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Along with habitat degradation, hydrological modification, and unsustainable harvest, impacts from genetic introgression, competition and predation from non-native fishes is inhibiting efforts to sustain and recover native fish communities throughout the Columbia Basin. The intent of the proposed work is to minimize potential impacts of non-native fishes on native species in the Pend Oreille Basin.

There are three different projects in this proposal: 1) eradicate brook trout in three streams and re-establish westslope cutthroat trout, 2) suppress the northern pike population in Box Canyon Reservoir to benefit native species and game fish, and 3) suppress lake trout populations in Upper Priest Lake in Idaho to benefit bull trout. The need for suppressing brook trout, lake trout, and northern pike is a premise for the success of other management activities and is adequately discussed in the background materials.

The proposal clearly justifies efforts to recover westslope cutthroat trout in tributaries to the Pend Oreille River by eradicating or suppressing non-native brook trout and restocking the streams with native westslope cutthroat (Objectives 1, 2, and 5). This is a fairly new project that

has evolved as tasks were accomplished on Graham Creek to reestablish westslope cutthroat trout. The sponsors apparently have successfully suppressed brook trout in two streams using a piscicide, suggesting that this technique could be effective for brook trout suppression in other streams. Using the Harig and Fausch model seems like a reasonable approach for forecasting potential success of cutthroat reintroductions. The proposal would be improved by inclusion of better maps and captions to locate the study sites.

Objective 1: (Reintroduce westslope cutthroat trout to upper Smalle Creek and Goose Creek) seems reasonable, but tabulated data or a report could have been provided on the efficacy of electrofishing and rotenone for brook trout removal.

Objective 2: (Determine the best method for westslope cutthroat trout translocations) is a key long term objective that will not be reached until 2016 when a parental analysis will be done. However, it will be important to track the results of the egg transplants and the success of other early life history stages.

Objective 3 (Maintain stable or reduced lake trout numbers in Upper Priest Lake) is a long term lake trout control project. IDFG has been gill netting lake trout in Upper Priest Lake since 1998 and in 2009 began trapping in the Thorofare, a body of water connecting Priest Lake and Upper Priest Lake which serves as a pathway for movement of lake trout from Priest Lake to Upper Priest. The sponsors state that in spite of these efforts, the lake trout population in Upper Priest Lake has remained stable. The sponsors argue that bull trout in Upper Priest Lake have shown signs of recovery, but the evidence for this is not convincing as the number of bull trout captured in the lake remains low, probably too low to detect statistically significant trends in bull trout abundance. An added problem is that the Thorofare serves as a pathway for boat traffic between Upper Priest Lake and Priest Lake, thus encumbering the trapping effort. In short, the efforts since 1998 have shown little sign of success, and it is uncertain whether they will be successful in reducing lake trout abundance and increasing bull trout populations in Upper Priest Lake in the future. The ISRP 2007-09 review expressed serious concerns about this project and essentially considered the lake trout suppression project of questionable value.

The project would benefit from direct collaboration with biologists working on the same lake trout problem in Flathead Lake. A recent paper by Syslo et al. (2011) documenting 15 years of lake trout control in Yellowstone Lake demonstrates the complexities of trying to suppress this apex predator.

Objective 4 (Reduce northern pike abundance by 85% in Box Canyon Reservoir). The effort to suppress the northern pike population in Box Canyon Reservoir is justified. Northern pike are voracious predators and are abundant in the reservoir, threatening native species and non-native game fish, and they have the potential to move downstream in the Columbia River, possibly endangering recovery of ESA listed salmon. The sponsors, however, present

little evidence of how far northern pike have spread in the Columbia. Pike are present downstream at Boundary Reservoir, but flow fluctuations discourage spawning.

The sponsors are applying a suppression technique for northern pike drawn from an Alaskan study that used gillnets to target spawning populations in shallow water. The sponsors conducted a pilot study and state, "From this pilot study, we conclude that intensively netting northern pike in sloughs and backwaters from ice off through the spring freshet could drastically reduce the abundance of northern pike in Box Canyon Reservoir." However, the results are from only one year of study. The proposal does not provide information on where the pilot study took place and the location of the sloughs where the proposed work will occur.

The technical background is quite thorough but could have been expanded to include more out of basin references to non-native fish suppression attempts. The information on attempts to control northern pike in California was instructive. Mack et al (2000) point out that control of invasives has to be strategic and tackling one species at a time is usually ineffective. An ecosystem approach is required (see also ISAB food web report) but this project does not demonstrate such an approach. The sponsors are not alone in this regard.

The project is very significant for regional programs. There is much overlap with other projects, but there is no apparent direct collaboration or synergy between fish suppression attempts in this project and others, for example, lake trout in Flathead Lake. The proposed work is consistent with several regional native fish recovery plans including the Pend Oreille Subbasin Plan, the Draft Bull Trout Recovery Plan (2002), the Intermountain Province Subbasin Plans (2004), and the Idaho Department Fish and Game Fisheries Management Plan 2007-2012.

Mack, R. et al. (2000) Biotic invasions: causes, epidemiology, global consequences, and control. *Ecol. Appl.* 10, 689–710

John M. Syslo, Christopher S. Guy, Patricia E. Bigelow, Philip D. Doepke, Brian D. Ertel, and Todd M. Koel, 2011. Response of non-native lake trout (*Salvelinus namaycush*) to 15 years of harvest in Yellowstone Lake, Yellowstone National Park *Canadian Journal of Fisheries and Aquatic Sciences*, 2011, 68:(12) 2132-2145, 10.1139/f2011-122

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Results of past work indicate a number of notable accomplishments to date. The sponsors have demonstrated some success in taking steps to recover native species in tributaries to the Pend Oreille River through eradication or suppression of brook trout. They will be investigating several techniques for reintroducing cutthroat to streams where brook trout have been eliminated or suppressed. The central question at this point is how successful reestablishment of westslope cutthroat in these streams will be. While past work has apparently suppressed

non-natives in streams, the challenge is much greater in reservoirs and lakes and success has been limited in those habitats.

Adaptive management also has been demonstrated: “Initially, the Kalispel Tribe attempted to restore native fish habitat. Monitoring results showed that the restoration projects generally increased non-native fish numbers while native fish numbers either decreased or stayed the same.” Since habitat restoration alone was insufficient to recover cutthroat trout, the new strategy is suppression of brook trout, which will need to be carefully monitored to measure success or failure. The sponsor’s seem dedicated to changing strategies if the ones employed do not meet expectations.

A most noteworthy accomplishment is the outreach effort undertaken to gain public support for native species recovery. The sponsors have involved the public in decision-making, apparently resolving public concerns in the process. The sponsors indicate that, through this process, they had achieved public buy-in to support their approaches to native fish restoration.

ISRP Retrospective Evaluation of Results

Results of past work are well described and indicate a number of notable accomplishments to date. The original purpose of the project was a multi-year effort to eradicate brook trout in three streams and reestablish westslope cutthroat trout through translocation of individuals from genetically similar populations. The project appears to have been successful in suppressing brook trout numbers. The central question at this point is how successful reestablishment of westslope cutthroat in these streams will be.

There are three different components in the current proposal: 1) eradicate brook trout in three streams and re-establish westslope cutthroat trout, 2) suppress the northern pike population in Box Canyon Reservoir to benefit native species and game fish, and 3) suppress lake trout populations in Upper Priest Lake in Idaho to benefit bull trout. The first component follows from previous work on brook trout suppression. The ISRP judges northern pike suppression, a new component of the project, to be worthwhile, but request a report in three years documenting progress. In the ISRP’s view lake trout suppression in Upper Priest Lake, which has been ongoing since 1998, has shown little success in reducing lake trout numbers and in significantly increasing bull trout. We deem that it did not meet scientific criteria.

A most noteworthy accomplishment is the outreach effort undertaken to gain public support for native species recovery. The sponsors indicate that, through this process, they achieved public buy-in to support their approaches to native fish restoration.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

This project is related to the Kalispel Resident Fish Project (199500100), Restoration of Bull Trout Passage at Albeni Falls Dam Project (200704600) and The Joint Stock Assessment Project (199700400), all currently funded through BPA.

The sponsors directly address the emerging issue of the impact of invasive species, namely brook trout, lake trout, and northern pike, on native fishes and will undertake eradication or suppression so as to benefit bull trout and westslope cutthroat. However, many other non-native species such as largemouth bass are present in the Pend Oreille system and potentially can negatively affect native fish populations. The sponsors do not consider how these species will be dealt with.

The sponsors provide a well thought-out discussion of the possible impacts of climate change on bull and westslope cutthroat trout. The work they are proposing, if successful, should help ameliorate the impacts of climate change on native fishes. However, the impacts of climate change could conceivably favor non-native species, making their suppression more difficult and thus counteracting the proposed measures to reduce climate change impacts on native species. The issues described for climate change, especially for the westslope cutthroat trout and possible expansion of northern pike downstream in the Columbia command attention to the further need for non-native suppression.

The sponsors state, "Monitoring of the effectiveness of this project will be completed by the JSAP (Project #1997-004-00) and WDFW. Overall project effectiveness will be monitored and evaluated annually by Spring Pike Index Netting (SPIN) (Connor et al. in prep) and consultation with a biometrician to determine the relationship between CPUE and overall abundance of northern pike and adaptively develop biologically significant target population level goals. Response of resident species will be periodically evaluated by standardized warm water fish surveys (Bonar et al. 2000)." Clarification of this approach would have improved the proposal. For which aspect of the project will a biometrician be consulted? Also an explanation of "biologically significant target population level goals" would have been helpful.

4. Deliverables, Work Elements, Metrics, and Methods

Most Deliverables contribute directly to accomplishment of the Objectives. The sponsors provide some basic metrics for measuring progress toward their goals. The methods for the most part appear sound. The sponsors have had prior success suppressing brook trout and so are well positioned to conduct suppression in the proposed streams. It would have been helpful if the sponsors had discussed the monitoring activities they will undertake after cutthroat trout reintroduction.

Deliverable 3, “Annually remove at least 75% of the lake trout population in Upper Priest Lake,” like Objective 3 is problematic. The sponsors state that an estimated 75 % of the lake trout in Upper Priest Lake are removed annually by gill netting and yet the population remains stable, presumably due to recruitment within the lake and continued movement of lake trout from Priest Lake through the Thorofare into Upper Priest Lake. If annual lake trout removal is truly 75% of the population it would seem that recruitment and immigration from Priest Lake must be substantial to stabilize the lake trout population. No estimates of recruitment or immigration were provided in the proposal. Alternatively, the 75% removal estimate is a serious overestimate. The estimate was arrived at by using the Leslie Depletion Method. It is uncertain whether this method is appropriate for estimating population abundance in Upper Priest Lake. No information on the model was given, nor was any data provided. Better scientific justification for continuing this component of the project is needed. Furthermore, no clear decision points or criteria for determining success of this project were specified, and consequently it is unclear how long this component of the project will continue or how success will be determined.

[200724600](#) - Restoration of Bull Trout Passage at Albeni Falls Dam

Sponsor: Kalispel Tribe

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The FERC relicensing process identified that permanent fish passage was required for the POR dams including Albeni Falls, especially for bull trout (ESA Threatened). The trap and transport mode has been implemented as a temporary measure and includes some rather clever monitoring that combines genetics and radio-tracking to measure success/benefits, but also to continue learning about life history and biology of the bull trout.

The genetics information to be gathered for the Westslope cutthroat trout will be important for identifying components of the river's metapopulation and to provide basic information to inform future management decisions and actions. Lessons learned by trap and haul work on this major river system will have application to numerous areas in the Columbia River Basin with similar problems for bull trout and west slope cutthroat trout. As the sponsors note at least four dams are required to provide fish passage within their new FERC licenses

The sponsors should be urged to make sure their monitoring program covers the possibility that bull trout released in the reservoir may be using tributaries in addition to the streams where their PIT tag receivers are located. The ISRP learned from the presentation that 2011 data suggested more straying from natal streams than anticipated.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The technical background is appropriate to justify the need and the basis for the proposed activities. Both objectives are consistent and tiered to priority actions in the Pend Oreille Subbasin Plan.

The project is clearly significant to regional programs. Lessons learned by trap and haul work on this major river system will have application to numerous areas in the CRB with similar problems for bull trout and west slope cutthroat trout. As the sponsors note at least 4 dams are required to provide fish passage within their new FERC licenses.

The technical background is succinct and clearly outlines the problems and achievements to date by the sponsors and others. A concern is the fate of the offspring of the fish that are trapped and hauled. It seems that if the entrainment-passage problem is not resolved within their life span they are destined for difficult passage downstream unless they remain in the reservoir. Obviously further work, outside the scope of this particular proposal, is required.

The objectives are well described and are straightforward.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The narrative describes the history of actions, accomplishments, and results of previous RME.

Results have been very useful and are providing basic data needed for conservation of these two species.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The sponsors give a good balanced account of the possible effects of climate change. They are likely overly optimistic about the potential for pike removal.

Tagging methods are well described although details such as dummy surgery results are not given. Statistical methods are not given, but at this preliminary stage in the investigation numbers are small and likely not large enough for detailed analyses.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables and Work Elements are appropriate for the objectives.

The metrics and methods for the temporary, manual passage of bull trout is a good way to test with tracking methods the hypothesis that passed fish migrate to probable source tributaries based on their genetic source assignments.

- DELV-7: Assignment of Archived Westslope Cutthroat Trout Samples from Pend Oreille River Below Albeni Falls Dam and Priest River

Archiving samples collected from the Pend Oreille River below Albeni Falls Dam and the Priest River will fill key data gaps associated with entrainment, life histories, migration, and tributary productivity and importance. It would have been useful to include more background on the catalog to get a sense of the project's contribution to it.

- DELV-6: Genetic Analysis and Cataloging of Westslope Cutthroat Trout Genetic Samples

The sponsors provide a non-specific description of how genetic samples will be analyzed by mentioning possibly using microsatellite DNA, SNPs, or geochemical markers. More specificity would have been useful for meaningful scientific review.

Revision of the major geospatial database for the project is a step forward. The new Geospatial Enabled Database Management System (GEDMS) could not be accessed using the links provided in the proposal (see also review of 199700400 - Resident Fish above Chief Joseph and Grand Coulee Dams).

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The proposal uses protocols submitted into MonitoringMethods.org - Temporary Fish Passage at Albeni Falls Dam and Westslope Cutthroat Trout Genetic Inventory.

Additional justification for collecting a maximum of 10 fish per 100 meters of stream length by backpack electrofishing would have been useful.

Monitoring sites for bull trout PIT tags are 8 tributaries that are potential spawning sites. Presumably there are no other potential streams that would contribute to monitoring the degree of straying. This raises the question of the design of the PIT tag monitoring and the geospatial issue.

[199500100](#) - Kalispel Tribe Resident Fish Program

Sponsor: Kalispel Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. Goose Creek Habitat Restoration: The sponsors should develop a detailed plan for monitoring westslope cutthroat trout after their reintroduction to Goose Creek. The plan should be reviewed by the ISRP prior to its implementation.
2. Largemouth Bass Production and Fishery: The ISRP would like to review a progress report in two years on how the largemouth bass program is working. As proposed, the potential benefits and success are uncertain. This report should also include an evaluation of how the screening is working. The ISRP also recommends that the sponsors pursue their plans for monitoring mercury in bass tissue as this is a subsistence fishery.

Comment:

The sponsors' response to the ISRP's questions concerning the Goose Creek habitat restoration project was satisfactory. They presented what appears to be a carefully planned, exceptionally well designed, and scientifically sound monitoring program for instream and riparian habitat and floodplain recovery for Goose Creek. The sponsors have selected appropriate indicators and performance criteria for monitoring channel and floodplain changes which should allow them to determine whether the restoration objectives are being met. The monitoring plan for westslope cutthroat trout is currently not well developed. The sponsors discussed the rationale and to some extent the procedures that will be used to reintroduce cutthroat to Goose Creek, but details of a monitoring plan for the cutthroat population after reintroduction were not provided. This is, perhaps, understandable because reintroduction of trout into Goose Creek will not take place for several years. Nevertheless, the sponsors should submit a detailed monitoring plan for cutthroat prior to implementation of the plan.

The sponsors for the most part provided a satisfactory response to the ISRP's questions about the project to develop a largemouth bass subsistence fishery in a small slough off Box Canyon Reservoir. This fishery is a highly artificial situation where largemouth bass will be stocked as fry and fed worms and brook trout while in the slough rather than having to forage naturally. It is uncertain at this point whether artificial feeding will be able to sustain the bass population over the long run. After two production years a progress report on this project should be reviewed by the ISRP.

In their request for a response the ISRP asked if the sponsors had plans to monitor fish/bass tissue for possible mercury contamination. The sponsors responded, "At this time there is no

plan for monitoring mercury levels in bass within the slough, however KNRD management along with hatchery staff are exploring options for testing and monitoring." As this is a subsistence fishery, the ISRP recommends that some level of monitoring for mercury be implemented.

10.Kootenai Subbasin

199404900 - Kootenai River Ecosystem Restoration

Sponsor: Kootenai Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

A model or some other method of integrating data being collected is required to evaluate the response of the river as an integrated ecological system to nutrient addition. As a first step, a concise data synthesis report involving the other Kootenai River ecosystem restoration projects would allow hypotheses about river response to nutrient enhancement to be refined (see also qualifications for 200200200 - Kootenai River Habitat Restoration Program). Ideally, a peer reviewed article, in a well-regarded journal, should follow. Alternate hypotheses could be tested through time, and the monitoring protocols could be modified accordingly. The understanding of system response to nutrient addition that could be generated using an integrative process would also greatly enhance the effectiveness of adaptive management.

Comment:

The ISRP noted the Kootenai River is one of the largest systems that has received long term nutrient additions and, therefore, is very important to monitor and report how the ecosystem is being altered. Smaller systems such as Kuparuk River in AK and the Keough River in BC are not directly comparable because of their smaller size. The connection to Kootenay Lake is a unique attribute since eventually the nutrients added to the river are going to accumulate in Kootenay Lake which is also being fertilized. Further, kokanee from the lake are likely to spawn only in lower tributaries, and the benefits of this “nutrient pump” farther upstream may be minimal.

Comments on specific responses

1. The sponsors state that a report “currently in progress, will update and combine previous reports from 2009 and 2010 with recent data covering water quality, algae, macroinvertebrates and fish. Reports will emphasize pre-nutrient and post nutrient addition periods (2003-2010). Findings, thus far, have continued to strongly support the positive benefits of nutrient addition to the Kootenai River biota (Holderman and Gidley 2011, In Prep.). Significant increases in primary, secondary, and tertiary productivity levels have been demonstrated”. The ISRP would like to see the latest draft of the report.

An on-line draft of the report was provided.

2. If tributaries are being used by rainbow trout in the Canyon reach what evidence exists that habitat conditions are limiting there as well in the main river where the nutrients are being added?

The response is satisfactory.

3. How far downstream are the nutrient benefits expected to be realized and will these benefits interact with the bioengineering work being done in the braided reach? Do the sponsors anticipate a nutrient spiraling effect?

In response to the ISRP question about the long-term plans for nutrient additions (i.e., sustainability of this restoration approach) the project sponsors indicated that they view continued nutrient addition as necessary to compensate for nutrients being sequestered above Libby Dam. However, the ISRP has a practical concern; namely, nutrient additions on this scale cannot go on forever. As well if Libby Dam is the source of the problem, why are the nutrient additions, at appropriate magnitudes and scales, not being done at Libby Dam? It seems that point of supplementation would be more appropriate from a system-scale perspective.

It seems that the use of stable isotopes signatures would be more effective in answering questions about downstream spiraling of nutrients, quantifying how far downstream the positive effects of the nutrient additions can be detected, and the pathway leading to whitefish. The sponsors should take a careful look at these methods to see if they would be more effective in terms of cost savings and better quantification of ecological processes. See above general comments regarding implications of downstream nutrient spiraling and upstream nutrient “pumping” from migrating kokanee. A rough estimate of the overall benefit of an increased kokanee population to nutrient dynamics of the river should be possible using pre Libby dam information on escapement levels and spawner distribution.

4. Is there a working model that sets the nutrient addition response in the context of the whole ecosystem? If so ISRP would like to see details on the model. Will the annual cost of \$1.8 M be ongoing?

It is a major oversight not to have a working model that sets the nutrient response in the context of the whole ecosystem. This needs to be completed immediately; it should be the number one priority of the program.

The sponsors should consider using an “off the shelf” model such as Ecopath to provide an ongoing perspective on the trophodynamics of the ecosystems they are trying to restore with nutrient additions.

5. Whitefish seem to be responding to nutrient addition. What is their role in Kootenai River food web and could they be a food item for sturgeon?

The response is satisfactory. Given that the whitefish seem to be responding to the nutrient addition, their role in the food web is a key factor to understand.

The ISRP encourages investigations on feeding habits of top predators such as white sturgeon in the reaches where whitefish are available as food.

See also comment to response # 3 on possible use of stable isotopes as a tracer for whitefish food relationships.

6. Reports being prepared for publication were not provided although requested at the last ISRP review. At a minimum, the sponsors should provide a table with the publication title, key authors, target journal, and submission date.

Given the importance of this effort, the sponsors should improve their rate of publications, preferably in highly regarded professional ecosystem oriented journals. The KTOI and IDFG should be authoring joint publications. This would provide evidence of sustained collaboration.

7. Some of the protocols related to environmental and physiochemical sampling are not complete on the MonitoringMethods.org website, thereby making it difficult to evaluate. The ISRP would like to see a complete description of all protocols.

See comment below response # 8.

8. If changes in the monitoring protocols are anticipated in the future, the ISRP would like a description of them.

The current monitoring design does not appear to be well-suited to addressing the ISRP concerns about the spatial extent of the nutrient effect. The figures provided in the response to illustrate downstream responses (Figure 3.1, 3.2, 3.3, 3.4) do indicate that there is an increase in various biological parameters from the point of nutrient addition to sample site KR6. However, virtually every monitored parameter declines dramatically between KR6 and KR4. This decline also occurs during years prior to the addition of nutrients, raising the question of whether this change is due to a diminution of nutrient effects or change in some other factor that prevents the benefits from nutrient addition from being expressed. It is interesting that site KR4 is in the straight reach while the sites within the response reach are either in the canyon or braided reaches. Is it possible that the observed pattern in the monitored parameters is a response to change in physical habitat conditions rather than a lack of nutrients? It would seem that some investigation of the interaction between physical habitat conditions and response to nutrient enrichment should be incorporated into the monitoring effort to better understand this dynamic. Recognition that certain channel conditions are unresponsive to nutrient addition would be of critical importance in considerations for expanding nutrient enhancement of the Kootenai River. For example, the plan to increase P

additions to achieve a concentration of 5 ug/L may not extend biological responses further downstream if factors other than nutrient availability are governing biological response.

9. More details are required on the particular relationships, at the working scientific level, between this project and the other three Kootenai River proposals.

There seems to be much overlap in what the various Kootenai River projects are doing as provided in the Table in the response. This suggests a need to consolidate the projects into one that can be carefully monitored for redundancies as well as overall restoration effectiveness and professional productivity. If consolidation is not possible or practical, frequent data synthesis is required. By this ISRP means actual merging of data sets between projects, not meeting to discuss separate results.

The ISRP appreciates that there is a Core Adaptive Management Team, a Modeling Team, a Policy Team, and a host of other teams and committees listed. However, the key aspect is how they interact and, more importantly, it should be clear who makes the important management decisions in this complex project. Essentially, they should have a standing scientific advisory committee that meets with them at least annually and offers them advice on program components, models, and research directions.

The draft Kootenai Subbasin Adaptive Management Plan was provided. However the sponsors state “The Kootenai River Habitat Restoration Program (KRHRP) adaptive management and monitoring program does not [sponsors’ underlining] specifically include metrics related to the biological response of the focal aquatic species populations”. These metrics are being collected in other projects/agencies and will be shared and evaluated in the context of the KRHRP monitoring and adaptive management plan. A procedure should be worked out to determine which of these several adaptive management plans, including that for the nutrient addition project, will be implemented, should there be disagreement about them. At present there does not seem to be an overarching adaptive management plan.

ISRP Retrospective Evaluation of Results

This proposal and project remain the broadest of the Kootenai River projects. The attention is to the whole ecosystem rather than to the more limited fish species components of other studies. The Kootenai Tribe of Idaho and Idaho Department of Fish and Game initiated a comprehensive, multi-trophic level and water quality monitoring program in 2000 to investigate the underlying problems of the Kootenai River ecosystem. The current ISRP review is the latest review for the project which is now somewhat narrower in focus, with specific emphasis on nutrient addition as a tool to increase resident salmonid production.

In 2000, reviewers were not confident that all the issues to be studied have been thought through and they thought this was particularly true for the proposed nutrient addition study,

which was viewed as inadequately planned. The study was described as too simplistic and short term and reviewers thought it probably should be dropped.

Reviewers in 2007 were much more enthusiastic about the project and supported the work in an experimental phase. The proposal demonstrated much enthusiasm for ecosystem improvement with an impressive list of potential contributors. Integration had been accomplished by cooperative development of an ecosystem model and an adaptive management process.

In 2012, the ISRP arrived at a similar conclusion as the 2000 reviewers. The proposal, and the response to questions raised, did not adequately address the ISRP specific major concern about the need for a model, or some other method, of integrating data being collected to evaluate the response of the river ecosystem to nutrient addition. A mechanism for synthesizing data would allow hypotheses about river response to nutrient enhancement to be refined through time and the monitoring protocols to be modified accordingly. As well, current ISRP reviewers recommended that the data obtained from this project, as well as the three other related Kootenai River programs, be integrated into a synthesis paper.

[200200800](#) - Reconnect Kootenai River with Historic Floodplain

Sponsor: Kootenai Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The ISRP believes that the components of this project focused on the completion of the Ball Creek reconnection and the development of a prioritization tool for identifying future reconnect projects (Objectives 1 and 3) meet scientific criteria. However, the technical merits of Objective 2, the execution of future reconnect projects, cannot be evaluated from the information provided in the proposal. Thus, Objective 2 is currently not scientifically justified. Completion of the prioritization tool is required before future reconnect projects can be evaluated.

The Kootenai River projects have been in existence for some time and have collected a significant amount of data on river and floodplain characteristics and function. However, these data have not been used to their full potential. The ISRP recommends that a synthesis report be produced that summarizes the results that have been obtained from the RM&E efforts associated with these projects. The synthesis should not be a simple tabulation of data collected but a concise and comprehensive interpretation of community and system-scale responses that can be used to guide current and future restoration efforts on this system. This

qualification has been applied to all Kootenai River projects currently being reviewed (199404900, 200200800, and 200200200).

Comments:

The response failed to fully address several of the major concerns raised in the original ISRP review. The four, primary concerns expressed in the original review were:

1. Provide a synthesis and model of the existing data as justification and guidance for prioritizing project activities and identify the most promising future projects.
2. Specify the RM&E and adaptive management plans in sufficient detail for ISRP review.
3. Further detail is required on the staging of the various components of restoration.
4. The ISRP requested clarification on the relationships and coordination among the various restoration projects that are being implemented on this stretch of the Kootenai River.

The ISRP concerns about the staging of various components of this project were partially addressed. The text and tables included in the response to clarify scheduling were helpful. The inclusion of the Gantt chart that was requested in the original ISRP review did not help because it was unreadable. The sponsor indicated that the lack of clarity in their description of the sequencing of project activities in the original proposal was largely due to the structure of the Objectives section of the proposal form. Although the form may be cumbersome, many of the other projects reviewed by the ISRP were able to clearly convey scheduling of project activities. Although the response partially addressed the ISRP concern on this issue, the sequencing of objectives and work elements presented is still confusing.

Administrative relationships among the Kootenai River projects were adequately described in the response. However, technical relationships among the various projects were not described. This problem was common to all the Kootenai River proposals. For that reason, the ISRP suggests that a synthesis report be produced summarizing the results that have been obtained from the RM&E efforts associated with these projects. The synthesis should not be a simple tabulation of data collected but a concise and comprehensive interpretation that can be used to guide current and future restoration efforts on this system. This qualification has been applied to all Kootenai River projects currently being reviewed (199404900, 200200800, and 200200200). A review of the ocean research being funded by BPA was recently completed and could serve as a template for a synthesis report on the Kootenai River ([ISRP 2012-3](#)). The sponsors of all the Kootenai River projects should also be more aggressive about publishing the results of the research being conducted on the river and floodplain. These are very large projects with the potential to be a model for river/floodplain restoration. However, the experiences gained through the implementation of these projects cannot be effectively shared unless this information is published.

A link to the draft Adaptive Management Plan (AMP) was provided with the response. Although still under development, this plan does indicate the types of information that will be used to assess project effectiveness and provides a process by which this information will be used to modify future restoration efforts and monitoring plans. However, some vital elements of an adaptive management process appear to be missing. For example, how experimentation will be structured in a manner that will inform decisions and how management decisions will be made are not described.

The relationship between the subbasin AMP and the monitoring planned for the reconnect projects is not clear. The response includes a lengthy description of various biotic indices used to track biological response to project implementation. These indices are not explicitly addressed in the subbasin AMP plan, leaving it unclear as to how the monitoring of the reconnect projects will be integrated into the subbasin AMP process.

The biotic indices are a useful mechanism for assessing biological response to the reconnect projects. However, without accompanying information on changes in physical and chemical habitat attributes, it may be very difficult to ascribe a cause to an observed change in an index. Ideally, an RM&E plan would be developed that couples these indices with assessment of water chemistry, physical habitat conditions, and trophic relationships. The process to be used for data storage and retention was fully explained and appears well designed.

A dynamic ecosystem model (e.g., Ecopath) would also help the sponsors address their goal of “creating conditions that help support and enhance the food web” of the Kootenai River. Use of such a model would help link the reconnect project to efforts on the mainstem of the river and provide insight into how this project will support the overarching objective for the Kootenai River Habitat Restoration Plan (KRHRP), which seems to be “Restore and maintain Kootenai River habitat conditions that support all life stages of Endangered Species Act listed Kootenai River white sturgeon; Restore and maintain Kootenai River habitat conditions that support all life stages of native Kootenai subbasin focal fish species” (from proposal project 200200200). Such a model would be useful in the context of the Operational Loss activities as well.

The response to the ISRP concern that climate change was not being adequately considered was not sufficient, and the response about invasive species was incomplete. The response to this issue creates the impression that climate change has not been seriously considered in the design of the restoration strategy for the Kootenai River and its floodplain. Further, description of procedures to monitor the spread of *Didymo* was complete but there was no discussion of measures being implemented to address other invasive species.

The ISRP request to see a more thorough explanation of how the baseline information was used to inform the design of the Ball Creek project was not fully addressed. The original proposal and the response indicated that considerable effort had been devoted to collect information on characteristics of the Ball Creek project site prior to designing the reconnection project. The

ISRP desired some discussion of how this baseline information influenced the design of the restoration plan. The information provided only superficially addressed this point.

Despite the remaining deficiencies in the proposal, Objective 1 (continue with the Ball Creek reconnection) has progressed to the point where implementation seems appropriate. In addition, the approach proposed for Objective 3 (restoration ranking plan) appears to be technically justified. However, the adequacy of the approach for Objective 2, the design and implementation of future reconnect projects, cannot be assessed from the information provided. The prioritization process for identifying future projects (Objective 3) needs to be completed and specific future project sites identified before components of the project related to Objective 2 can be reviewed. It seems premature to include funding for future restoration project design and implementation until sites are identified and some understanding of the nature and extent of the work required is determined.

[200200200](#) - Restore Natural Recruitment of Kootenai River White Sturgeon

Sponsor: Kootenai Tribe

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The project sponsors did a thorough job of addressing some of the ISRP comments on the original proposal. However, there are several issues that still need to be considered prior to proceeding with this project:

1. The response indicates that project-scale monitoring will be limited to assessment of the effects of the project on habitat condition. In order to determine the manner in which a specific restoration project is affecting one of the focal species, some level of biological assessment should be included at the project-level. The quality of the biological monitoring at the whole-system level appears to be very complete on the Kootenai River and should provide a good indication of how populations of the focal species are changing over time. However, the ability to associate a change in demographics with restoration efforts will require some level of understanding of the focal species' response at the project sites.
2. A link to a draft of the KRH-RP subbasin adaptive management plan was provided. This document is still under development, and additional detail will be added over time. The plan provides a generalized process for structured decision making about the Kootenai River projects but does not contain enough detail to understand how adaptive management will be achieved at a project scale. Specific adaptive management components for each project should be developed and linked to the subbasin adaptive management plan. The ISRP's programmatic

comments on Structured Decision Management in this report provide some additional information on this point.

3. The hypothesis raised by the ISRP concerning a larger and relatively unknown sub-population of white sturgeon in Kootenay Lake and the possible interaction with the river population should be considered more completely.

4. The response provides an explanation of the administrative relationships among the various Kootenai River projects. However, an explanation of how RM&E results generated by these various projects are being integrated and interpreted was not included in the response. Some of the projects have been underway for a number of years and have collected a considerable amount of data. A synthesis of the results obtained across all these projects relative to addressing the two key objectives listed on page 14: (Restore and maintain Kootenai River habitat conditions that support all life stages of Endangered Species Act listed Kootenai River white sturgeon; Restore and maintain Kootenai River habitat conditions that support all life stages of native Kootenai subbasin focal fish species) would be a very useful exercise. The project results are presented in the KTOI proposals largely as lists of parameters being measured. To take full advantage of the wealth of information being generated, these data should be synthesized and interpreted. The synthesis should not be a simple tabulation of data collected but a concise and comprehensive interpretation of these data that can be used to guide current and future restoration efforts on this system. This qualification has been applied to all Kootenai River projects currently being reviewed (199404900, 200200800, and 200200200). A review of the ocean research being funded by BPA was recently completed and could serve as a template for a synthesis report on the Kootenai River. The sponsors of all the Kootenai River projects should also be more aggressive about publishing the results of the research being conducted on the river and floodplain. These are very large projects with the potential to be a model for river/floodplain restoration. However, the experiences gained through the implementation of these projects cannot be effectively shared unless this information is published.

5. The ISRP requested some additional information regarding the extent to which the 10 recruitment failure hypotheses had been experimentally tested. The response indicated that there has been relatively little experimental testing of these hypotheses. Their relative validity has been assessed by a very highly qualified expert panel using a subjective scoring system. Expert opinion has considerable value, especially if it is applied using an organized process as was done here. However, expert opinion falls quite short of accepting or rejecting a hypothesis based on specific field data. The RM&E effort in the near term should focus on the experimental evaluation of those hypotheses deemed to be most likely limiting sturgeon recruitment.

Comments:

Additional comment on the response and more detail on the qualifications described above are provided below.

I. More detail on the feasibility assessments and design activities for phase 2 and 3 projects should be presented.

A considerable amount of additional detail was provided about the process used to identify and prioritize Phase 2 and Phase 3 projects. The response relied heavily on the KRHRP Master Plan, referring to this document rather than providing information in the response. The ISRP review would have been greatly facilitated if the sponsors had summarized the pertinent parts of the plan and included them in the proposal. The response stresses the reliance on the adaptive management process and indicates that Phase 2 and Phase 3 projects will be modified based on monitoring results generated from the implementation of Phase 1 projects or the nutrient enhancement and reconnect projects. However, the time between Phase 1 and Phases 2 and 3 may be too short to obtain any conclusive indication of project effectiveness. Scheduling future restoration efforts to take maximum advantage of the information being collected from existing projects should be considered.

II. A draft of the KRHRP monitoring and adaptive management plan should be provided.

As noted above, a link to the draft plan was provided with the response. Although this document describes a generalized adaptive management approach for the project area, it fails to specify how adaptive management will be applied at the project level. Adaptive management processes for each project should be developed and linked to the framework articulated in the subbasin plan. The project level RM&E effort also should incorporate some level of biological monitoring (see qualification above). An understanding of the biological responses by the focal species to individual projects is necessary to determine the extent to which particular restoration efforts are contributing to changes in population attributes detected by the systemwide biological monitoring efforts on the Kootenai River.

III. Ten recruitment failure hypotheses are listed in the proposal. Identify which of these hypotheses have been tested and what conclusions have been reached.

To date, the relative validity of the 10 recruitment-failure hypotheses has been investigated largely through the application of a structured expert-opinion process. This effort represents a good method of prioritizing experiments to verify the accuracy of these opinions. This should be a near-term RM&E priority.

IV. Summarize the history and results from spill tests resulting from the suit by the Center for Biological Diversity (CBD) in 2003 that concerned the RPA in the 2000 Biological Opinion and the designation of Kootenai sturgeon critical habitat.

A summary of the results, to date, of the various spill tests from Libby Dam were provided in the response. This information adequately addressed the ISRP concern.

V. There are three other projects on the Kootenai River that are closely related to this proposal. Describe how this project connects with these projects.

As noted in the qualifications, the administrative relationships among the various projects were adequately described. However, the manner in which information generated by the various projects was being synthesized and interpreted was not explained in the response or in the subbasin adaptive management plan. The ISRP suggests that a multi-project synthesis of the research and monitoring results generated to date be completed.

Additional Minor Comments

This project is entitled “Restore Natural Recruitment of Kootenai River White Sturgeon” in Taurus but also was referred to as “Kootenai River Habitat Restoration Project.” Which is the correct name? Projects should be labeled consistently and should reveal the main thrust of the project.

The ISRP was also concerned that although the project indicated that an “ecosystem approach” was being employed for this project, it seems to be very focused only on the focal species. Other native species receive very little attention in the proposal. The response to the concern about this issue provided some information about studies being conducted on cottids, mostly related to potential predation impacts on focal species. It would be useful for the project sponsors to consider if there are some other native indicator species, such as other fishes or macroinvertebrate species, that could provide an indication of an ecosystem-level response that may not be reflected by monitoring the focal species alone.

[198806500](#) - Kootenai River Fishery Investigations

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The ISRP suggests this project co-lead the proposed synthesis document (referred to in the ISRP review of Kootenai River Habitat Restoration Program Project Number: 200200200) that could focus on the two overarching objectives of the four Kootenai river projects. The present sponsors are measuring the restoration response in the fish community and hence their data sets are a logical point to start the assessment.

Comments:

The ISRP thanks the sponsors for a very thorough response effort in which an attempt was specifically made to directly address each of the questions. They provided considerable clarity on a number of issues. The responsibilities, sharing of tasks and details on approaches are much better articulated and are appreciated.

Objective 1: Restore natural recruitment of Kootenai River white sturgeon

All responses were satisfactory.

The sponsors suggest that they have an understanding of the substrate and recruitment problem, but the ISRP concluded that uncertainty remains. The hypothesis forwarded by them as to why sturgeon are not recruiting well, in terms of substrate, is plausible and well worth testing, but not proven. It is unclear why sturgeon would repeatedly spawn over finer substrate when natural river processes might suggest that if they went farther upriver, as they are able to do, they might find larger substrate, and that such behavior might not have been selected for. Another hypothesis perhaps worth considering is that because of energetics, the largest, oldest sturgeon, in this case the wild fish, may remain farther downriver, whereas smaller younger hatchery fish, both mature and immature, may move farther upriver. If so, as the hatchery fish mature, they may spawn farther upriver over the more desirable substrates. This pattern has been observed repeatedly in other species, and it may explain why some hatchery fish are moving upriver into Montana whereas the older fish typically have not.

The response to linkages with other programs was clearly presented. They have evidently developed a close working relationship with British Columbian biologists in population estimates and other key areas where coordination is needed.

The responses regarding choice of gears and use of trammel nets was well reasoned and well presented.

The description of the VEMCO telemetry approach and its advantages was clear although the technique provides an approximation of what is usually considered fish microhabitat.

The clarification of the egg mats, cues, and hypotheses tested was adequate. However the sampling for larvae is a difficult proposition given the vast area of river to be sampled and the likely very low density of organisms to be sampled. The ISRP recommends that attention should be paid to geospatial aspects of the sampling grid.

Objective 2: Restore natural recruitment of Kootenai River burbot

All responses were found to be adequate. Gear questions were adequately addressed. If bull trout redd survey methods are being employed, their statistical basis should be reviewed to make sure they are appropriate for burbot work. Burbot tend to spawn in “balls” which is a quite different behavior compared to salmonids. See McPhail, J.D. and V. I. Paragamian, 2000. Burbot Biology and Life History p.10-23 in Paragamian, V.I. and D.W. Willis (Ed) Burbot: Biology, Ecology, and Management. Publication No. 1: Fisheries Management Section of the American Fisheries Society.

OBJ-3: Increase resident salmonid densities in the Kootenai River

Responses seemed adequate but would be useful if this nutrient work were developed in a broader, more effective conceptual framework for its effect on river productivity (see also comments on 199404900 - Kootenai River Ecosystem Improvements Project).

Clearly Libby Dam is the source of the nutrient deficiency problem. As a suggestion, it seems worthwhile to begin discussions with Montana and the Tribes for adding nutrients at the Libby Dam outflow, perhaps in addition to the present site. This strategy would treat the Kootenai River as an integrated system rather than as starting at jurisdictional borders.

Overall, the nutrient addition program and its success in increasing resident salmon populations – while a tremendous experiment, and apparently successful – has been unable to take the results to publication where others could learn from the Kootenai River results and also provide anonymous, peer reviewed, and constructive criticism . We would recommend a multi-agency, multi-authored synthesis published in a highly regarded professional journal on the approach and the results. The synthesis referred to in the introductory part of this review would be a start toward such a publication.

Although the IDFG’s group publication record is good, many of the planned publications are targeted at specialized journals with a limited audience and citation rate. The impact and dissemination of project findings could be improved by targeting broadly read ecosystem-oriented journals.

ISRP Retrospective Evaluation of Results

In 2006, the ISRP reviewers of the resident fish component of the Kootenai River had some of the same concerns identified in the present review of the project. They noted connection between sturgeon, burbot, and salmonids was not established, and why ecosystem rehabilitation is a separate category was not clear. The sponsors included hypothesized limiting factors and key strategies from the subbasin plan. What they were actually going to try to accomplish toward those objectives was less clearly presented. Additional information on the focal species obtained from the proposed work will add to the understanding of their limiting factors. However, now, with at least 15 y of investigative work completed to date, little progress has been made to improve natural recruitment of either sturgeon or burbot. Clearly it is time for a “summing up” or synthesis of the collective progress of the projects, which should help chart the way ahead.

11.Libby Dam

[199500400](#) - Libby Reservoir Mitigation Restoration and Research, Monitoring and Evaluation (RM&E)

Sponsor: Montana Fish, Wildlife and Parks (MFWP)

ISRP recommendation: Meets Scientific Review Criteria

Comment:

Overall, the ISRP judges the project proposal and program to meet scientific criteria. The project's actions and RME address losses due to construction and operation of Libby Dam. Libby Dam has no upstream or downstream passage, which contributes to population losses. While this project is analogous in many ways to the MFWP-sponsored project associated with Hungry Horse Dam mitigation (199101903), the ISRP judged this proposal to have a more cohesive approach and presentation. The sponsor's in-person presentation provided additional clarity and an introductory level of progress and accomplishments touched on in the proposal.

Similar to the HHD mitigation, the ISRP recommends to Council that following the retrospective report and review of HHD mitigation, project sponsors for Libby Dam mitigation undertake a comparable retrospective report of project history, results and accomplishments toward addressing the loss statement and mitigation plan as well as prioritizing future actions. The sponsors describe a three-phase timeline for mitigation, which will serve as a useful template for such a retrospective presentation. Currently, priority is described as "Priority for protection are those watershed which have relatively undisturbed habitats that contain strong populations of native species." The challenge for sponsors and others in the subbasin will be to categorize specific tributaries or reaches that fit this, and lesser, priorities. As part of the prioritization effort, the ISRP challenges the sponsors to consider the adequacy and effectiveness of moving toward incorporating and evaluating more passive restoration techniques where opportunities present, with Didymo suppression in the Kootenai and sediment removal in the Fisher River being exceptions.

While the ISRP requests no specific response at this time, a number of items emerged from the review for consideration by sponsors as they undertake activities and ultimately report on accomplishments.

Deliverables:

DELV-1. Mitigation effectiveness monitoring - The ISRP recommends that a retrospective analysis and report be undertaken in the future to detail protocols, accomplishments, and outcomes of the mitigation activities since project was begun (see comments above).

DELV-3. Remove non-native fish - The ISRP has previously identified the need for follow-up monitoring to examine effectiveness where non-native fish are to be suppressed/eradicated, such as in the Flathead subbasin and elsewhere. This is especially salient where a risk continues for hybridization between restored native and non-native species continues. Moreover, it appears that for WCT restoration in Boulder Creek the state's MO12 origin trout will be used as a founder stock rather than a translocation from a more related source within the subbasin. The origin of the semi-domesticated MO12 trout is outside the Kootenai basin. The ISRP challenges the sponsors to consider the alternative approach(s).

DELV-4. Didymo research - This activity appears to be in its conceptual stage of modify nutrients and will benefit from a well-designed approach to ensure it is sensitive to response and overall utility to river managers.

DELV -7, -8, and -9 describe a variety of stream habitat activities in five streams. Evaluation of the effectiveness in terms of fish population responses for these and related projects is needed and should be part of a mitigation retrospective. Previous efforts have shown that there are significant challenges with implementation and effectiveness including major problems with voles and deer, weeds, the need to water seedings, high peak stream flows, presumably low inherent stream productivity, and erosive bed materials. There may be opportunities to consider more passive restoration.

Data Management: Detail on protocols for the data management approach are important to document. This project has collected considerable data and will continue to do so, making the adequacy of the data management approach vital to ongoing adaptive management.

Adaptive Management: There quite a few successful activities, so the restoration actions could be used for demonstrations to attract funds from other sources for the restoration of other sites. The public could be engaged or encouraged to be supportive of these activities through these demonstrations.

Publications: After all these years of research and restoration activities, the group needs to have more publications in the primary literature. Very few people or other similar projects are benefiting from what is being learned. Without peer-reviewed publications, the project is not achieving its full potential.

[200600800](#) - Mainstem Columbia Amendments Research at Libby Dam

Sponsor: Montana Fish, Wildlife and Parks (MFWP)

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The research in the Kootenai River needs more effective integration through time. The ISRP recommend that the project sponsors develop an integrated conceptual model of the system, which would facilitate identification of key hypotheses to be tested and the presenting and publishing of results when these questions are answered. The ISRP will be looking for this in the next project review.

Likewise, the ISRP will be looking for dissemination of new knowledge and insights in the form of presentations at scientific or regional management meetings; workshops held to present information on problems common to these and other similar regulated rivers; and especially in the form of peer-reviewed publications to make a permanent record of the findings.

Comment:

The sponsors have outlined their objectives more clearly in the response than in the proposal, especially those for assessing effects of Libby Dam. They have also demonstrated that they are conducting ongoing data analysis, and improving methods for analysis in many cases.

Additional suggestions that may assist in optimizing studies for the Libby Dam/Kootenai River include:

1. The revised objectives make the proposal much clearer. Setting up clear hypotheses and alternatives is an important step. However, is there no expectation about the direction of these? The statement of non-directional alternative hypotheses indicates that little is known about the consequences of actions proposed. However, with the benefit of past data and experience, it should be possible to formulate more specific hypotheses for more powerful tests.

In addition, the sponsors should become versed on the current thinking about the drawbacks of hypothesis testing vs. model selection, so they can couch their results in appropriate terms. A *priori* hypotheses are a good thing, but how they are tested and reported are important for acceptance by the scientific communities.

2. Will production of phytoplankton and zooplankton be estimated, or simply density or volume?

3. It appears that the sponsors will fit models of Didymo thickness and other metrics as a function of various covariates such as phosphorus. It would be informative to compare these models and covariates using the methods developed for "model selection and multi-model inference" by Burnham and Anderson (2002). These methods are believed by many to be superior to strict hypothesis testing, and traditional methods of developing one reduced model from the global model by deleting variables that are not significant. We urge the sponsors to look into these newer methods.

4. Under Objective 11, it was unclear for what biological group the richness and evenness would be calculated.

5. The ISRP appreciates the details presented for the early attempts of analysis of survival for bull trout, sturgeon, and rainbow trout using MARK. Although past data often may be too sparse for robust estimates, this design and analysis method should prove useful for future work, and analysis of some past data. Again, we urge the sponsors to approach experts with MARK if questions arise. They are often glad to help.

6. As for depletion estimates of bull trout abundance, the sponsors argue that the software that Montana uses to analyze data for population estimates has only certain options available. Nevertheless, working with an expert like Dr. Paul Lukacs at the University of Montana would allow using even newer methods that can combine data across bull trout samples in various tributaries or regions of Montana to estimate more robust capture probabilities. Likewise, new estimators allow including length as a continuous covariate instead of forcing separate estimates by size classes. This would improve estimates and confidence intervals for this and other projects.

7. As to topography of stream mouths, the hypothesis presented seems rather uninformative, especially if the goal is to determine fish passage upstream or downstream. Would it be possible to determine a measure of minimum habitat needed for fish passage (thalweg depth?) and to compare this through time, in addition to overall topography?

8. It is not entirely clear why evaluations of condition, growth, CPUE, and contributions of hatchery and wild sturgeon for fish captured in Montana will be compared to fish collected in Idaho and British Columbia. How will this information be used to inform management decisions?

9. More details for the adaptive management plan should be provided for contracting and Council consideration. For example, what are the implications for decisions about dam operations resulting from various outcomes of the project? Who will be involved in making those decisions and who will have final authority? How will dam operation decisions influence habitat restoration and fisheries management planning? What are the consequences to other aspects of the project if Didymo control efforts fail?

10. The sponsors should provide evidence of a strong commitment to sharing successes and lessons learned with others in the region and beyond through workshops, meetings, agency reports, and peer reviewed scientific publications. The peer-reviewed publications provide the opportunity to learn from other scientists who review the work, as well as to create a permanent record of the research and management decisions that is easily accessible in other places and future times.

ISRP Retrospective Evaluation of Results

This project has been ongoing for six years, during which the flow regime has been changing in the Kootenai River but has been more stable in the Flathead River. Partly as a result of recent changes, project results are further advanced for the Flathead River system than the Kootenai. Key questions about effects of ramping rates and reservoir levels on bull trout habitat use and benthic invertebrates have been answered in the Flathead River, although further questions remain about potential effects on native mountain whitefish and an invasive diatom (*Didymo*). These are the subject of ongoing study. In contrast, data on the effects of the new regime in the Kootenai River have been collected for several years since the flow regime change in 2008, but it will take more years before sufficient data are available to compare to previous regimes. Five years of data after the regime change would be a minimum to allow useful analysis. Improved designs are being developed for analysis of these before-after comparisons to capitalize on the substantial data being collected in the Kootenai River.

12.Flathead Subbasin

[199101903](#) - Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)

Sponsor: Montana Fish, Wildlife and Parks (MFWP)

ISRP recommendation: Meets Scientific Review Criteria - In Part (Qualified)

Qualifications:

The ISRP's recommendation results from the omnibus nature of the project's objectives and work elements. In general, the proposed efforts lack an overall cohesiveness that addresses mitigation priorities for Hungry Horse Dam operations outlined in the loss statement and joint mitigation plan (with CSKT). The ISRP suggests that MFWP develop a retrospective that summarizes past work under five general themes and prioritizes general objectives for work in the next 5 to 7 years, showing links among themes as necessary. This retrospective would be reviewed by the ISRP. These themes might be arranged as below:

1. Effects of dam operations on fish and invertebrate habitat and populations.
2. Restoring native westslope cutthroat trout (WCT) to the refuge in the South Fork Flathead River (SFFR) above Hungry Horse Dam (HHD).
3. Understanding and managing non-native species invasions, primarily from rainbow trout, lake trout, and northern pike.
4. Population structure, demography, and viability of three salmonids and several sculpins.
5. Processes that create and maintain habitat for these species, and habitat enhancement to aid these processes.

Therefore, the ISRP recommends to the Council that the sponsors prepare a 10 to 20 year retrospective evaluation as a qualification for further support. The evaluation should address previous and long-term efforts within the context of how well actions have met or not met mitigation goals/objectives associated with the loss statement and mitigation plan. From this retrospective, the sponsors should construct within the next 18 to 24 months a prioritization framework for ongoing and future mitigation actions and RME. These backward and forward looking document(s) would be reviewed and reported on by the ISRP in a retrospective report. Ultimately, the latter will assist the Council by informing how an individual Objective fulfills a priority and then ultimately how it will accomplish this fulfillment.

An additional qualification is the absence of M&E for resident trout produced by Creston NFH (USFWS; see project 1991-019-04 and associated ISRP review) and stocked by and for MFWP in fishing lakes. The Creston proposal indicates the recipients of the hatchery trout are responsible for stocking decisions and monitoring. The program requires a coordinated M&E effort. This current proposal appears to be the likely venue for evaluating the vital fishery and harvest components of the fish stocked into fishing lakes. The ISRP recommends to the Council that the cooperators (USFWS, MFWP, and CSKT) submit a joint monitoring and evaluation plan for the associated production and stocking activities.

The ISRP's "In Part" recommendation stems from either uneven, inadequate, and qualitative detail or questionable rigor for several of the Objectives and associated Deliverables. Specifically, for Deliverable 1 (population monitoring), the design of the PIT tagging work needs a more thorough presentation and inclusion of analysis and results from previous efforts. Moreover, some additional linkage to how data are managed, analyzed, and made available is an important omission.

For Deliverable 3, information about the number and location of enhanced stream reaches, along with complementary information for reference reaches is needed.

For Deliverable 4, ISRP remains skeptical of the long-term success of "genetic swamping" approach to hybrid suppression without a complete or nearly so, elimination of RBT or their hybrids. However, there may be merit as a well-controlled, proof-of-concept "experiment" that would inform future management actions. As such, sponsors need to present a monitoring design that would rigorously evaluate the effectiveness of the approach over a multiple generation time frame. A summary of the percentage of WCT and RBT alleles is not a robust metric of success. Rather, some analysis of how the alleles are "packaged" is needed to determine whether a rainbow trout population persists and introgression is continuing or has been effectively suppressed by the method. Moreover, is there an accepted temporal component, that is, how many generations, before the method is deemed a success or not.

The ISRP questions the overall key uncertainty or need associated with Deliverable 6. There is a literature basis for answering this kind of question regarding the persistence and fate of rotenone. Unless there is a unique aspect to the issue, this kind of work has been done elsewhere. Similarly, Deliverable 7 does not identify the key uncertainty(s) and the design for the work. Therefore, these two Deliverables do not meet scientific criteria.

Finally, for Deliverable 9, the ISRP is uncertain about the necessity to develop a library of 300 SNPs for the rainbow and cutthroat introgression issues, whereas 100 SNPs are proposed for bull trout. While analytical power may be increased by having more loci, certainly there will be redundancy with a target of 3-10 markers per chromosome. What is needed to justify either of these library sizes is a power analysis and objective decision rules for deciding sufficiency of the size of the marker set for each specific question/sub-objective.

Comment:

On a positive note, ISRP applauds the sponsors in their history of creativity and commitment to publishing their work in peer-reviewed outlets. This adds great value and credibility to their RME efforts. From the in-person presentation and on-site visit, the ISRP judged that the sponsors have undertaken many valuable tasks, implemented most of them reasonably, and have an admirable track record of publishing in the peer-reviewed literature. However, the presentation of task accomplishments is not well linked to the categories of mitigation identified in the problem statement, and the accomplishments section does not arrive at a conclusion regarding the status of the task of mitigating for the impacts of Hungry Horse Dam. Adaptive management as a consequence of completing uncertainties research, status and trends monitoring, and implementing restoration actions appears sufficient. Dam operations have been modified, angling regulations for predacious non-native game fish liberalized, and the westslope cutthroat trout management plan established.

A major question is whether estimating vital rates for bull trout and westslope cutthroat trout using PIT tags could be improved by using the design and analysis approach in Program MARK (see website of Dr. Gary White at Colorado State University). This flexible system was designed for estimating survival, abundance, and movement rates for long-lived and mobile organisms like ducks, frogs, and salmon. Recent advances also allow combining data across systems to achieve greater power in estimating parameters like survival and capture probability (for example, see Saunders et al. 2011 in NAJFM for abundance estimates of trout in 10 streams). Likewise, the method allows explicitly incorporating detection rates. Dr. Paul Lukacs of the University of Montana is an expert in using this method, and might be engaged in the research, perhaps with a graduate student or postdoc to achieve state of the art estimating and modeling. The synthesis will prove critical in this project.

[199101901](#) - Hungry Horse Mitigation/Flathead Lake Restoration and Research, Monitoring and Evaluation (RM&E)

Sponsor: Salish and Kootenai Confederated Tribes

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

This proposal has many positive aspects, for example shoreline restoration, conservation of westslope cutthroat trout, and riparian restoration. It also has a significant number of concerns. In some cases the benefits to fish and wildlife are debatable, such as lake trout reduction. Objectives and outcomes are not clearly defined with many quite vague, and provisions for monitoring and evaluation of results via data management are murky. Nevertheless, the

proposed activities, if carried out in a scientifically credible manner, are consistent with the Council's Fish and Wildlife Program. A stimulating site visit in October 2011 demonstrated quality field efforts based on well thought-through logic and understanding.

Important issues remain with the proposal for this large, multifaceted effort and are discussed below as a means of providing constructive feedback to the sponsors. These should be considered during the contracting process and through additional ISRP review of the Flathead Lake Environmental Assessment.

1. Objectives and Deliverables need to be better linked, and both need specific details articulated. As they stand now, most objectives are vague and difficult to properly evaluate. To a substantial degree these concerns result from having a very large and diverse proposal that might better be split into two.
2. Transparency of linkage with Montana Fish Wildlife Parks needs clarification. The absence of listed project relationships probably does not reflect those that are in place with state and federal agencies, and others. The CSKT and MFWP have a shared mitigation and implementation plan as well as roles outlined in the Flathead Subbasin Plan. For the Flathead Lake component of the proposal, it appears to reviewers that success in suppressing lake trout will be impossible if there is not a unified program by both co-managers of the lake. The proposal under Deliverable 3 indicates some unspecified level of coordination with MFWP as part of the ID team during the creation of the Environmental Assessment in 2012. It would be helpful to increase transparency of the linkages between this proposal and those in 199101903 (MFWP).
3. The lake trout reduction program needs continuing assessment as to how it will be accomplished and a timeline for meeting a stated goal incorporated into the proposal. The predator problem is too big for an individual project to solve. It needs a basinwide approach and study with an adequate design. As discussed in the ISRP's programmatic comments included in the front section of this report, a more unified effort is needed in dealing with lacustrine predators. This effort might include getting together appropriate groups of fishery biologists and modelers dealing with lake trout and other exotics, such as walleye, for a conference. One conference goal could be to discuss and design studies that cover multiple locations that complement each other, especially for eradication issues. Further, there are emerging predators other than lake trout, such as smallmouth bass, that require monitoring, especially if temperatures increase from climate change or local land use. It seems worthwhile to engage in preliminary modeling to gain insights into systems and biotic communities going forward.
4. The data management system requires careful scrutiny. This aspect of the program needs a better description. It is not clear that an efficient data management system is in

place. Considering the scope of the projects, there needs to be a clear and open system for entering and analyzing data, and for assessing data quality. Further, many of these data are acquired with public funds and therefore should be readily available to the public. What facilities and equipment, including software, are in use? What are the planned upgrades to the data management system, for example cloud computing?

5. A number of unpublished reports are listed as accomplishments, but very few professional publications, especially by principals in the program. Publication needs stronger emphasis in the future.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The primary purpose is for fulfilling mitigation from impoundment and operation of Hungry Horse Dam. This project partially describes an effort by CSKT to understand limiting factors of native fish and to monitor effectiveness of management actions and population status/trends in the Flathead basin. The project tiers to other regional planning and conservation activities, especially the Draft Recovery Plan for Bull Trout, the Montana Cutthroat Memorandum, and the Flathead Subbasin Plan.

The proposal does not delineate all planned activities, but rather focuses on and summarizes efforts in two "landscape level" areas – Flathead Lake and Jocko River. For the Flathead Lake part, the proposal focuses on getting a handle on the scale of the lake trout problem. That is, how many and what level of effort will be needed to reduce their impact on native bull trout. For the second part, the proposal focuses on two elements of threats to westslope cutthroat trout: 1) isolating aboriginal gene pools and 2) effectiveness of passage to increase population size in the Jocko River.

The 18 Objectives are very extensive, from tributary and lake habitats to populations to genetics. They are expressed largely in terms of a benchmark for reference. These are broken out further by tasks and work elements that appropriately tier to the objectives. In addition, work on stabilizing the lake shoreline shows success and will be continued (Objective 7).

Presentation of some objectives is hampered by a paucity of supporting information that makes review a challenge. For example Objective 10 calls for at least five local populations of bull trout of at least 100 adults in all core areas but does not indicate how many there are and where they currently exist, which others are targets for rebuilding, and what will be needed to rebuild them. Similarly, a goal is indicated for cutthroat trout conservation populations without providing adequate details, especially regarding current status. Summaries of, or links to, that information are needed. For the Jocko basin, the link to the Master Plan was very valuable to

provide the needed information; something similar is needed for project lands and waters outside the Jocko.

In Flathead Lake, the long-term persistence of westslope cutthroat trout and bull trout is threatened by lake trout. For several years an angler-based approach was used to try to reduce lake trout numbers. Throughout the years, population numbers of species of concern were monitored, but the results were not sufficient to benefit native trout. Now, a more aggressive net-based method is proposed to reduce lake trout numbers to a point where the native trout will respond favorably. A comprehensive Environmental Assessment is being prepared describing the full range of options to reduce lake trout numbers. The effectiveness of the action will be determined by direct measures of lake trout population harvest relative to targets, and ultimately by measures of native fish abundance by redd counts and catch rates in standard gill nets.

The Jocko River represents an opportunity to restore an entire watershed. A watershed assessment was made and a master plan developed to guide restoration activities. The tribes now own or have easements on over 80% of the floodplain. Efforts to date include removal of passage barriers, installed fish screens and reconstructed ~3 km of channelized river. Completed genetic status review of existing westslope cutthroat trout populations to develop a management strategy. More of the above-mentioned work needs to be completed over the next 5 years to complete the project. Also, there is a need to remove non-native fish species from the system.

Regarding emerging limiting factors, it is surprising that competition and predation from non-native fishes are listed as key emerging limiting factors and then it is proposed that rainbow trout be stocked for public fishing. It seems that the sponsors are missing an opportunity for public education on non-natives and may be offering a longer term counter-productive lesson.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The monitoring of Flathead Lake fishery and the evaluation of the "kokanee" experiment ultimately demonstrated the role of non-native lake trout in the system as a limiting factor for native species stability. Several associated projects on bioenergetics, community changes, foodwebs, and shoreline changes have provided information to CSKT, MFWP, and NPS regarding the management options and approaches.

The sponsors did a helpful job linking the accomplishments to ongoing objectives and to reporting of results.

From these, the sponsors identify a list of six management changes due to information from previous monitoring and evaluation, including imposition of a directed fishery removal effort on

Flathead Lake trout and a phased restoration project to mitigate for irrigation structures on the Jocko River.

Although much improved from previous proposals, the approach taken is to state that the overall program has produced many significant accomplishments over the years, and reviewers concur, but although these accomplishments are itemized and briefly described, virtually no data summaries of key metrics are provided. Such metrics were provided during the site tour and during the presentation on Flathead Lake, but they are absent from the proposal.

Similarly, for the Jocko River fish program the proposal states that it has been the subject of major work for 5 years, but summaries of key metrics, especially trout abundance, are not included. Summaries do exist to some degree in the Master Plan, a link to which is provided. More detailed summaries of Corsi's results, either as links or in tabular form, are needed to adequately evaluate the work to date. Deliverable 12 would continue the important task of status assessment of cutthroat trout, but the extent to which the assessment has been conducted to date is not given, nor is a completion date.

The restoration Master Plan for the Jocko River is an impressive document. It is very readable and shows much of quality work with emphasis on whole-ecosystem process restoration and protection. This approach is likely to have great success in the Jocko system where sponsors have control over a large land base and have the resources to sustain a large-scale, long-term effort. This eliminates the need to attempt the conventional band-aid approach of placing instream structures.

That said, it is apparent to reviewers that the knowledge and understanding of fish populations of the Jocko are not as advanced as is that of geomorphology and physical stream and riparian rehabilitation. Reviewers challenge the sponsors to put forth a superior effort when assessing limiting factors for cutthroat trout populations as proposed in Deliverable 12. Rather than uncritically assuming some generic limiting factor for the species overall in a stream reach such as summer temperature or sediment, data should be gathered at times and places when possible limiting factors can be assessed carefully for each key life-stage of cutthroat including egg to alevin, juvenile summer rearing, first winter, and adult. Further, it will not be possible to reduce impacts from non-native trout until project staff has a good understanding of what constitutes the preferred conditions for each.

Fish population data in the Jocko Master Plan have some real limitations. Fish numbers are reported in relative terms of percent catch from electrofishing rather than as population estimates. This is useful in assessing trends, but is limited otherwise. Also, in the Montana tradition, numbers of fish captured per length of stream are reported. Without also identifying the average stream width, it is not possible to compare between sites. A better approach would be to report numbers in terms of fish density, that is, the number per hundred square meters

or similar. An understanding of growth rates and age structure will be needed so that ideally year-classes of cutthroat can be tracked through time.

Regarding adaptive management, the sponsors have used past results to shape the course of their activities. While the recreational lake trout fishery has not been successful in reducing lake trout abundance or increasing bull trout abundance, the results have provided insights on future approaches. They are conducting a large scale recreational fishery experiment and appear to have strong connections with the public, which are positive aspects.

ISRP Retrospective Evaluation of Results

For Flathead Lake the fundamental question is "Do lake trout negatively affect bull trout?" Catch rates in gill nets of bull trout versus lake trout (1981, 1983) vs. (1997-2005) showed a dramatic increase in lake trout following the establishment of Mysis. Bioenergetics modeling provided an estimate that lake trout annually consumed 30,000 bull trout. Also, good data on bull trout redd counts show a major decline since the 1980s, but not continuing to decline in recent years. Other evidence of bull trout declines following lake trout introductions have occurred at Priest Lake, Whitefish Lake, Bowman Lake, and Kintla Lake. An analysis of the lake trout population at Flathead Lake by Hansen indicates that the population attributes are consistent with a population living near carrying capacity, that is, the underlying mortality rate is not high enough to suppress the lake trout population and the body size is below normal. They have collected some useful series of data at Flathead Lake and had some modelers evaluate the data and draw some conclusions. The population numbers of lake trout at Flathead Lake in 2010 (Hansen) were estimated in the spring and fall and differed considerably from 1.1 million to 489,000. It is concluded that current lake trout fishing is not adequate to reduce the population, thus, following an adaptive management approach more take is needed to solve the problem.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The absence of listed project relationships probably does not reflect those that are in place with state and federal agencies and others. The CSKT and MFWP have a shared mitigation and implementation plan as well as roles outlined in the Flathead Subbasin Plan. It would be helpful to increase transparency of the linkages between this proposal and those in 199101903 (MFWP). Overall, the proposal gives the impression that the project operates separately from many other projects in the basin, for example Hungry Horse, and is only peripherally involved with other research activities on Flathead Lake and the upper Flathead Basin.

The role of invasive predators is a central theme of the Flathead Lake part of the proposal. The role of climate change is acknowledged and described briefly, but will require deeper consideration in the future. No focus or funding request was directed at toxics.

A concern of the ISRP in past reviews has been lack of reference to similar efforts, especially regarding lake trout suppression, being conducted in other systems. The current proposal continues that trend, but following the field tour reviewers are now aware the project staff is well apprised of such efforts elsewhere.

In contrast to the lake trout predation issue which is quite well documented, the Jocko River specifics regarding limiting factors are basically generalized without much quantitative data collected including habitat quantity and quality and fish population information.

4. Deliverables, Work Elements, Metrics, and Methods

Monitoring and evaluation was inadequately described, making it impossible to assess whether the data management and reporting protocol is meeting Council standards.

Deliverables: Many are problematic. Several of the Objectives do not have Deliverables, and many of the Deliverables only partially address the Objectives.

DELV-1: Annual population estimates for lake trout in Flathead Lake – This is really a discussion of the methods used. Are they not already in the MonitoringMethods.org website? The sampling methods proposed seem to be very biased toward larger/older fish. How will they effectively sample younger fish?

DELV-2: Quantification of angling parameters in the Flathead Lake fishery – Why should the Council fund this? Recreational angling is a very selective method and does not give a complete picture of the fish community.

DELV-3: A reduction in lake trout population size by the percentage identified in the Lake Trout Suppression EA – The EA process, as initiated, does not identify the best method(s) to use for lake trout reduction. Also, reviewers doubt that a 25-50% reduction in lake trout is possible without an extensive gill net fishery (and a host of other suppression efforts) on such a large lake. Lake trout are abundant, most likely in the millions, and most are smaller and younger individuals. Processing and marketing the fish will require a capital investment, and that is not discussed here. A recent paper by Syslo et al (2011) documenting 15 years of lake trout control in Yellowstone Lake demonstrates the complexities of trying to suppress this apex predator: John M. Syslo, Christopher S. Guy, Patricia E. Bigelow, Philip D. Doepke, Brian D. Ertel, and Todd M. Koel, 2011. Response of non-native lake trout (*Salvelinus namaycush*) to 15 years of harvest in Yellowstone Lake, Yellowstone National Park. Canadian Journal of Fisheries and Aquatic Sciences, 2011, 68:(12) 2132-2145, 10.1139/f2011-122.

DELV-5: Increased fishing opportunity through planting of hatchery-raised fish – Why should the Council fund this? Use of non-native rainbow trout sends a counter-productive message to the public when the stated objectives emphasize native fish.

DELV-6: Land management plans for newly acquired properties – Description of this deliverable does not provide identification of sites, and their characteristics, that require land management plans. This deliverable articulates an approach but does not specifically identify what will be delivered.

DELV-8: Relative population structure of lake trout in Flathead Lake – This deliverable is a more comprehensive approach to DELV-1. While the stated objectives for sampling are to accurately quantify population size structure, and relative abundance of each species within the fish community of Flathead Lake, gill netting alone will not do this. As proposed, it will give a good picture of lake trout population structure, as well as for some other species, but will miss quite a few others. Note that the budget is small for such a large effort.

DELV-9: Immediate post-acquisition restoration and maintenance of newly acquired properties.

DELV-10: Appraisal reports, NEPA documents, surveys, and title reports, and DELV-11: Land protection agreements with private landowners – What properties are involved? Considerable funds are requested, but no details are provided on the properties.

Data Management: This aspect of the program needs a better description. It is not clear that an efficient data management system is in place. Considering the scope of the projects there needs to be a clear and open system for entering and analyzing data, and for assessing data quality. Further, many of these data are acquired with public funds and therefore should be readily available to the public. What facilities and equipment, including software, are in use? What are the planned upgrades to the data management system, for example cloud computing?

Key Personnel: Subcontractors have produced the most peer-reviewed publications. Core personnel should become more active as lead authors on publications; the results are useful well beyond the basin. This metric should be carefully considered as it shows leadership within the broader restoration community.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

No linkages in MonitoringMethods.org are found for this project/sponsor.

[199101904](#) - Hungry Horse Mitigation-Creston Hatchery

Sponsor: US Fish and Wildlife Service (USFWS)

ISRP recommendation (response review): Does Not Meet Scientific Review Criteria

Comment:

The 1996 amendment to the Power Act establishes clear standards for ISRP review. The Council 1999 Artificial Production review and most recent Fish and Wildlife Plan establish guidelines for artificial production projects. The 1996 amendment establishes the requirements for quantifiable objectives and a monitoring plan to determine whether or not they are achieved. The Artificial Production Review and Fish and Wildlife Plan establish that the number of fish produced or released is *not* a sufficient goal; rather, post-release objectives are required. To meet adequate scientific review criteria, post-release metrics need to be established for survival, growth, and harvest. A robust monitoring plan with measurable objectives needs to be designed. The ISRP concludes that this project proposal *Does Not Meet Scientific Criteria*.

The fundamental basis for this conclusion is that the sponsor (USFWS's Creston National Fish Hatchery, in collaboration with CSKT and MFWP partners) has not provided the kind of information necessary for a scientific review of the biological or fishery benefits and costs. Moreover, the project sponsor has not demonstrated that a monitoring and evaluation plan is available against which to evaluate claimed success and mitigation benefits. Finally, there is no direct support for the sponsor's claim that the lake fisheries divert harvest pressure from local sensitive areas (beyond secondary-level claims from an Ontario MNR website that does not provide data or analysis).

In the preliminary review, and in previous review cycles, the ISRP explicitly requested a linkage to an M&E plan within the context of MFWP's Hungry Horse Mitigation project or as a stand-alone plan; an evaluation summary of biological and fishery data; and evidence of diverted pressure benefiting the local sensitive populations. While the sponsor provided some very basic information which the ISRP identified for inclusion in results reporting, for example the sites stocked and health/pathogen certifications, the broader reporting requested based on a foundational M&E plan was not provided.

The sponsor responded inadequately to the ISRP request for a copy or a linkage to an M&E plan. The sponsor indicated that the CSKT and MFWP recipients of produced fish are responsible for M&E. While this may be the case as a matter of policy, no planning or data-reporting such as a link to evaluations in annual reports or elsewhere was provided. The ISRP acknowledges that the sponsor is requesting funds for an operation and maintenance activity in support of their partners' management activities. Moreover, the ISRP acknowledges that the sponsor may not be ultimately responsible for, nor has been delegated authority for, conducting the monitoring and evaluation required for a science-based program. However, this

does not change the fact that the ISRP cannot judge the merits of whether or not production, release, and management of rainbow trout or cutthroat trout in the state and tribal lakes satisfy mitigation goals.

To guide the Council and to assist the sponsor and its partners in meeting the scientific criteria for the stocked lakes fishery programs of CSKT and MFWP, as well as the O&M project for producing trout for stocking by CNFH, the ISRP recommends to the Council that the sponsor and partners produce a collaborative M&E plan within 12-18 months. The plan should include:

- a) clear and measurable objectives, not simply conceptual goals, that include benchmarks or targets indicating amount of success;
- b) specific working hypotheses, that is responses to management actions;
- c) a general approach to testing these hypotheses, including the specific metrics and analyses that will be used for production and post-release performance evaluations; and,
- d) the structure of results reporting.

The M&E plan should focus on the whole program, of which trout production is but a single, subordinate objective. Also, the M&E plan should address each partner's role, not only in operations, but specifically in terms of evaluating whether or not the program is meeting well-defined and quantifiable objectives. The ISRP has found beneficial the inclusion of a conceptual logic pathway describing the program, including possible stopping points if mitigation objectives are not being reached, as well as other adaptive management decision points.

The ISRP also recommends the Council requests that the sponsor and partners produce a retrospective analysis of the "stocked lakes" program within 12 to 18 months, in concert with the M&E plan. The analysis should be an objective evaluation and assessment of the program's degree of success in meeting its mitigation objects, including identifiable information gaps that would inform the M&E planning.

ISRP Retrospective Evaluation of Results

Creston National Fish Hatchery obtains west-slope cutthroat and rainbow trout eggs, hatches them, and rears the progeny with the goal of distributing 100,000 west-slope cutthroat trout (WCT) and 100,000 rainbow trout (RBT) annually in offsite closed-basin lakes for Montana Fish Wildlife and Parks (MFWP) and for the Confederated Salish-Kootenai Tribe (CSKT) to mitigate Hungry Horse Dam. The objective is to provide fishing opportunities to the public and tribal members that will reduce fishing pressure on cold water habitats selected as recovery areas for native fish populations. Eyed westslope cutthroat trout eggs are obtained from the MFWP

Washoe Park State Fish Hatchery (M012 strain) and rainbow trout (various strains – Arlee, Eagle Lake, Kamloops) from the Ennis National Fish Hatchery.

For cutthroat trout survival from eyed eggs to release was 79, 69, 20, 44, and 51 percent for the years 2005 through 2009. The 20 percent survival rate in 2007 was caused by a pump failure. Survival of juvenile trout has been affected by cold water disease. The founding stock at Washoe Hatchery is reported positive for the pathogen. Fish health inspections at Creston have been negative for reportable bacteria and viruses. For rainbow trout survival from eyed eggs to release was 89, 99, 87, 83, and 86 percent for the years 2005 through 2009. Fish health inspections found all rainbow trout lots to be negative for reportable bacteria and viruses.

To meet MFWP and CSKT management requests, Creston NFH stocked the following numbers of trout during the last five fiscal years: FY 2010 WCT 122,611 RBT 102,111; FY 2009 WCT 96,406 RBT 72,922; FY 2008 WCT 97,417 RBT 71,189; FY 2007 WCT 104,840 RBT 86,652; and FY 2006 WCT 99,126 RBT 100,239.

Post stocking survival and harvest is unreported. The ISRP is unable to establish mitigation fishery benefits. The ISRP highly recommends that this program improve its record of results reporting.

[200200300](#) - Secure and Restore Fish and Wildlife Habitat in Montana

Sponsor: Salish and Kootenai Confederated Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria

Comment:

The response addressed the key ISRP concerns. The scoring system for habitat and cost are simple and relatively comprehensive, and with review from biologists during a site visit, should allow ranking parcels by their benefits to fish and the relative costs to achieve these benefits.

Likewise, with regard to climate change, the ISRP agreed that selecting properties that have features making them resilient to increased temperatures, and increased variability of temperature, flow, and other disturbances, will make them as resistant to climate change as possible.

A few comments about the criteria should be considered as the sponsors move forward. The numbers below refer to the criteria.

Biological Criteria

1. Is overwinter habitat not often limiting for the resident fish? If so, should its importance be scored higher?

3. This is apparently a new criterion, and groundwater is an important consideration. However, if the depth to groundwater is not known, then some of the categories are not mutually exclusive. Also, is groundwater measured next to the stream, at the boundary between floodplain and uplands, or where?

5d. This criterion seems to contradict the statement above it that all parcels must include at least one river bank. That is, if they don't then they aren't even considered for scoring.

Cost Criteria - If the minimum score for each of the four criteria is 1.0, then is the minimum total score not 4.0, instead of 4.5?

The ISRP also felt that connectivity and adjacency could be given more weight in the criteria, and in ranking parcels. For example, the targeted resident fish generally need multiple habitats that are dispersed throughout watersheds, so the importance of any one segment of stream or river may depend on whether native species can reach it. Likewise, the benefits of one parcel may be greatly increased if it provides suitable summer habitat but is also adjacent to another protected parcel with winter habitat.

In contrast, it may also be important to know whether nonnative species can reach the site or whether they are limited by barriers to connectivity. That is, sometimes lack of connectivity can be a good thing. This is partly addressed in Biological Criterion 1d but probably deserves its own criterion.

ISRP Retrospective Evaluation of Results

The ISRP is pleased with efforts by the two sponsors to collaborate actively on this project. This level of cooperation and collaboration is rare in the Columbia River Basin. The project has so far protected 35 km of streams since 2002 using about \$27.5 million, including 6000 acres of riparian habitat. Some of the parcels are key components of the Jocko River restoration effort (see the Jocko River Master Plan) and others link to the River to Lake Initiative on the Flathead River mainstem upstream from Flathead Lake. Overall, ISRP members were especially impressed with the ongoing acquisitions in the Jocko River basin as contributing important fish habitat.

13. Malheur Subbasin

199701900 - Evaluate Life History of Native Salmonids in Malheur River Subbasin

Sponsor: Burns-Paiute Tribe

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The sponsors should be congratulated for preparing a very strong proposal. The proposed work would benefit bull trout recovery and provide useful background information on the status of redband trout in the Malheur basin. Success of the Lake Creek brook trout suppression effort hinges on significant reduction in brook trout abundance in High Lake.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The goals of the proposed work are to suppress brook trout in priority streams supporting bull trout within the Malheur basin and to conduct a basinwide assessment of redband rainbow trout abundance. Mechanical methods, such as electrofishing and strategically placing weirs to impede brook trout movement into bull trout spawning areas will be used to suppress brook trout. Mechanical methods are being tried as an alternative to a piscicide. The sponsors also propose to undertake a statistically rigorous estimation of abundance of redband trout throughout the Malheur basin.

The sponsors present a convincing argument, based on previous studies in the Malheur basin, that suppression of non-native brook trout, which threaten listed bull trout through genetic introgression and competition, is necessary for bull trout recovery in the basin. Furthermore, the work on redband trout seems justified as this fish is listed as a “species of concern” by several state and federal agencies, and little is known about their distribution and abundance in the Malheur basin.

Especially for the Lake Creek site, the technical background is provided in an unusually strong and complete manner that incorporates quality maps, graphics, and photos to very clearly explain the situation and focus on the nature of the problem. Much of it is based on previous work in the basin that provided needed information on distribution, abundance, movement, and genetic structure of brook and bull trout, and to some extent, redband trout. Furthermore, work done on bull trout and brook trout outside the project area are nicely referenced and used to help design the proposed work. The proposal is well prepared, easily read, and well-grounded scientifically.

The proposal provides a good discussion of how the sponsors’ efforts, and jurisdiction, coordinate with co-managers, and regional and federal agencies and programs. There are

indications of unusually strong efforts to communicate. This project is closely tied to other projects in the Malheur basin and to several regional plans. The project directly responds to the Columbia Basin Fish and Wildlife Program 2009 Amendments, the USFWS Bull Trout Recovery Plan, the Malheur River Subbasin Implementation Strategies for bull trout (2011 draft), and the Malheur Subbasin Management Plan. The sponsors have been awarded several non-BPA contracts for other related components of the proposed work.

There are seven objectives, several of which commit to gathering statistically sound estimates of the status of populations of native species. All objectives appear sound and important. They address the crucial problems identified by the sponsors. Accomplishment of these objectives should aid in recovery of bull trout in the basin and provide useful background information on redband trout.

Critical to the success of the Lake Creek project is successful suppression of brook trout in High Lake, a headwater lake that serves as a source population of brook trout for Lake Creek. Removal of brook trout from High Lake has been ongoing for a couple of years. Based on the information presented in the proposal, it appears that a large proportion of the brook trout population has already been removed. Because the lake is relatively small (~ six acres) there is a high probability that the project will be able to significantly reduce brook trout abundance.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Accomplishments to this point are considerable. The sponsors present a thorough discussion of results that not only describe previous baseline work but also serve as a justification for the currently proposed work. The proposal clearly describes the work completed to date on bull trout, which is largely radio tracking, and how it is useful in developing the design of the proposed suppression efforts. The limited work to date on monitoring the status of redband trout in the Malheur basin was adequately described. Plans for developing a stronger database were outlined.

Discussion of results would have been improved if the sponsors provided some analysis of habitat quality and quantity including not only temperature but also other habitat factors such as deep pools, and large wood, and whether habitat is a limiting factor for bull trout. A question for the sponsors to consider is: would habitat enhancement as well as direct mechanical suppression of brook trout in concert improve chances of bull trout recovery?

In some cases, bull trout and brook trout abundance from earlier surveys is expressed as total numbers of fish. In future work, the sponsors should consider expressing abundance as densities or CPUE, for example in the High Lake brook trout removal project. These expressions of abundance would make comparison between locations more relevant as different sampling locations may differ in sampling effort and amount of habitat sampled.

Adaptive management is clearly evident in this work. Considerable previous work in the basin has focused on gaining baseline information on population status of brook, bull, and redband trout, and factors limiting native trout abundance and distribution. Based on this work the sponsors propose to begin more management oriented work on brook trout removal and restriction of their movement into streams where they are absent or at low abundance, the response to bull trout to the brook trout suppression efforts, and a more systematic and complete assessment of redband abundance and distribution.

ISRP Retrospective Evaluation of Results

This project is well designed, with important accomplishments to date. The project has progressed significantly over the years. The sponsors present a thorough discussion of results that not only describe previous baseline work but also serve as a justification for the currently proposed work. The baseline work consisted of obtaining needed information on status and trends of bull trout and, to some extent, redband trout in the Upper and Middle Malheur basin, and identifying limiting factors for bull trout. Brook trout were identified as a major limiting factor. The sponsors propose to undertake brook trout suppression in key bull trout streams to address this problem. The progression from initial assessment of status and trends to the direct management action of brook trout suppression is both logical and necessary for bull trout recovery and is an excellent example of adaptive management.

Critical to the success of the project is successful suppression of brook trout in a headwater lake that has served as a source population of brook trout. The ISRP recommends that the sponsors seriously consider treatment of the lake with a piscicide as the methods they are currently using probably will not lead to complete eradication of brook trout.

The sponsors also plan to undertake a systematic and complete assessment of redband trout abundance and distribution in the Malheur basin. This work is well planned and well designed and should provide much needed information on redband status and trends. The ISRP recommends that the sponsors evaluate limiting factors as part of this assessment.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Relationships among agencies and the Tribe seem well developed and clearly described. Recovery of bull trout in the Malheur basin is a multi-agency effort in which the Burns Paiute Tribe has taken the lead role. The proposal directly and comprehensively addresses the non-native fish problem but does not deal with effects of climate change, which could elevate stream temperatures directly jeopardizing bull trout and possibly benefiting brook trout.

4. Deliverables, Work Elements, Metrics, and Methods

Most deliverables contribute directly to accomplishment of the objectives. The methods for the most part appear sound. The work is well designed. We commend the sponsors for using a GRST design for sampling redband trout (Deliverable 3) and estimating abundance of brook trout (Deliverable 7) and bull trout (Deliverable 9) in Lake Creek.

The proposed work has been nicely thought through and is very clearly laid out. The detail and explicit emphasis in this section of the proposal indicates that project personnel are doing nearly all that is currently possible to achieve the rapid and concerted brook trout suppression required to bolster Lake Creek bull trout.

Reviewers, however, continue to support chemical suppression of brook trout in High Lake. Mechanical suppression, especially if it includes capture of all spawning adult brook trout in the outlet and inlet, might be able to significantly reduce abundance. However, with this species' ability to successfully spawn in spring seeps in the lake proper, it is unlikely that eradication would be possible. Night electrofishing in a raft with a throwable electrode has proven effective in ponds as fish may move into shallows at night and freeze in the craft's underwater lights.

There are other reasons for support of chemical treatment of High Lake. It was historically fishless and fits with recent USFS emphasis on restoring lakes to a fishless state to favor amphibians and other native species. There is a precedent to using chemical treatment in Wilderness Areas. Montana Fish, Wildlife and Parks (pers. com. Matt Boyer, MFWP, Libby/Kalispell) recently has done so.

Weir placement and operation on Meadow Fork Big Creek should be suitable for restricting movement of brook trout into the stream. This activity appears to be a valuable component of the project.

The proposed survey protocol (Deliverable 3), designed to develop a robust assessment of redband by electrofishing non-privately-owned sections, seems adequate. The links to location maps were helpful. Some habitat attributes will also be recorded.

Reviewers suggest that the survey also could and should be used to gain understanding of factors limiting redband abundance with only minor additions to protocol, but it can only be successful if thought through prior to initiation of fieldwork, rather than after-the-fact. A very few simple hypotheses should be framed, such as "large redband are only present if pool depth or volume exceeds some particular dimension." The process does not necessarily need to be statistically rigorous, but over time might lead to the framing and testing of more elegant hypotheses.

The sponsors should consider monitoring the North Fork Malheur while the assessment of brook trout suppression and bull trout recovery in Lake Creek is ongoing. Since the North Fork is brook trout free it seems as though it could provide a useful reference site for comparison with Lake Creek. It is unclear why bull trout in Meadow Fork Big Creek will be assessed by snorkeling and not electrofishing, as will be done in Lake Creek. Meadow Creek, like the North Fork, could provide another worthwhile reference location.

The sponsors propose several metrics for evaluating success of the various suppression and control measures for brook trout including ratios of brook trout to bull trout, abundance estimates, and redd counts. It would have been useful if the sponsors summarized the quantitative target values, ranges, or clear trends of each metric that will be used to determine the success of their efforts for both Lake Creek and Big Creek. Ratios alone may not be sufficient to assess success of brook trout suppression if bull trout abundance declines at the same time as brook trout abundance; that is, a given ratio could be achieved but at the same time bull trout abundance could have declined to unacceptable levels. Additionally, it is unclear how the ratios were derived.

14.Owyhee Subbasin - Duck Valley Indian Reservation

[199501500](#) - Duck Valley Reservation Reservoir Fish Stocking Operations and Maintenance (O&M) and Monitoring and Evaluation (M&E)

Sponsor: Shoshone-Paiute Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

Within 18 months the program should develop a Management Plan for the three reservoirs, and that the plan should be reviewed by the ISRP. The plan needs to summarize the physical, chemical, and biological characteristics of the three reservoirs and the watersheds they are in; establish subsistence and recreational harvest objectives for trout stocking; establish whether economic objectives from recreational fish are appropriate indicators of the program and what the standards and objectives might be; and develop a monitoring plan to collect and analyze the data to determine if the program is achieving its goals and in an efficient manner.

Comment:

The current project leads are new, but they are beginning to examine past results of this program and develop management approaches. Concurrent with this review, they developed a Five-Year Report looking at results from 2006-2010. The report was helpful but inconclusive in establishing whether the program is on track. The first issue is whether there is winter kill or summer kill, and how that should guide fish stocking. Winter water sampling began in 2012. This should be valuable, but it does not require the monitoring of a suite of variables throughout the winter. The critical issue is whether or not winter kill is occurring, and monitoring should be tailored to specifically assess that, with dissolved oxygen as the key variable. From the data given in the Five-Year Report, ISRP reviewers think that summer kill might be expected in Lake Billy Shaw in mid to late summer. Biochemical oxygen demand (BOD) generated by respiration of the massive beds of aquatic macrophytes might lower dissolved oxygen to the point of an anoxic level for trout, but typically this occurs only for a brief period before dawn on days when there is no air motion. To detect this, BOD must be monitored by measuring dissolved oxygen at the critical time, not in mid-day as it has been to date. Sentinel fish held in cages might also be utilized. For these studies, Lake Billy Shaw should receive the most careful scrutiny and Sheep Creek Reservoir the least.

Each reservoir has been stocked with fingerlings, and these usually are intended to provide a put-grow-and-take fishery, in contrast to the stocking of catchable trout which provide put-and-take fisheries. If over-winter survival or if survival during the hot spell is poor, especially in Lake Billy Shaw due to low DO and high temp, then stocking fingerlings may not be accomplishing anything. Stocking fingerlings may also be providing forage for yellow perch. The program

needs to move beyond ad hoc stocking to a biologically based program whose activities are measured and evaluated. Removal of yellow perch and tui chubs needs to be designed and evaluated including details on trapping. Tui chubs and Lahontan cutthroat trout and redband trout coexist in a number of large lakes in California, Nevada, and Oregon, so we know that trout fisheries and tui chubs can be compatible.

In general, presenting mean values for fishery metrics such as catch and effort is marginally useful. Annual data should be reported.

The description of the proposed actions to deal with the canal headcut is an engineering issue, not biological as it currently stands, so additional details are needed to help reviewers better visualize the project.

ISRP Retrospective Evaluation of Results

Three reservoirs on the DVIR receive hatchery trout to provide subsistence and sport fisheries. Sheep Creek Reservoir (SCR) was built in the mid-1950s and has a surface area of 855 acres. Mountain View Reservoir (MVR) was constructed in 1969 with 640 acres and the 430 acre Lake Billy Shaw (LBS) Reservoir was completed in 1998.

A mix of sterile and fertile trout stocks are planted at SCR and MVR, with LBS having only sterile fish planted in the reservoir. In Fiscal Year 2011, a total of about 133,000 catchable rainbow trout were planted in the DVIR reservoirs. Of these, 16,000 sterile rainbow trout were planted in LBS, 54,000 sterile and fertile rainbow trout were planted in MVR, and 63,000 fertile rainbow trout were planted in SCR. Additionally, due to the recent increase in the amount of area colonized by Eurasian milfoil in MVR and LBS, 4,000 triploid (UFSWS certified) grass carp were introduced (3,200 in MVR and 800 in LBS).

The average annual fish harvest in Mountain View Reservoir (MVR) is approximately 14,500 fish. Assuming each fish harvested has grown since the time of initial stocking (average of 30 cm, 0.58 g), growth in length is proportional to weight (evidenced by the average W_r of 97.9), and that the Length Frequency histogram is representative of the population as a whole and that the largest proportion of fish are in the 35-40 cm range, most fish harvested should weigh approximately one pound. A harvest of 14,500 pounds of fish is equivalent to a 42% mass harvest rate. This allows surviving fish, beyond the initial year of stocking, to increase in size, resulting in a more desirable fishery. It must be kept in mind that much of the harvest is not reported, particularly in regards to tribal member subsistence fishing. Implementation of a new creel survey methodology is anticipated to collect more accurate data beginning in the summer of 2012.

Utilizing the same assumptions for Sheep Creek Reservoir (SCR), with an annual fish harvest of approximately 8,000 individuals, results in a 44% mass harvest rate.

Lake Billy Shaw (LBS) has been managed for a trophy fishery since construction. Following along with the same assumptions as described above, with an annual reported fish harvest of approximately 250 individuals (ca. 6300 were caught with most released), results in a 2% mass harvest rate. This is an exceedingly low amount of biomass removed from the system each year given the previous stocking levels. Stocking levels will be further reduced in 2012 and beyond, trying to achieve a balance between stocking levels, production, and harvest. As a side note, this reservoir is the most popular fishery for the local population, though none are reported.

[199701100](#) - Duck Valley Reservation Habitat Enhancement

Sponsor: Shoshone-Paiute Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The sponsors provided most of the information the ISRP requested. The ISRP qualifications can be resolved during contracting and do not require further ISRP review.

1. The portion of the response describing priority ranking of habitat enhancement sites is somewhat unclear, as described in comments below. The ISRP suggests that the sponsors should make clear during contracting that the project will prioritize native fish needs over other productivity and water quality considerations.
2. The extent to which monitoring data are being gathered at sites other than Skull and Strickland Canyon creeks is unclear. During the contracting process, it should be ascertained that the Status and Trend Monitoring Strategy plan of 2004 is being adequately followed elsewhere on the Reservation, as proscribed. The response indicates that the Tribe uses another site selection procedure different from the Status and Trend Monitoring Strategy plan, based on water quality standards set by Idaho Department of Environmental Quality and/or the EPA. It should be established during the contracting process that the original protocol is not compromised.
3. Additional information supporting proposed habitat enhancement in the East Fork Owyhee River is needed during contracting, as described below.

Comment:

The portion of the response describing priority ranking of habitat enhancement sites is somewhat unclear because the response states "a priority ranking based on water quality" will be used but also states that Tribal departments meet to rate potential habitat enhancement projects based on Tribal goals to "enhance productivity and water quality of springs and streams that support native fish habitat." The cause of confusion is whether the goal is to enhance productivity of springs and streams for other than native fish or do native fish have priority in selecting activities to enhance productivity and water quality? The ISRP suggests that the sponsors should make clear during contracting that the project will prioritize native fish needs over other productivity and water quality considerations.

The sponsors adequately provided specific references to appropriate RM&E components of the project. The sponsors are urged to interpret results with caution because controls may be biased due to non-random initial selection of treatment sites. Random selection from both treatment and control sites after treatments have been purposefully applied to selected sites is not a valid method of randomization. The proposed methodology of identifying directional hypotheses (one-tailed), focal species, and indicators is appreciated.

The ISRP appreciated receiving details of responses in North Fork Skull and Strickland Canyon creeks to fencing and had several comments. It is clear that extensive beaver activity poses challenges to monitoring. Under the circumstances staff should consider some modifications or additions to sampling protocol. Larger fish in pools will need to be sampled by snorkeling, if feasible, or raft-mounted electrofishing. Using backpack shockers to make a mark-recapture estimate would not be successful as larger fish would not be included. It will be critical to understand the extent to which spawning is successful above beaver ponds or between them. Based on the data reported it appears that it may not be successfully occurring in Skull Creek. Also it is apparent that some individual trees need to be protected from beaver, and management of beaver numbers is needed if they are to continue to play a long-term positive role in the ecosystem.

The response about predation and non-native species, as regards proposed habitat work in the East Fork Owyhee River, is not entirely satisfactory. What evidence exists to support the expectation that lowering stream temperatures will impede bass movement into redband inhabited stream segments and limit predation? Evidence is needed that temperature changes resulting from habitat actions would be close enough to the critical temperature threshold to result in the desired shift in bass and redband behavior. This should be provided during contracting. Explanation of how human transport of non-native rainbow trout around the proposed elevated culvert in newly connected streams will be controlled and how migration of redband trout below the elevated culvert will be controlled should be provided during contracting.

Adequate details were presented in the response to describe the placement of fish screens at the main Tribal irrigation diversion on the East Fork Owyhee River to protect wild redband trout.

15. Upper Snake Province

199201000 - Fort Hall Habitat Restoration

Sponsor: Shoshone-Bannock Tribes

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The sponsors should provide a comprehensive habitat restoration plan including a scientifically sound monitoring and evaluation strategy to the ISRP for review within 18 months. The plan should cover both montane and spring streams on the Fort Hall Reservation. The ISRP strongly recommends that the sponsors enlist the assistance of a fluvial geomorphologist in developing the restoration plan and a biostatistician to assist with the design of the M&E plan and analysis of data. Plans developed by the Crystal Springs and Yankee Fork projects may be useful examples. The ISRP also would like to review the Draft Resident Fisheries Management Plan.

Comment:

The sponsors provided additional, useful information that was not included in the proposal including maps of the project sites and streams; additional data; and a more complete list of objectives and strategies for accomplishing the objectives. The response at least partially addresses the ISRP's questions but unfortunately it raises additional questions and concerns. It is not evident from the proposal and response that the project has a clear direction, a comprehensive restoration plan in place, and a systematically planned and consistent monitoring program for fish and habitat. In future proposals and reports, the sponsors should strive for better organization and more coherent writing, especially in explaining results. Two major issues were not adequately addressed in the proposal and response: 1) a comprehensive presentation of data and analysis, and 2) a clear description of the fish and habitat monitoring plan.

Data presentation and analysis

The sponsors state that habitat conditions in Fort Hall Reservation streams have improved, but this assertion is not as well supported with data as it could be. The sponsors provide a map identifying numerous sites that are apparently continually monitored yet they present data from only a few select sites and sometimes for only a few years. The response could have been improved if the sponsors presented an analysis of trends from habitat and fish monitoring for all sites and streams, and for all years that the sites and streams were sampled. The only habitat data that was presented in the response were trends in silt depth for two streams and channel width for one stream. The sponsors should have identified all the habitat variables, for

example canopy cover, stream temperature, and channel morphology, that were measured and the metrics used, and included these in their analysis.

Discussion of fish sampling design and methodology could have been expanded. It would have been helpful to have known the locations, number, and lengths of sites sampled for fish and the rationale for selection of these sites. The sponsors would do well to report fish data not just as total trout captured but also according to species (Yellowstone cutthroat, rainbow trout, hybrids) and size class.

The sponsors identify some montane and some low elevation reference streams that will be compared to streams with ongoing projects to assess how well the treatment streams are responding to habitat improvement actions. Montane streams and the spring streams on the Fort Hall Reservation should be treated as separate kinds of systems as they differ geomorphologically, hydrologically, and biologically. Thus, it may be problematic to use a montane stream as a reference for a spring stream. It would have been helpful if the sponsors had used data to compare reference streams to treatment streams in terms of flow regime, geomorphology, channel morphology, riparian conditions, and level of impairment. They should justify why these streams are good references based not only on fish abundance but also on habitat conditions.

Monitoring and Evaluation

The sponsors state, “Status and assessment of the habitat and fishery will begin in 2012 which will provide further guidance for future projects for the Bottoms. Assessment and Inventory will quantify fishery status and habitat with the intent to facilitate and determine project effects on the population level.” This statement is perplexing. Based on the proposal and the response, the ISRP Impression was that an M&E plan is in place and that quantification of the status of fish populations and habitat is underway. If there is an M&E program in place, it should have been discussed more fully. Many of the comments made under “Data and analysis” above apply here. What is the design of the M&E plan? What are the design and protocols for sampling habitat and fish? What are the habitat and fish variables that are being measured, and the methods and metrics?

ISRP Retrospective Evaluation of Results

The proposal continues instream and riparian habitat restoration in Fort Hall Reservation streams, largely lower gradient spring streams that are highly productive but provide challenges in their rehabilitation. The sponsors have undertaken a number of habitat restoration projects, some of which appear to have been successful at least locally. They have also encountered difficult problems. For example, on Clear Creek, a major Fort Hall Reservation stream where restoration actions were implemented, habitat restoration was suspended due to the negative

impact of the Tribal bison herd on riparian habitat. This problem remains unresolved, although there are future plans to fence the stream to exclude bison.

Unfortunately the project appears to lack clear future direction. A scientifically sound habitat restoration plan and monitoring and evaluation program are badly needed. Data analysis needs to be more comprehensive. The ISRP strongly recommends that the sponsors enlist the assistance of a fluvial geomorphologist, especially one experienced with spring streams, in developing a robust restoration plan and a biostatistician to assist with design of the M&E plan and analysis of data.

The sponsors have completed a Draft Resident Fisheries Management Plan for the Reservation that awaits approval by the Fort Hall Business Council and scoping by the Tribal Membership. Hopefully, this Plan will address the above concerns.

[200717000](#) - South Fork Snake River Yellowstone Cutthroat Trout Recruitment and Survival Improvement

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation: Meets Scientific Review Criteria

Comment:

This is a long-standing, well-run project that attempts to sustain the South Fork Snake River's native Yellowstone cutthroat trout (YCT). The sponsors are to be commended for the quality of the proposal and the success of their work to date.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The South Fork Snake River is one of the last strongholds for fluvial Yellowstone cutthroat trout within their historical range, and it provides an important fishery with significant economic value. There is a clear need to maintain the viability of this population which is currently threatened by, among other factors, hybridization and competition with non-native rainbow trout and by entrainment in a large irrigation diversion called the Great Feeder Diversion. The purpose of the proposed work is to minimize hybridization of Yellowstone cutthroat trout and rainbow trout, and to quantitatively assess entrainment and subsequent mortality of cutthroat trout in the large irrigation diversion system (an ISRP recommendation), which will result in development of best management practices to minimize entrainment and mortality.

The sponsors provide a nice description of the situation and a clear definition of the problem. The sponsors provide strong justification for this work, first, by clearly discussing the nature of

the threats posed by hybridization and competition with rainbow trout and the dangers to the population of large scale entrainment, and second, by demonstrating how the proposed work fits into their overall management strategy for protecting viability of Yellowstone cutthroat trout in the South Fork Snake. The steps that are being taken to address these problems are well reasoned and carefully planned and, if successful, should lead to major benefits for the fish population. Unlike some other waters in the Columbia River Basin where threats from non-native fishes are so severe that they probably have no hope of a satisfactory outcome, the South Fork Snake offers the opportunity to provide significant benefits to native fish with continued work. The proposed work is consistent with the Fish and Wildlife Program and the Upper Snake Subbasin Plan.

There are two objectives: to protect the genetic integrity and long-term viability of the Yellowstone cutthroat trout population in the South Fork Snake River and to increase the survival rate of the cutthroat trout population in the South Fork Snake River. Both seem appropriate and important. A major assumption of the proposed work is that removal of rainbow trout is critical for cutthroat trout recovery, and another is that this can be accomplished. The sponsors make the case that "yes" applies to both, and the ISRP agrees.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The history of the project and changes in the fish population over the past decade show the ability of the sponsors to recognize the problem, to target and conduct specific research to define alternatives, and implement a multi-pronged management approach. The accomplishments presented in the proposal are operational changes that involve modifications to the weirs in each of the cutthroat trout spawning tributaries which should significantly improve capture of fish migrating into the tributaries. This is important because it allows the sponsors to remove rainbow trout and hybrids and so lessen their chances of their spawning with Yellowstone cutthroat trout. However, this discussion, by only dealing with operational improvements to weirs, does not provide a full understanding of the breadth of accomplishments of this project.

Adaptive management is shown in many ways, especially regarding screening of the tributaries. In fact, the entire management program for Yellowstone cutthroat trout in the South Fork Snake has been evolving based on past results of the work. The changes instituted include weir modifications undertaken because previous weir designs were ineffective, establishment of an angler incentive program to reduce densities of rainbow trout and hybrids in the mainstem South Fork Snake, and modifications to flow regimes regulated by Palisades Dam to benefit cutthroat and the riparian ecosystem.

ISRP Retrospective Evaluation of Results

This project can claim substantive accomplishments that have progressively improved management of Yellowstone cutthroat trout in the South Fork Snake River. The sponsors have a clear understanding of the major problems facing cutthroat trout in the South Fork and have taken steps to address these problems that are well-reasoned and carefully planned and, if successful, should lead to major benefits for the fish population. Their three-pronged approach for managing cutthroat trout includes establishing a more natural flow regime, minimizing competition and hybridization with non-native rainbow trout, and reducing entrainment in irrigation diversions. One of the greatest challenges facing this program at present is measuring entrainment of trout in a major diversion, the Great Feeder, and developing best management practices to reduce entrainment rate. This is a difficult problem to address, but it is necessary for reduction of entrainment mortality. Not all of their work is funded by BPA, but the BPA-funded portion is key and integrates well with their overall management plan.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Relationships between the proposed work and other South Fork Snake activities involving federal agencies and non-governmental groups are well described. It is also evident how the proposed work complements other IDFG actions designed to bolster cutthroat trout by managing the fishery.

Pertaining to emerging limiting factors, the sponsors obviously are addressing the problem of non-native species. They also provided a thorough discussion of the possible impacts of climate change on Yellowstone cutthroat trout and how their management practices could lessen these impacts.

4. Deliverables, Work Elements, Metrics, and Methods

Three deliverables pertain to the tributary work and three address the Great Feeder entrainment component. They appear to be important and clearly described, with appropriate methods, and most appear accomplishable using the approaches and methods outlined in the proposal. Deliverables 4 and 5, which pertain to quantification of entrainment of cutthroat trout in the Great Feeder Diversion and its subsidiary canals, are the most uncertain, but nevertheless necessary. This problem admittedly is difficult to address and the sponsors propose a complex design that involves multiple methods of sampling, extensive PIT tagging, and multiple detection sites. It would have been helpful if the sponsors had discussed how entrainment rates will be calculated for the Great Feeder and subsidiary canals using PIT tag data.

The sponsors state in Deliverable 4, “The estimate of previously PIT tagged cutthroat trout entrained through the Great Feeder will be compared to the estimate of PIT tagged cutthroat trout in the entire South Fork Snake River drainage to gauge the population-level impact of entrainment at the Great Feeder Diversion.” This is a desirable, even critical, estimate. The sponsors, however, needed to clearly explain how they will obtain an estimate of the number of PIT-tagged fish in the entire drainage and why they believe this is the appropriate way to measure proportion entrainment. Perhaps a more appropriate measure would be the number of fish entrained relative to the number of fish passing the entrainment site over any given time period, not the total number of fish in the river. With continued sampling of entrained fish and fish passing the entrainment site throughout the time period when river flow is diverted, a seasonal estimate of entrainment proportion could be obtained. Admittedly, these measurements would be difficult to obtain.

Genetic “sorting” appears to be based on visual identification of rainbow trout and rainbow-cutthroat hybrids. While this is a pragmatic approach, it will likely result in an underestimation of the contribution of rainbow genes into the cutthroat trout population. Unfortunately, alternatives that provide greater discrimination are not practical for real time management.

16. Clearwater Subbasin - Dworshak Dam and Trout Ponds

[200700300](#) - Dworshak Dam Resident Fish Mitigation

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation (response review): Meets Scientific Review Criteria - In Part

Qualifications:

In Part - The enclosure experiments are not adequately justified.

The enclosure (mesocosm) experiments were questioned in the initial ISRP review. Reviewers then felt this work might be of scientific value if it was well justified and shown to be an integral part of the overall effort. The response, however, did not provide an adequate justification for this component of the project. There were no hypotheses and no clear indication of what the measured responses would be, and how those responses could be directly related to kokanee growth and year class strength. This essential information should have been provided in the proposal or response, not just by referencing a U.S. Army Corps of Engineers study at Heppner, Oregon. The sponsor's response defended the intent of the mesocosm study, and one justification for the enclosure experiments is that it will help assuage public concerns. The sponsors also argue that the enclosure experiments will allow them to better regulate nutrient addition to the reservoir and provide a better understanding of the trophic dynamics of the system, although effects on kokanee growth will only be able to be inferred from these experiments. Another advantage of the enclosure experiments is that they could allow determination of the effects of nutrient additions under conditions of less environmental variability than in the reservoir, and could strengthen the inference, based on the response of lower trophic levels, that nutrient addition to the reservoir is having a positive effect on kokanee. The ISRP does not find those arguments to be sufficiently compelling to scientifically justify the resources that would be consumed by this task.

Comment:

The proposal should have provided a better summary of the response of kokanee to the initial addition of nutrients to the lake and have more strongly anticipated the expected future response. The following comments are given as feedback so future analysis might be strengthened.

To understand how the kokanee population responds to nutrient addition, it would seem to be necessary to track each cohort (brood year) separately over its lifespan. Data should have been broken out into growth and abundance by age, and before and after maturation, as that gives a better indication of whether there is a strong year class and how well the fish are growing. Although the sponsors indicated that they would age fish and some objectives addressed

specific numbers of fish of a given age, it would have been better if they had set a target density, that is number, of fish of a given growth rate or size. There are many problems with assessing kokanee populations because of their short life and semelparity. Density plays a large role in not only pre-maturation growth rate but maturation schedule, post-maturation-decision growth rate, total survival of fish to an age, and thus on year-class strength. The proposal would have benefited from a clearer description of exactly how the sponsors would monitor kokanee response to better clarify if abundance and growth are actually responses or just observations independent of the nutrient addition. The sponsors simply showed that kokanee biomass went up after the years of nutrient addition, without carefully documenting the exact age-specific response or causal links that may be potentially identifiable in their shorter term plankton responses.

The proposal does not indicate how many age-groups of kokanee are present in Dworshak Reservoir, but from papers by Rieman and others it appears to be three. Table 1 of the response gives data for a variety of age-groups and appears to suggest the age-2 fish might be the oldest the project dealt with. This point needs clarification.

Reviewers were expecting to see creel census data presented in the response, but the response indicates no creel surveys were done because of lack of funds. This is an important oversight, but the sponsors note that some creel census will be incorporated into future efforts.

The sponsors repeated that, "The benefits of N supplementation are cumulative, with benefits reaching higher trophic levels in successive years." This statement is poorly documented. If many of the phytoplankton responses are rapid and zooplankton consume phytoplankton, then why is it assumed that it takes 4-5 years for a kokanee response? How good are the scientific data from Stockner and the work of others leading to this conclusion and why was it not referenced? Understanding the reality of this lag time seems crucial to their claimed observed kokanee response in the past and crucial to the proposed 5-year time frame in this proposal. Without that understanding, the observed year class of kokanee may have been due to more random and unknown year class events/variability that kokanee are well known to exhibit.

In the response, new information was given on kokanee size and numbers from fall seining of prespawning adults collected at index tributaries of the North Fork Clearwater River. These data, presented with minimal detail, appear to contradict previous conclusions based on trawl and acoustic surveys. Figure 4 shows that the number of adult kokanee gathering to spawn increased sharply in 2010, but that average length was the same as before nutrient addition. This is the opposite of what was observed in summer trawl/acoustic sampling when fish density remained about the same, but biomass increased after nutrient addition as compared to pre-nutrient addition. Also, having this "record number" of spawners indicates a high density of age-0 kokanee might be expected for 2011, which is not a desired outcome, and apparently did not occur.

The ISRP has concerns about the interpretation of Objective 3 and the part of Deliverable 3 that involves this seining of index spawning streams and measurement of spawner length, weight, and fecundity of female spawners. The inference here is that spawner carcasses will increase the productivity of these streams and thus benefit resident fishes. The sponsors make the valid point that nutrient addition to lakes has been shown in other studies to increase kokanee growth and biomass. The sponsors, however, plan to measure neither stream productivity nor the response of lower trophic levels and resident stream fishes. For these reasons, the ISRP does not believe that simply measuring spawner abundance in the index streams and inferring a positive response is scientifically warranted. Without basic measures of stream and lower trophic level biomass productivity, it will be difficult to demonstrate any relationship between the reservoir nutrient enrichment actions with increases in stream food web productivity. If the project moves in that direction, comparisons with adjacent reference streams that are not accessible by Dworshak kokanee spawners would seem an important evaluation element.

[199501300](#) - Nez Perce Trout Ponds

Sponsor: Nez Perce Tribe

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

This is a straight-forward and self-contained proposal, is technically sound, and presents no major issues or concerns. The qualifications are that the sponsors should identify the location and descriptive information about site characteristics and what developmental work is needed before recreational benefits begin. The sponsors should also identify how sedimentation ponds at Talmaks Reservoir will be maintained, including how sediment will be removed.

The ISRP recommends that these items be addressed in the Council's decision making process and BPA contracting.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The background describing the purpose and history of the project and its significance to regional programs is clearly presented. Most of continuing funding is sought for O&M of existing pond programs.

Objectives of the long-standing project are largely to provide fish for recreational use, principally by tribal members but also by non-members, and to provide a valuable outreach function.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The proposal very briefly summarized project accomplishments in a section that would have been inadequate in communicating results in terms of basic metrics like number of hours of recreational effort and trout catch rates to date in the absence of the site visit and the Portland presentation. It appears that 3,000 to 3,700 kg of trout are harvested annually from the three ponds.

Reviewers agree with sponsors' assessment regarding the severe environmental limitations and shortcomings of the Mud Creek and Talmaks ponds. They also understand the traditional value of those two sites. The factors limiting return-to-creel of stocked trout at Mud Creek and Talmaks ponds that have sub-optimal performance appear to be well identified and understood by the sponsors.

It is equally apparent that the Tunnel pond is performing well to provide good recreational opportunities, both in terms of quality and quantity.

17.Deschutes Subbasin - Bull Trout on the Warm Springs Reservation

[200715700](#) - Bull Trout Status and Abundance on Warm Springs Reservation

Sponsor: Confederated Tribes of Warm Springs

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

1. The sponsors need to more appropriately frame their work and all future annual reporting into a bull trout life history framework, including hypotheses and how the data are to be used in hypothesis testing.
2. The ISRP recommends that the sponsors seek assistance with the data analysis and model development, using this long term and valuable bull trout data base, from Dr. John Skalski who is under contract to BPA or a scientist with similar expertise.
3. The ISRP also recommends that the sponsors develop a plan to assess bull trout response to habitat restoration and other management actions.
4. In addition, the ISRP suggests that the sponsors collaborate to a greater degree with other researchers in the Pacific Northwest, including academics and agencies. Such collaboration might include the development of their data sets for publication in refereed journals.

Comment:

The sponsors provided more adequate details of their sampling methods and protocols in the response (www.monitoringmethods.org). The best methods to be used may relate specifically to hypotheses developed. That is, the information needed to evaluate these hypotheses, for example, age structure of fish in snorkel counts. The data collection approach itself seems to be acceptable, but after more than 10 years of data collection, significant problems are arising in the interpretation and actual understanding of the data because limitations have arisen for the data that were not clearly foreseen, for example, resident versus migratory life histories and the need for age structured life history information in snorkel counts.

The key aspect of the proposal for which a response was requested but not adequately addressed was a clear development of hypotheses to guide the bull trout investigation. The sponsors noted that funding limitations and staffing issues due to a shortage of lead scientists have limited hypothesis development. The sponsors stated that *“The lack of qualified personnel that could dedicate time to this project has effectively arrested development of the scientific understanding that should have been realized, which by now would have resulted in*

development of hypotheses to be tested." They also suggest that future efforts will address hypothesis development, but no hypotheses are forwarded and no details are provided as to how hypothesis development will occur. The sponsors seem reticent to develop hypotheses until they have more data, although they did mention some potential hypotheses on pages 8 and 9 of their response. Many of their responses suggest difficulties in interpreting and understanding data that they collected in the past, suggesting a significant lack of staff continuity and loss of institutional memory regarding the details of the data collection. They did note, however, that some outside scientists would be consulted regarding analysis and interpretation of existing data. For example, the analysis of Budy *"will indicate, given the current monitoring study design, what precision and with what power that declining trends in bull trout populations can be detected."*

This lack of hypothesis development and testing has had consequences on the direction and focus of the project since 1998. The sponsors noted that *"In September 2011, a report that reviewed and synthesized data from 1998 to 2009 was completed (CTWSRO Natural Resources Branch Fisheries Research Dept. 2011). Through this effort and preparation of this categorical review, problems that prevent thorough analyses and interpretation of data collected were realized."* One of the main "problems" was the inability to distinguish resident from fluvial bull trout, confounding attempts to assess status of the two population segments. Evidently, even after more than 10 years of investigations, this issue of two main life history components was not fully recognized or addressed. In the sponsors' words, *"Apparently, an initial assumption of the original monitoring plan was that only fluvial bull trout were present in the study area. This is believed to be erroneous and will be addressed by using half-duplex PIT tag technology to determine home range of resident forms and migration timing and spatial patterns for fluvial forms."* This difficulty of identifying the fish in each life history type has clouded the interpretation of the time series collected over the past decade. The proposed work with half-duplex PIT tags is thus designed to address this limitation, although the details of how the life histories will be, as the sponsors state, "teased out" remains unclear.

In trying to understand the resident versus fluvial life history components, it may be useful to think about exactly what kinds of data need to be collected from fish besides PIT tag data, for example telemetry data, scale pattern analysis, reproductive periodicity data, to identify the life histories and how many fish are contributing to each pattern. It would seem that radio telemetry might be an effective method for addressing this issue. In addition, the relation between native bull trout and introduced brook trout is confusing. As the sponsors state, *"brook trout are sympatric with bull trout in index reaches therefore, redds from brook trout and resident bull trout may be indistinguishable."* Other issues regarding interpretation, for example the data depicted in Figures 3-5 in the response, seem to be a result of not clearly having hypotheses to guide the exact sampling methods, resulting in difficulties in interpretation when such interpretation is attempted. For example, snorkel counts may need age estimates with them to be useful to interpret against redd surveys and having a hypothesis

up front to guide the sampling will ensure that the data are being collected in the format needed to test a given hypothesis. The sponsors thus have more than a decade of data, but the interpretation remains a challenge. The project may benefit from assistance and collaboration with other scientists and specialists in the region with expertise in data management and model development.

In the response, insufficient information was also provided on how management actions and habitat restoration will be evaluated.

18. Umatilla and John Day Subbasins - Freshwater Mussels

[200203700](#) - Freshwater Mussel Research and Restoration

Sponsor: Umatilla Confederated Tribes (CTUIR)

ISRP recommendation (response review): Meets Scientific Review Criteria

Comment:

Mussel declines are of great concern throughout North America and elsewhere because of pervasive changes to river systems. Thus, resident mussels are excellent taxa for monitoring and assessing local/regional environmental conditions. The development of a solid understanding of mussels in the Columbia Basin is a logical approach and should lead to better resource management. Project development has followed a logical and conservative pathway, and has contributed greatly to our knowledge of freshwater mussel status and trends in the mid-Columbia. The questions from the ISRP, generally relating to details, were all answered in meaningful ways with a detailed dialogue that covered the issues of concern point by point. The logic went from understanding the genetics, to the fish hosts, to the habitat relationships. Graduate students were covering various phases including habitat relationships for the various genera, and the sponsors seemed to have contact with many mussel biologists and were very familiar with the literature. The ISRP was pleased to see that data from the John Day and the Umatilla jointly being used to develop habitat relationship hypotheses that are now being evaluated.

The ISRP appreciates the approach in this study and is providing a few points of information:

(1) Contaminants can be a serious issue in the Columbia Basin and may act as a "wild card" and confound any mussel habitat relationships that may exist. The anti-cholinesterase compounds (carbamates and organophosphates) are not a simple group to evaluate, especially if mussels are dead and decaying. Residues are difficult to determine, even in fresh tissue, and fresh samples for determining cholinesterase activity should be immediately stored at -80C. Some of the anti-cholinesterase activity compounds (the carbamates) can reactivate back to normal activity at normal temperatures. Perhaps the best approach for dealing with modern pesticides, which are highly toxic but short-lived, is to understand what the farmers and ranchers are using on crops adjacent to the river. When pesticides are applied is important as well. The persistence of these products is not very long; that is, there could be an event that kills mussels and then is over with no residues remaining a short time later. The new lab at Walla Walla may provide an opportunity to address contaminants in a more meaningful way. Fisheries studies, dealing with these types of pesticides, have taken place on Hood River and can provide more background information.

(2) The ISRP notes the possibility of expanding mussel studies into Lake Roosevelt as another project, and the ISRP believes it would be prudent to significantly expand the spatial scope of

mussel studies in the Columbia Basin in the near future, especially the assessment and monitoring.

(3) The data base developed on this project, especially if activities increase in scope, needs to be strong and perhaps 2% of the budget for data management is inadequate. Studies along the Upper Mississippi have been ongoing for many years and perhaps lessons learned can be obtained from their work (starting point might be Upper Midwest Science Center USGS, LaCrosse, Wisconsin, and UMRCC Ad Hoc Mussel Committee, USFWS, Bloomington, Indiana). The sponsors probably know these people already.

(4) Locally, a Freshwater Mussel Workgroup planning committee includes Kevin Aitken, Molly Hallock, Shelly Miller, Shivonne Nesbit, Al Smith, and Cynthia Tait. Again, the sponsors may already know these people.

19. Basinwide - Climate Change Impacts

200900800 - Climate Change Impacts

Sponsor: Columbia River Inter-Tribal Fish Commission (CRITFC)

ISRP recommendation (response review): Meets Scientific Review Criteria (Qualified)

Qualifications:

The response adequately clarified many of the issues the ISRP raised in the review of the original proposal. However, three qualifications remain:

1. OBJ 3 is not fully developed. The manner in which the data base tool for the mainstem (OBJ 1) and the projections of alterations in tributary flows and water temperatures under various climate scenarios (OBJ 2) will be used to develop strategies and tools to mitigate for climate change impacts remains unclear, especially as it relates to tributary habitat. The response seems to imply that the primary mechanism that will be used to achieve OBJ 3 will be providing information to policy discussions regarding river management options. They certainly should make this information available as proposed, but there is no plan to use the information in any formal decision making process nor is any indication provided as to how the information generated under OBJ 2 can be used to identify viable climate change mitigation options for tributary habitat or aid in the refinement of restoration project designs to better accommodate climate change. The ISRP programmatic comments on Structured Decision Management at the front of this report provide some additional information on this point.

2. One of the stated goals of OBJ 2 is to predict effects of climate change on fish populations. The examples provided for Satus and Toppenish creeks illustrate how impacts on flow and water temperature will be predicted but provides no indication as to how this information will be used to predict response of fish populations. Predicting climate change impacts on fish populations will require analyzing which effects will be most important, such as comparing effects of altered temperature on growth and reproduction versus effects of altered climate on drying, freezing, fire, and landslides that will affect tributary habitat. However, the responses suggest that only in a few cases will the sponsors consider climate change effects on multiple limiting factors. A comprehensive assessment of the effects of climate impacts on habitat will be necessary in order to predict responses of aquatic communities and first foods. Some description of the process for predicting fish response should have been included in the response.

3. The response does not adequately address the ISRP concern regarding the potential for synergistic habitat impacts due to climate change, human populations increase, land use change and invasive species. The ISRP recognizes that the focus of this proposal is to generate quantitative, local scale projections of climate change impacts on flow and water temperature.

But in order to identify viable mitigation options, the full suite of factors negatively impacting aquatic habitats needs to be considered. At a minimum, a conceptual design as to how the climate information generated by this study could be coupled with information from studies examining other habitat impacts should be provided.

Comment:

The response addresses many of the ISRP concerns raised during the review of the original proposal. However, there were several ISRP concerns that were not adequately addressed, as reflected in the Qualifications above. Additional comments on specific elements of the response are below.

- 1) The response by the sponsors presented much more detailed information on the project objectives and progress to date than was contained in the original proposal. This new information greatly facilitated the ISRP review.
- 2) The response indicates that there is alignment between this project and other climate research groups in the region. The project sponsors are aware of the latest work in the region to estimate changes to temperature, flow, and habitat due to climate change, as well as the latest work, modest as it may be, to project the effects of these physical changes on fish populations at the regional and local scale. Considerable effort should be expended to ensure that these relationships become more collaborative over time; interactions among programs should be synergistic rather than overlapping. Are there mechanisms in place to ensure that this happens?
- 3) Objective 1 and 2 and the methods that will be used to address these objectives were well described. As noted in the qualifications above, the description of the approach to Objective 3 was not complete.
- 4) The data base tool was adequately described in the response.
- 5) Inclusion of a summary of the results from the flow and temperature projections developed for Toppenish and Satus creeks was very helpful in illustrating the methodology to be used to estimate climate change impacts on tributary habitats.
- 6) The ISRP's concern about the lack of a fully-developed adaptive management strategy or formal decision support process for this project was not completely addressed. The response indicates, "This project will develop information and model projections necessary to assist Tribes in updating their resource plans to include restoration and maintenance actions that ensure ecological resilience. Through collaborative partnerships, this project will also provide information to state and federal agencies necessary for those entities to determine what will be required co-manage tribal natural resources." In a very generic sense, this statement indicates

the intent to use the information generated by this project adaptively. But little detail is provided as to how this goal will be accomplished.

B. Data Management and Information Dissemination

[200400200](#) - Pacific Northwest Aquatic Monitoring Program (PNAMP)

Coordination

Sponsor: US Geological Survey (USGS)

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The issues raised in this review can be addressed during contracting. No response to the ISRP is required.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The continuation of PNAMP activities, particularly web-based coordination and standardization of study protocols and field methods, is beneficial to the region.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The sponsors effectively describe the evolving history of PNAMP and provide an effective summary of accomplishments. The proposal describes PNAMP collaboration and coordination functions as reactionary processes that are responsive to the needs of partners. This is one indication of the adaptive management philosophy of PNAMP. The proposal focuses on shifting more PNAMP effort to web-based resources and tools as another indication of adapting to new information from changing situations.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The proposal summarizes project relationships by stating that, "PNAMP provides a voluntary forum for coordination and collaboration for new and existing monitoring programs and projects in the Pacific Northwest." The relationships are additionally documented by having 20 signatories to the PNAMP charter. The proposal identifies how involvement with PNAMP varies among signatories depending on the activity.

PNAMP's approach to limiting factors is reactionary to the needs of partners as new information about threats to focal species arises. There may be a valuable role for PNAMP to identify limiting factors for discussion among partners before threats arise.

PNAMP has developed the web-based resource, [MonitoringMethods.org](#), to support data management and sharing. Feedback from users of [MonitoringMethods.org](#) should be actively

solicited and used to improve the resource. Other web-based tools have been developed or are proposed. The ISRP supports these efforts.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables are mostly clearly identified and linked to project objectives. One exception is that the utility of the geodatabase mentioned in Deliverable 16 is not clear. More explanation of how integrating the geodatabase with other web resources will be beneficial. This should be specified during contracting.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The ISRP supports the continued development of the standardized protocols and methods in MonitoringMethods.org.

[198810804](#) - StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)

Sponsor: Pacific States Marine Fisheries Commission (PSMFC)

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

In summary, StreamNet's objectives are clearly stated, and most deliverables appear to be on track to meet the objectives (see Qualification #1). The project is of benefit to the Fish and Wildlife Program. However, an effectiveness monitoring plan needs to be developed and implemented (Qualification #2), and QA/QC methods are not documented in sufficient detail (Qualification #3).

The ISRP supports the project's shift in focus to increased emphasis on derived estimates, such as indicators and metrics to support regional scale reporting under the ESA, as per the Coordinated Assessment (CA) project (www.pnamp.org/project/3129). Acquiring data from the tribes is a major step forward. The ISRP supports the strategic plan (Schmidt, 2009) that emphasizes developing internal database capabilities within the data source agencies and a distributed network for dissemination of data. However, the need of a central location for data should be reevaluated as a distributed network system is developed. Coordination and management of such a distributed network will require considerable resources. The ISRP concludes from information in the proposal that there is substantial room for improvement in regional coordination of data management in the Columbia River Basin. This will necessarily

involve discussions with the Council and BPA, as well as agreement and support from the states, tribes, and other management agencies and entities involved in collecting and providing data to StreamNet.

Specific Qualifications:

- 1. Resolve issues concerning Deliverable #2 (update existing StreamNet datasets), as follows:** (1) StreamNet proposes to stop updating or to provide only opportunistic updating of some of its primary datasets for an unspecified number of years until data collection activities for the Coordinated Assessment (CA) project are completed. The sponsors need to clarify how this will impact the Council's Fish and Wildlife Program and other projects and programs that require updated StreamNet datasets to complete their work; (2) A regional discussion on which (if any) data types should be permanently dropped from StreamNet needs to be held; and (3) The sponsors need to clarify whether derived value data being collected for the Coordinated Assessments project meet the needs for reporting High Level Indicators (HLIs) for viable salmonid population (VSP) parameters.
- 2. Design and implement a plan for internal and external effectiveness monitoring.** Previous ISRP reviews cited "Lack of clarity of who uses StreamNet, site use, and user satisfaction." The sponsors responded that "Site usage and use by agency is reported annually in our annual reports" and that it is difficult to assess satisfaction because it is used over the internet. A very strong rationale for any project is that it is achieving its objectives, and it is important to assess how well StreamNet is meeting the needs of agencies, tribes, and other users. The ISRP suggests that the sponsors provide two letters of reference from each agency working with StreamNet, one from the administrative level and the other from the staff level, outlining progress, improvements, limitations and shortcomings of the approach, and whether alternative forums or approaches might better meet agency needs.
- 3. Provide a report describing in detail the data quality assurance and quality control (QA/QC) procedures used by StreamNet.** In the FY 2007-09 review, the ISRP encouraged the sponsors "to complete the draft document describing QA/QC procedures soon." In this proposal, the sponsors state, "We hope to develop a report describing the entire QA/QC process more fully in the future." The lack of well-documented QA/QC procedures reduces confidence in the quality of StreamNet datasets and data management systems.

Specific comments and suggestions for improving the proposal are listed below.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The StreamNet project has clearly played an important role in providing information to regional programs and meeting regional objectives. However, the proposal would be improved by inclusion of a description and evaluation of project significance with respect to regional coordination of data management under the Council's Draft Monitoring Evaluation Research and Reporting Plan, Subbasin Plan objectives, Council's 2006 Research Plan, and other regional plans.

The problem statement focuses on the difficulty that StreamNet has in acquiring data from the Basin's management agencies. If regional data networks develop, however, the need for a central facility like StreamNet may decrease. A long-term goal is to move regional data dissemination toward a distributed "Exchange Network" model. The proposal would be improved by a more detailed description of this model. As those capabilities are developed, StreamNet is working with the Coordinated Assessment project to provide critical metrics, and the ISRP supports this effort.

The primary objective of StreamNet, to provide easily assessable regional data for agencies and others, is highly important. StreamNet appears to be succeeding in this objective, but it could have provided statistics on numbers of users of the database from various agencies (see Qualification #2). Although these data are reportedly located in annual reports, these data should have been summarized in the proposal.

The StreamNet website encourages submission of datasets that may be of interest to others. Although the proposal mentioned a number of other dataset projects, it was not clear to what extent StreamNet datasets might overlap with other datasets that are made available online. The proposal would be improved by inclusion of a dataflow chart showing how all of the datasets and database organizations integrate among themselves and avoid duplication.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The sponsors note that Pisces has some errors in their accounting of project reports, and that they have had difficulty in meeting deadlines for the annual reports and quarterly status reports because "input has to be obtained and consolidated from six subcontracting agencies."

The proposal lists a number of accomplishments, and it describes how it has responded to previous deficiencies. They collaborate with agencies to help standardize data collection so that the data can be stored more readily. StreamNet has responded to most past ISRP comments (see Qualification #3), and they are attempting to fix problem areas as described in detail in the proposal.

It would be useful to obtain information from active agency participants on StreamNet about the percentages of data from their agencies that find their way into the program each year, as well as their perceptions of how successful and useful the project is and what can be done to increase the quantity and quality of data entered (see Qualification #2).

StreamNet has focused on maintaining and updating a set of fish related data over many years and seems to have done a good job with those data and the information technology available. Better results could have been obtained if data storage in StreamNet had been viewed as higher priority among the states and tribes.

One important negative result relevant to the ISRP's ongoing resident fish review is that provision of resident fish data to StreamNet is still not an agency priority. The sponsors state, "We are unable to change this situation, given that even when the NPCC Chair requested that we include more resident fish data, he also stated outright that there would be no additional funding to support the effort."

StreamNet devised an internet-based approach to disseminating data that are standardized and georeferenced across agency lines. StreamNet is, however, labor intensive, and with current staffing they have to focus on updating existing data sets, and have little time available to work to locate and standardize additional types of data.

StreamNet is evolving in response to input from agencies and user groups, demonstrating adaptive management for example by working with the Coordinated Assessments Project. However, this will result in delays by three agencies (WDFW, IDFG, and ODFW) in the updating of primary StreamNet databases (see Qualification #1). The ISRP concurs with the sponsors' statements that a regional discussion is needed on which datasets, if any, to completely eliminate.

About three fourths of the project consists of sub-projects with states and tribes to develop data and databases and make these data available via StreamNet. StreamNet is proposing to expand the project to include the Colville, Shoshone-Bannock and CRITFC member tribes to the project. However, CRITFC's StreamNet budget was moved to Columbia Basin Fish Accords. The current relationship with CRITFC is unclear. Has CRITFC data not been stored on StreamNet in the past? The proposal would be improved by addressing these issues.

Retrospective Evaluation of Results

StreamNet's primary past contribution to the Fish and Wildlife Program has been to provide access to summarized, interoperable fisheries datasets collected by the Basin's fisheries agencies. Data are provide via the project's website (www.streamnet.org) through an online data query system and interactive map applications. The primary data sets include:

- Anadromous fish distribution (generalized)
- Resident fish distribution (generalized)
- Adult abundance in the wild, redd counts
- Adult abundance in the wild, spawner counts
- Adult abundance in the wild, dam/weir counts
- Adult abundance in the wild, estimates of spawner population
- Hatchery returns (anadromous).

StreamNet's goal of providing updated data within a year of data collection in the field has not always been met because of delays from internal reviews and in release of data by the agencies that collected the data.

StreamNet also develops and disseminates a variety of other data types including stream network hydrography, fish barriers, protected areas, hatcheries, dams, and other structural facilities, and fish age data. StreamNet also disseminates independent data sets that do not fit the StreamNet data exchange format and are archived in the Data Store (www.streamnet.org/datastore_search.cfm), where they are searchable and downloadable, along with metadata and functions as a data archive, as suggested by the ISRP (ISRP 2000-3). They also provide source documents for all data contained in the StreamNet database to the StreamNet Library.

Additional past contributions include:

- Initiating development of internal database systems in some partner agencies;
- Responding to data-related requests from participants in the Fish and Wildlife Program, for example their lead role in developing an initial draft Data Exchange Template for the Coordinated Assessments project and hiring specialists to assist agencies in describing data management gaps and needs, which was used as a template to help the state and tribal agencies determine their capacity to locate and provide the specified indicators and metrics (www.pnamp.org/sites/default/files/ca-lessons_learned_report-2011-05-17.pdf);
- Redesign and ongoing implementation of an online data query application for the StreamNet database (<http://test.streamnet.org/>); and
- A guide on data sharing, *Considerations for Regional Data Collection, Sharing and Exchange* (Schmidt and the StreamNet Steering Committee (2009), and a condensed 'top ten list' format (StreamNet, 2010). Many of the concepts discussed in the data sharing guide were adopted by the Coordinated Assessments project and in new data-related requirements for BPA contracting.

StreamNet results can be evaluated in part by review of their responses to issues raised in the past at workshops and by groups like NED, PNAMP, CBFWA and the ISRP, as follows:

- **Timeliness of data updates:** Addressed in part by encouraging and supporting agencies to develop internal database systems and initiate agency-wide approaches to data management.
- **Lack of data from some tribes:** Addressed in part by initiating work with the CRITFIC member and other tribes.
- **Need for additional types of data:** Addressed in part by assisting agencies with developing internal database capacity to allow more efficient data management and sharing.
- **Lack of derived data:** Addressed in part by assisting agencies in development of a data exchange network approach, whereby agencies other than StreamNet provide derived estimates and supporting data via web services.
- **Lack of standardized field sampling:** Addressed in part by collaborating with management agencies and regional scale entities to coordinate what is monitored and how, e.g., the Coordinated Assessments project.
- **Not enough resident fish data:** Not addressed due to a lack of funding to support the effort.
- **Lack of standardization in data collected, collection methods, and data standards:** Addressed in part because data collection issues were not addressed, but data standards were addressed through the Data Exchange Format (www.streamnet.org/reports_pubs.cfm).
- **Unclear priorities for the types of data provided through StreamNet:** Addressed in part by organizing a workshop with CBFWA in fall 2006 and prioritizing abundance data to support the Status of the Resource report, but regional consensus recommendations were not developed.
- **Lack of clarity of who uses StreamNet, site use, and user satisfaction:** Addressed in part by reporting site usage in annual reports, but user satisfaction could not be determined via an online user survey.
- **Lack of description of QA/QC procedures:** Addressed only by a brief description in the 2012 proposal.
- **Lack of adequate metadata:** Addressed in part by working through the PNAMP Metadata Work Group, but limited primarily to general descriptions due to lack of original metadata with the data submitted by data-collection agencies.
- **Justification of the amount of staff and infrastructure:** Addressed in the 2012 proposal.
- **Description of the project interface:** Addressed in StreamNet's Web Query System User's Guide (www.streamnet.org/wqs_guide.html) and user guide for the map interfaces (map.streamnet.org/website/bluesnetmapper/HelpFile.htm).

The StreamNet strategic plan (Schmidt 2009) emphasizes developing internal database capabilities within the data source agencies and a distributed network for dissemination of data. As the distributed network develops, the need for a central location for data management should be evaluated by the agencies and entities collecting, disseminating, and using the data,

as centralized coordination and management of such a distributed network will require considerable resources.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The primary relationships described include those with PNAMP, CBFWA, and CRITFC, and there appears to be good coordination and collaboration with these entities. This section of the proposal would be improved by more information on BPA-funded projects and project numbers, including data collection projects, that are necessary for successful completion of proposed StreamNet objectives and deliverables. The sponsors note that agencies are the major limiting factor for StreamNet, that is, the efficiency with which data can be located and accessed within agencies and converted to regional standards. Clearly, provision of data to StreamNet is not always a high priority for management agencies.

The ISRP supports the StreamNet strategic plan (Schmidt, 2009) that emphasizes providing more support for developing internal database capabilities within the data source agencies. However, progress has been slow in some agencies, because it is not viewed as high priority. Although not discussed in this proposal, the Tribal Data Network proposal (#200850700) appears to be the companion proposal to facilitate this move.

The ISRP supports the increased focus on providing derived estimates and assisting data source agencies with development of internal data systems for storage and dissemination of data.

The sponsors describe important emerging limiting factors with respect to regional-scale data coordination in the proposal. Concerns are being addressed to at least some extent by the Coordinated Assessments project. Nevertheless, the ISRP concludes that there is a need for improved coordination of data management at the regional scale that will necessarily involve discussions with the Council and BPA, as well as agreement and support from the states, tribes, and other agencies and entities involved in providing data to StreamNet.

4. Deliverables, Work Elements, Metrics, and Methods

The ISRP supports StreamNet's proposed new work in several areas: (1) to help develop indicator and metric data for the Coordinated Assessment project; (2) to collaboratively establish data needs and priorities, agree on standardized formats and definitions for sharing, and initiate sharing of the selected data as routine operations; and (3) to revise the data query system to improve user friendliness, increasing speed, and linking tabular and GIS data.

The ISRP is concerned that some data currently collected (Deliverable #2) will be put on hold until a distributed network can be established (see Qualification #1). Because the primary focus of regional data coordination is the Coordinated Assessment project, it is not likely that

Deliverable #2 can be met within the period covered by this proposal. Although this is reflected in a reduction in funding for this deliverable, as discussed earlier in the proposal there is a need for regional consensus on this issue and whether some Streamnet datasets should be completely eliminated.

Among the three work elements listed for this project, none has metrics. The guidance given on the proposal submission site emphasizes an “emphasis on outcomes,” discussion of hypotheses, quantitative (and qualitative) measures and metrics, summary tables and graphs, and trends. Data management activities are amenable to scientific analysis. Key questions, hypotheses, relationships, data gathering and analysis, reporting of results, and revisions based on what is learned are expected. Greater emphasis on trying to measure outcomes and include in the proposal an adaptive management framework for designing, implementing, evaluating, and revising data management activities is recommended.

A log-in system to StreamNet might allow the program to more effectively evaluate public usage.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The project is 100% RM&E and Data Management with three work elements:

None of these work elements is associated with metrics in MonitoringMethods.org; however, it would be useful for retrospective evaluation of project results to develop quantifiable metrics or these work elements that could be used to track trends in data management project results.

[200850700](#) - Tribal Data Network

Sponsor: Columbia River Inter-Tribal Fish Commission (CRITFC)

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Comment:

This is an important project that represents a major step forward in the development of a distributed network system as envisioned in the StreamNet proposal. Otherwise, gaps in data are likely to continue for many evaluations and analyses. However, information in the proposal was incomplete, and the ISRP requests that the following qualifications be addressed during contracting:

1. Objectives should be restated in terms of desired outcomes rather than tasks.

2. All of the objectives require planning and coordination services to at least some extent, but the project proposal addressed tailored questions only for data management. Tailored questions for planning and coordination need to be addressed.
3. The sponsors need to define the success criteria used to determine whether each of the five project objectives will have been met at specified milestones. The proposal should include a project evaluation plan beyond providing annual reports and holding workshops and explain what metrics will be used to assess effectiveness and impact of the work accomplished.
4. As stated in the proposal, deliverables for this project are driven by data requests, and tribal requests get priority, but the sponsors need to provide a more detailed explanation of how tribal and other requests are prioritized.
5. The sponsors need to provide a clear description of exactly what data will be housed in the Tribal Data Network. It appears that there might be some duplication with other projects, for example DART. Will this project store and disseminate data from all tribes, that is, both CRITFC and non-CRITFC tribes, in the Columbia Basin?
6. What are plans for checking accuracy of data? Will there be peer review of methods for analysis of data?
7. The majority of proposed project costs (> \$1 million per year) are related to staff salaries. According to the executive summary current funding covers only 1.5 FTEs, and cooperation with other projects leverages an additional 4-5 FTEs of CRITFC staff. How will the proposed shift in staff FTEs to this project affect work on other projects? The sponsors need to provide a clearer explanation of the percentages of project and individual staff time that will be devoted to each of the proposed work elements, and, if applicable, to other projects.

Additional comments, questions, and suggestions to improve the proposal are listed below.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Project significance to regional programs and technical background were adequately addressed. Objectives are stated as tasks, for example “Providing data management services to the tribes” rather than as desired outcomes. The sponsors need to define the success criteria used to determine whether the project’s objectives have been met. The proposal uses many undefined acronyms and technical jargon, and would be improved by providing a list with definitions of acronyms and technical terminology.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The sponsors list a number of project accomplishments, but this section of the proposal would be improved by describing each result in terms of value-added, specifically with respect to the Council's Fish and Wildlife Program and the region, results of user/member assessment of effectiveness and impact of the work accomplished, and how results of this assessment have modified previous and proposed activities over time to increase value of this work.

The sponsors provide some useful examples of how project results are used for adaptive management.

ISRP Retrospective Evaluation of Results

This is a relatively new project, initiated in FY 2009, to continue support for personnel and infrastructure to allow the CRITFC tribes to collect, house, and distribute data from the projects funded by the Accords, that is, fish and habitat monitoring data for the reservations, ceded lands, and key co-management areas.

The Tribal Data Network's (TDN) primary goal is to ensure the availability and sharing of accurate and timely monitoring data among CRITFC member tribes and with other agencies to meet the reporting needs of the Accords and BiOp while also building capacity within tribes to support informed policy management decisions and tribal co-management needs.

Overall, the project appears to be on track to meet its objectives.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Tribal Data Network (200850700) and StreamNet (198810804) will work synergistically to integrate data management and sharing across the Basin consistent with the Columbia River Basin Collaborative Data Sharing Strategy. What are plans for checking accuracy of data? Will there be peer review of methods for analysis of data? What are the plans for updating data, for example the CHaMP project? Will this project store and disseminate data from all tribes, that is, both CRITFC and non-CRITFC tribes, in the Columbia Basin?

As described in the TDN 2011 workshop report, there seem to be several limiting factors related to data management, not adequately discussed in the proposal, for example, data sharing with NOAA and software/server compatibility. Although this project involves 25% coordination, tailored question for coordination were not addressed.

4. Deliverables, Work Elements, Metrics, and Methods

Is it not possible to get SARs with confidence intervals directly from DART for any set of PIT tagged fish? The sponsors stated that DART may provide some SARs. The sponsors need to check whether estimates are the same.

It is not clear exactly what data will be housed in this Tribal Data Network; for example, is habitat data for intensively monitored watersheds from the Columbia Habitat and Monitoring Project (CHaMP) project to be included? Is this the only place where CHaMP data are stored? Later, it is stated that CHaMP data will be downloaded.

The sponsors need to describe the percentage of project time that will be devoted to work elements, explain what metrics will be used to assess effectiveness and impact of the work accomplished, describe key personnel duties on the project, including the hours they will commit to the project, and provide a more detailed description of QA/QC procedures.

[200850500](#) - Streamnet Library

Sponsor: Columbia River Inter-Tribal Fish Commission (CRITFC)

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

The StreamNet Library plays an important role in providing library services to customers throughout the Pacific Northwest. The Library's goal to assemble grey literature, digitize reports and data, maintain journal subscriptions, subscribe to scientific literature search capabilities is very ambitious for a small library, and is proposed to increase substantially in the future. While the quality of services available supports the ISRP's conclusion that the project's objectives are being met, stronger emphasis on scientific component(s) of the project (see Qualification #1) and coordination with other projects and entities providing similar services (see Qualification #2) is needed.

The ISRP recommends that two related issues be addressed during contracting, as follows:

1. Specific attention to identifying the scientific component(s) of this project is needed, especially considering the projected growth of the Streamnet Library. The original scientific component involved archiving and providing to users the source documents and metadata for StreamNet datasets. However, in the problem statement the sponsors state, "A small percentage of the total number of documents produced by participating agencies are submitted [to the StreamNet Library] as source documents by the data compilers employed directly or indirectly by the PSMFC StreamNet Project." A greater

project emphasis on scientific components, measurement of outcomes, and development of an adaptive management framework for designing, implementing, evaluating, and revising data management activities would help to resolve such issues and to identify scientific components of planned future growth.

2. While this is a data management proposal, this project could benefit substantially from adopting a coordination focus as well. The project's activities extend throughout the Pacific Northwest and beyond, for example accumulating and archiving hard-copy materials from other libraries and providing literature searches for users and projects outside the basin. Acquisitions and associated services are desirable, but coordination could help decide where collections are being duplicated or the value of having duplicate items. StreamNet has other partners that are apparently doing similar activities. Are there coordination synergies that can be obtained with PSMFC, PNAMP, university, government, and historical archives? Information on projected trends in the rates of growth of paper and digital documents, number and type of users, types of user requests, and percent use of facilities could assist in planning for growth.

Comment:

Specific comments and suggestions for improving the proposal are listed below.

1. Purpose: Significance to Regional Programs, Technical Background, and Objective

The sponsors explain project significance primarily with respect to BiOp RPAs. This section would be improved by a more detailed explanation of significance to the Council's Draft Monitoring Evaluation Research and Reporting Plan, Subbasin Plan objectives, Council's 2006 Research Plan, and other regional plans. This might simply be a matter of reorganization of proposal content, for example the significance of this project to the Council's 2006 Research Plan is described in the Problem Statement.

The project serves an important role in providing library services to customers throughout the Pacific Northwest. The proposal would be improved by inclusion of information on total number of customers and a breakdown into different categories, for example public, state agencies, and tribes.

In the problem statement the sponsors state, "A small percentage of the total number of documents produced by participating agencies are submitted as source documents by the data compilers employed directly or indirectly by the PSMFC StreamNet Project." This is surprising to the ISRP given that this is the primary scientific component of the Streamnet Library. This issue needs to be addressed during contracting (see Qualification #1).

With respect to Objective #2 (Support development of document repositories to improve efficiency of reporting and tracking research in the basin), the sponsors state, "The ability of the Assistant Librarian to locate documents would be significantly enhanced by the development of digital document repositories in participating agencies." The ISRP agrees, however, this would likely diminish the need for costly centralized library services. An independent evaluation of current and future needs for centralized library services would be useful.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

According to the sponsors, the most productive accomplishment is locating and providing documents and other information to patrons in the Pacific Northwest with an average of 3000 requests annually, over 12 requests per business day, and many requests fulfilled with on-demand digitization of documents. The proposal would be improved by a breakdown into different categories of users both inside and outside the Basin.

The library plays a significant role in storing metadata for StreamNet and their other target customers, in providing a depository for materials from some state agencies, and in general making grey literature available. However, identification of scientific components to the project and a greater project emphasis on measurement of outcomes and development of an adaptive management framework for designing, implementing, evaluating, and revising data management activities is needed (see Qualification #1).

The library has a website which is easy to use and has provided access to journal literature via their journal collection, subscriptions to electronic journals, and full-text research databases; all necessary services for researchers in the Columbia Basin who do not have access to a research university library. The Library is expanding their collection of electronically available documents. However, the project might benefit from improved coordination with other projects and entities providing similar services (see Qualification 2).

ISRP Retrospective Evaluation of Results

The StreamNet Library is a cooperative, regional project that provides access to current and historical literature related to fish, wildlife and related habitat in the Columbia River Basin and Pacific Northwest. The Library provides research services including bibliography development, literature searches, document location and digitization, and metadata development assistance. As part of the StreamNet Project, the library serves as the repository for the StreamNet database source documents.

The project has succeeded in making documents and reports from BPA-funded projects accessible and has cataloged over 5300 electronically available documents. They have developed bibliographies of historical documents and organized current documents so that all species information is collated and can be related geographically. The Library has averaged

3000 requests annually during the past few years with over 12 requests on average per business day for locating and providing documents and other information to patrons in the Pacific Northwest. Many of these requests are fulfilled with on-demand digitization of documents. Several sets of significant research have been made available electronically:

- Northwest Fish Culture Conference
- Columbia River Thermal Effects Study
- 1990, 2001 and 2004 Subbasin plans and assessments
- Survey of the Columbia River and Minor Tributaries
- Inventory & Monitoring of Salmonid Habitat in the Pacific Northwest
- Bibliography on Vancouver Lake Watershed

The Library has also provided significant support for other libraries. While these results support the conclusion that the project's objectives are being met, stronger emphasis on scientific component(s) of the project and coordination with other projects and entities providing similar services may be needed. Acquisitions and associated services are desirable, but coordination could help decide where collections are being duplicated or the value of having duplicate items. StreamNet Library has other partners that are doing similar activities, and it is likely there are coordination synergies that can be obtained with PSMFC, PNAMP, university, government, and historical archives. Information on projected trends in the rates of growth of paper and digital documents, number and type of users, types of user requests, and percent use of facilities could assist in planning for growth.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The identification of scientific components of the project is needed, especially regarding projected growth of the library (see Qualification #1). The proposal would be improved by more specific responses to proposal guidelines. A major limiting factor is that BPA-funded projects, including the StreamNet project, do not routinely provide their reports and publications to the Streamnet Library.

The StreamNet Library's goal of organizing and making available "the entire body of work of the biological research community in the Columbia River Basin" is ambitious. To plan for this growth trends in the rates of growth of paper and digital documents, number and type of users, types of user requests, and percent use of facilities could assist in planning for growth. StreamNet collects considerable data some of which is in the Cataloging Statistics and Reference Statistics Reports. The 5300 digital documents, which are about 17% of the collection and 3000 inquiries per year are a good start. But having trend data would be very valuable for StreamNet planning purposes, as well as retrospective evaluation of project results. Are these data summarized and discussed with cooperating partners? Can more background be given on the "customer" base? What is the rate of growth in physical and electronic users? From what

entities do users come? At what rate has the library been collecting paper and digital documents? How are the documents distributed by subject? What subject areas are most requested by users? What is the rate of change in documents loaned or accessed digitally per year?

Mention is made of the increased use of Twitter and Facebook for providing data. What is the driver of this demand for service? Is it the social media aspect of these sites, more related to mobile need to access data, a way of expanding the user base for StreamNet, all or none of these? More background on the data management benefits and costs of this trend would be valuable for planning future commitments in this project.

The proposal says, "We provide access to full-text research databases that are accessible in the library. In FY2012, we will be expanding access to selected locations." What are the locations that need this service? How was the need measure? What is the potential benefit from localizing the service? Why can the searching not be accomplished through the StreamNet web site and online catalog?

A move is contemplated and more space is needed for future acquisitions. Can the number of documents held by StreamNet be measured in physical characteristics and in terms of amounts of digital storage required? With digital conversion of documents, do the physical documents have to be archived at the StreamNet library, or could they be more effectively and adequately stored off site for archival purposes?

Publication practices and dissemination policies of some agencies appear to limit the ability of the library to acquire information for the broader community.

Transfer speeds of the website appear to limit the ability of optical character recognition (OCR) reproductions of documents; however, images of documents are available. There is some potential for overlap with the Northwest Habitat Institute (NHI) proposal (#200307200) to implement a GIS spatial library and repository for habitat data and metadata.

4. Deliverables, Work Elements, Metrics, and Method

Deliverables seem quite consistent with the project's overall objectives. A unique service to the region is their development of historical data sets by searching relevant reports and literature to pass to data compilers.

Further justification for continued expansion of the Library to special collections and materials from outside the Basin would be useful, given the limited funding and need to improve regional coordination within the Basin (see Qualifications # 1 and #2).

Of the five work elements listed for this project, only no. 99 (outreach and education) has metrics, but the work elements are more inputs rather than outcomes. Work element (119. Manage and Administer Projects) is also mentioned in the introductory materials but is not developed elsewhere. More development of the work elements, research methods, metrics to observe outcomes, and reporting goals would strengthen the scientific dimensions of the proposal.

As a data management proposal a scientific component could be added that has an adaptive focus to generate improved guidance, protocols, metrics, and measures as more experience is gained, particularly in analyzing the growth path being charted by StreamNet (see Qualification #1). The guidance given on the proposal submission site places “emphasis on outcomes” that would come from discussion of hypotheses, quantitative (and qualitative) measures and metrics, summary tables and graphs, and trends. The data management process is amenable to scientific analysis. Key questions, hypotheses, relationships, data gathering and analysis, reporting of results, and revisions based on what is learned are expected. Greater emphasis is recommended on trying to measure outcomes and include in the proposal an adaptive management framework for designing, implementing, evaluating, and revising data management activities. This is a project that would appear to benefit greatly from coordination between a wide range of database developers and users. The cost-effectiveness of coordination could be very high.

While this is a data management proposal, this project could substantially benefit from adopting a coordination focus as well (see Qualification #2). The Work Elements are common to those selected in the 19 coordination proposals. The Digital Library Collections plan includes decisions that reflect cost considerations, such as digital scanning resolution and inclusion of color. Would coordination provide benefits in making these decisions? StreamNet has other partners that are doing similar activities. Would coordination with PSMFC, PNAMP, university, government, and historical archives increase effectiveness and provide efficiencies. A private consultant, the Portland Audubon Society, and the Johnson Creek Watershed Council have added materials to the StreamNet collections. Acquisitions are desirable, but coordination could help decide where collections are being duplicated or the value of having duplicate items. Are there coordination synergies that can be obtained with PSMFC, PNAMP, university, government, and historical archives?

In general, the proposal would be improved by more detailed descriptions of specific methods, for example in response to the question, "Please describe the sources from which you are compiling data, as well as what proportion of data is from the primary source versus secondary or other sources?" The sponsors answered, "We are compiling data from many different sources and include primary as well as secondary sources. The majority of our materials would be considered secondary sources." A specific answer would list individual sources by name or at least general categories of sources with some examples. What are the major secondary sources

that provide the majority of the materials in the library? Why does the Streamnet Library website have special pages for only a few collections, for example the Vancouver Lake Bibliography when the Library's "Journals of interest" page lists only a few fisheries journals?

Some of information on the Library's website is very out of date, for example on the "Suggested Readings & Background Information" page the most recent document listed was published in 1998. The page on "stock definitions" states "Found in the files, dated September 15, 1993, attributed to Larry Everson." If this page is necessary, it could be updated to provide information such as genetic population structure and listed ESUs.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the three RM&E work elements are published but do not provide adequate guidance on the methods and metrics. The best guidance available is from the ISRP (2007-14:2) "Evaluating the performance of coordination projects is conceptually the same as any other type of project. What is the goal of a coordination project? How will it contribute to the Fish and Wildlife Program? What are the specific objectives of the coordination project and the activities that accompany those objectives? What metrics will be used to measure the contribution of activities toward meeting the project objectives? That is, what are the indicators of success?" The project sponsors can identify metrics that work for the questions and hypotheses included in the proposal.

[199601900](#) - Data Access in Real Time (DART)

Sponsor: University of Washington

ISRP recommendation: Meets Scientific Review Criteria

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

DART provides an important and useful Tier 2 database, data repository, web-based data reporting and analysis services. The proposal provides evidence that DART is used daily by a number of organizations, including the Action Agencies, NOAA, State Agencies, and Tribes.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

For the past 6 years, DART annually delivers 400,000-600,000 database query results. DART provides analysis capabilities for evaluating water and fishery status and management actions for a real-time look into the current status of the resource and provides access to potential early warning triggers on a daily basis.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

DART is the primary publicly accessible repository for a number of projects in the region including the Adult Anadromous Fish Radiotelemetry Project (1996-2004), the cooperative Mid Columbia Status for Juvenile and Adult Salmon, and adult passage counts from Chelan and Grant County PUDs as well as the Tumwater and Zosel dams.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables, work elements, metrics, and methods were presented.

[200307200](#) - Habitat and Biodiversity Information System for Columbia River Basin

Sponsor: Northwest Habitat Institute

ISRP recommendation: Meets Scientific Review Criteria (Qualified)

Qualifications:

The issues raised in this review can be addressed during contracting. No response to the ISRP is required.

Deliverable 2 (Implement a GIS spatial library and repository for habitat data) and parts of Deliverable 5 (Continue to Acquire Other Regional Data Appropriate to Subbasin Planning and High-Level Indicators) appear to be regionally inconsistent with the objectives and deliverables of StreamNet and other fish and fish habitat data storage projects. Long-term storage of terrestrial wildlife and habitat data, including GIS data layers, may be more appropriate in a distributed network in cooperation with projects dealing with long-term storage and retrieval of fish and fish habitat data.

Deliverable 5 needs specific details that can be specified during contacting, namely, what other data sets should be acquired and where will they be permanently stored, should NHI serve in a “tier 2 data analysis” capacity to derive and disseminate High-Level Indicators and GIS data layers based on non-spatial and spatial data that reside within agencies and organizations, and what non-spatial information should be acquired?

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

We support the proposal to present a more comprehensive and integrated wildlife approach in the Fish and Wildlife Program. The project as proposed will continue to support subbasin planning and will now include other work objectives to develop wildlife high-level indicator information and integrate habitat inventories and evaluations.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

IBIS is an information system providing service to the region on terrestrial wildlife and habitat issues. The project has started producing GIS map based products for the Basin and has made major accomplishments, particularly in helping with development of subbasin plans and production of wildlife habitat maps.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

This project is to merge the Habitat Evaluation Project (200600600) with the IBIS project, as well as to take steps to integrate with the CHaMP program (201100600).

The proposal identified four emerging limiting factors for the Council's Fish and Wildlife Program that if addressed would better inform subbasin planning, high-level indicators, and other monitoring projects.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables 1, 3, and 4 meet scientific review criteria.

Deliverable 2 (Implement a GIS spatial library and repository for habitat data) and parts of Deliverable 5 (Continue to Acquire Other Regional Data Appropriate to Subbasin Planning and High-Level Indicators) appear to be in conflict with the objectives and deliverables of other proposals which meet scientific review criteria, namely StreamNet and other fish and fish habitat data storage projects. Long-term storage of terrestrial wildlife and habitat data, including GIS data layers, may be more appropriate in a distributed network in cooperation with projects dealing with long term storage and retrieval of fish and fish habitat data.

Deliverable 5 needs specific details that can be specified during contacting, namely what other data sets should be acquired and where will they be permanently stored, should NHI serve in a "tier 2 data analysis" capacity to derive and disseminate High-Level Indicators and GIS data

layers based on non-spatial and spatial data that reside within agencies and organizations, and what non-spatial information should be acquired?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The wildlife habitat monitoring protocols, both at a fine and coarse scale, can be found in MonitoringMethods.org.

[199800401](#) - Columbia Basin Bulletin

Sponsor: Intermountain Communications

ISRP recommendation: Meets Scientific Review Criteria

Comment:

The Columbia Basin Bulletin (CBB) continues to provide an important communication and education service to a wide range of people in the Columbia River Basin. The CBB's unaligned information encourages improved coordination by promoting better understanding of complex and contentious issues. Based on past project performance, the CBB is meeting its objectives. No significant changes in project direction have occurred, although based on requests from a reader survey conducted by the CBB, the sponsors have included more articles on research in the Columbia Basin or relevant research conducted outside the Basin.

The CBB provides regional coordination of information dissemination as outreach and education. Information in the proposal, however, was not sufficient for the ISRP to evaluate the CBB's effectiveness and impact on regional coordination. While beyond the scope of this proposal, the ISRP recommends a future, independent scientific survey of members/users to evaluate the CBB in terms of regional coordination of outreach and education.

The guidance given on the proposal submission site emphasizes outcomes, discussion of hypotheses, quantitative and qualitative measures and metrics, summary tables and graphs, and trends. Coordination activities are amenable to scientific analysis. Key questions, hypotheses, relationships, data gathering and analysis, reporting of results, and revisions based on what is learned are expected. Greater emphasis on trying to measure outcomes and include in the proposal an adaptive management framework for designing, implementing, evaluating, and revising coordination activities is recommended.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Columbia Basin Bulletin is a valuable resource on news related to Columbia Basin fish and wildlife issues.

Significance to regional programs: As a neutral information provider to projects and programs throughout the Basin, the project meets the Council's goal for program-level coordination of information dissemination including technical, policy, and outreach components.

Problem statement: The statement notes the complexity and controversy of many fish and wildlife mitigation issues and the corresponding need for a timely and neutral source of information that promotes coordination among stakeholders. The technical background is brief and no references, beyond the newsletter itself, are cited. This might be improved by describing the project's web site, newsletter, and their content. Providing more background on the history and development of the CBB as well as a brief summary of the work of key project personnel on similar past or current efforts would be beneficial.

Objectives: The proposal interprets the question as referring to biological objectives only, so does not list specific objectives. The CBB is in a unique position as an information provider. Based on the proposal the objective might be to provide "unbiased information about fish and wildlife issues important to the Columbia Basin." The deliverable is a weekly newsletter.

Emerging limiting factors: None is listed. The proposal would be improved by a discussion of the factors that might limit the project's success at meeting coordination objectives.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and history: a budget history of the past 6 years is provided. Annual budgets have varied in size but have not been exceeded. Cost share is listed. A description of effort adjustments in response to budget variability is provided.

Performance: Past performance at delivering a weekly newsletter is outstanding; weekly electronic newsletters and website posts have been delivered on time during the entire 14-year project history. However, status reports have been delivered late, on average 31 days late. The sponsors acknowledge the need for improvement in this regard.

Major accomplishments: The CBB has been published weekly since June 1998. The proposal notes the growth in the number of CBB subscribers from 300 to over 9500 over the history of the project. The number of subscriptions continues to grow. The amount of content and frequency of delivery has also grown. Web links are provided to all stories. Website use has also grown. Documentation of the trend in subscribers would be useful for assessing accomplishments.

In the program coordination section, there is no description of Past Accomplishments with work, value added, or user assessment of effectiveness and impact all marked NA. The accomplishments section provides a brief project history that would be better placed in the previous, technical background, section. The sponsors need to more thoroughly explain past results of regional coordination, evaluate these results in terms of their coordination objective(s), and briefly summarize improvements made to the CBB based on past results in terms of adaptive management. The sponsors mention a reader survey that they conducted, and it would be useful to have a more detailed summary of the survey questions and results. The sponsors state, "The CBB is now stakeholders' key source for objective, complete, timely information about Columbia Basin Fish and Wildlife issues." How was this determined? For example, the number of website users might or might not be a relevant metric of use by stakeholders as their key source of information.

Response to ISRP comments: This section provides details about the 2006 comments and their response, including conduct of a reader survey.

Adaptive management: None is listed. However, the sponsors' explanation of how they responded to their reader survey is a good example of adaptive management. In the "response to ISRP" section it describes the outcome of a readership survey and the adaptation of CBB content to reflect reader requests. The financial history section describes adaptations to budget variability.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The CBB is a Northwest regional project that informs many people interested in the Fish and Wildlife Program in the Columbia Basin.

Project relationships: the primary relationship is as an information link between projects and people throughout the Basin. The proposal provides a long list of entities that comprise its readership and with whom they work to collect and disseminate information related to Basin fish and wildlife activities, projects, and biological opinions. However, it would be useful to have a breakdown of the number of CBB articles per year by entity, as well as a chart of annual trends to help identify gaps in coordination of dissemination of information/education.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The statement describes in detail how the weekly newsletter is composed and delivered. While the work of the CBB is 100% information dissemination, more specific attention to identifying a scientific component to the proposal would help to plan for future success. The proposal guidelines ask how the proposed work and accomplishments "contribute to or inform Program policy development; lead to broad-scale implementation; and be

reported back to the Council?" A well informed public is critical to the Fish and Wildlife Program process. More details on the subscriber base and trends in subscribers and online users would be useful. Further, effort to get responses from users and subscribers might help the CBB play a stronger role in the Basin.

The proposal says that the Bulletin has "diverse and representative subscribers who are interested in supporting this collaborative and integrated approach." Are more data available about the subscriber base? The proposal also suggests that the CBB is independent thus making the news is more comprehensive and less biased. Can this be documented?

If the goal is to communicate broadly, then one question is why there is a charge to review the Bulletin's archives? It appears that the charge may prevent users from searching the history of an issue and increasing their knowledge of a recurring topic.

Work elements: The entire effort of the CBB is information dissemination to stakeholders. Outreach and education are the main work elements. One work element is identified, 99. Outreach and Education.

The CBB proposal offers may testable hypotheses about the importance of a communication mechanism like the Bulletin. Evidence would be useful in supporting statements like, "To terminate the CBB as a FWP supported, easily accessible, on-line stakeholder information tool -- and not considering the value of several years' investment in building stakeholder trust and use -- would eventually, due to lack of access of important, timely information, lead to a demand among stakeholders, particularly those who cannot afford or have the time to attend the myriad of meetings related to Basin fish and wildlife mitigation and recovery -- to create an information product that does just what the CBB is doing now."

Metrics: Primary metrics used by CBB sponsors to evaluate their results are the number of subscribers, website hits, visits, page views, or story reads. More detailed explanation of these metrics and analyses of annual trends in these metrics would be useful. Direct methods for members to provide feedback on articles and issues, for example through website tools or an online letters-to-the editor forum, might further assist in evaluation of CBB's educational and outreach performance.

How do we know that the CBB is viewed "as a trusted and well-used stakeholder information tool ...?" Do other news outlets pick up CBB stories? The expectation of feedback contained in the statement, "it would not take long for feedback to the Editor and others to make clear that something was awry" seems to be a rather passive approach. What kinds of questions were asked in the Survey Monkey project in 2007? Of the 800 respondents how many are in the 950 subscribers?

Methods: The description of methods, for example attendance at meetings, telephone interviews, in-person interviews, use of research reports, studies, policy letters, memoranda and other documents, is very general. The proposal does not provide enough information on membership fees and how these are used. The ISRP notes from reading the webpage that to become a CBB member, a \$5 fee must be paid, and membership fees range from \$10 for one month to \$60 for one year. These fees likely limit access by users who cannot afford the costs and might diminish the effectiveness of the CBB as a regional education/outreach tool. The educational/outreach methods of the CBB website might also be improved if all articles included direct links to all information sources used to write the articles, as well as additional information sources for readers who want to read and learn about the issues in more detail. A page on the CBB website devoted to a calendar of Columbia Basin regional meetings and events, as well as a page with links to primary information sources would be useful to readers/members.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocol for one work element is provided, but does not provide adequate guidance on the methods and metrics. The best guidance available is from the ISRP (2007-14:2) and the overview provided in this report. The project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

C. Regional Coordination

1. General Qualification Recommendation for Regional Coordination Proposals

Regional coordination is at a critical juncture. It is shifting from a very centralized model to one that is highly distributed and multi-layered. Several proposal sponsors provide discussion of why this change is taking place. From a scientific perspective, it is clear that regional coordination has not had sound science applied to it.

Many worthwhile scientific research topics could be applied to the regional coordination effort. In 2007, the ISRP (2007-14) suggested a scientific approach, but, this approach was not widely adopted by the coordination entities. And, although CBFWA made a good effort to implement this approach in 2009, several CBFWA members had already decided to leave the centralized regional coordination model. Had sound science regarding regional coordination been pursued, the current situation could be better understood and would be easier to address in policy decisions.

Proposal sponsors mention many issues worth scientific analysis. For example, are the right participants involved and are the messages of participants being heard? Is the regional coordination funding being used efficiently and effectively? How is regional coordination justified in relation to other pressing Fish and Wildlife Program needs (also see the ISRP's programmatic review of regional coordination).

A decision is needed on whether regional coordination is an area for scientific investigation and by whom. Four alternatives are possible and others may be identified as this issue gets policy discussion.

1. Continue with the emerging model of formula-funded coordination without including scientific investigation.
2. Encourage those making regional coordination proposals to identify important research questions for study along with their coordination efforts.
3. Hire an outside contractor to evaluate the regional coordination process and the effectiveness and efficiency of its outcomes.
4. Have Council staff do more monitoring of regional coordination outcomes and analyze whether these outcomes are contributing to achievement of Fish and Wildlife Program goals and objectives.

If any one of the three scientific approaches (2-4) are used, proposals should be revised or submitted that take a more investigative and analytical approach to assessing regional coordination effectiveness and efficiency. Reviewers encourage proposal sponsors to prioritize their scientific effort. Given the expenditures on regional coordination, having cases or comparisons that indicate value from investments in coordination would be desirable. Framing regional coordination in an adaptive management framework helps in continually improving and adapting regional coordination to changing needs and knowledge. In designing proposals, consider the following questions:

- 1. What has been learned?** What experiences, observations, insights, and background are known about regional coordination?
- 2. What is the problem?** What is a key regional coordination question, issue, or topic that needs to be addressed?
- 3. What is the assessment approach?** What qualitative and quantitative observations will be made to evaluate the problem? Identify the key ideas, concepts, or variables useful for studying the problem.
- 4. What are the methods?** Identify methods used to assess the identified regional coordination issue(s) and explain their relevance. What sites, groups, time periods, roles, values, actions are important to understand? Describe how data will be collected and analyzed.
- 5. What are the expected outcomes?** What new information about coordination will result from the assessment methods? How will outcomes be monitored and measured?
- 6. What is the next step?** Based on the expected outcomes, identify adaptive management possibilities for the next step in regional coordination.

Additional information from the proposal writing guidelines and previous regional coordination documents are highlighted below.

The main deficiency of all regional coordination proposals is that they do not place “emphasis on outcomes”; discuss hypotheses; include quantitative (and qualitative) measures and metrics; or present summary tables, graphs, and trends. Key questions, hypotheses, relationships, data gathering and analysis, reporting of results, and revisions based on what is learned are desirable. Greater emphasis on trying to measure outcomes and include in the proposal an adaptive management framework for designing, implementing, evaluating, and revising coordination activities is recommended.

Proposals should consider the scientific contributions that might be made during the current funding period. A scientific component to the proposal helps to plan for future success. The

proposal guidelines ask how the proposed work and accomplishments “contribute to or inform Program policy development; lead to broad-scale implementation; and [will] be reported back to the Council?” Proposal accomplishments should meet the proposal guideline to 1) "List important activities and then report results" and 2) "Evaluate those results in terms of the Project Objectives." Insights should be included that summarize "how previous hypotheses and methods are changed or improved in this updated proposal compared to past activities?"

The Palensky (2007) memorandum about regional coordination emphasizes the concepts “effective communication,” “monitoring and evaluating the successes and failures in an adaptive management context,” and “cost-effective and informed.” Develop research to observe and measure these or other outcomes from coordination activities?

Work element guidance is not particularly helpful. Guidance is available from ISRP (2007-14:2), “Evaluating the performance of coordination projects is conceptually the same as any other type of project. What is the goal of a coordination project? How will it contribute to the Fish and Wildlife Program? What are the specific objectives of the coordination project and the activities (tasks) that accompany those objectives? What metrics will be used to measure the contribution of activities toward meeting the project objectives? That is, what are the indicators of success?”

ISRP. 2007-14. Memorandum: “Input on Evaluation of Regional Coordination Projects.” (October 2, 2007).

Palensky, Lynn, November 1, 2007, Memorandum, “Status report on regional coordination definition.”

[198906201](#) - Annual Work Plan for Columbia Basin Fish and Wildlife Authority (CBFWA)

Sponsor: Columbia Basin Fish and Wildlife Authority (CBFWA)

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal contains so much detail that it is difficult to review. Future proposals would be improved through more summary and synthesis of relevant information.

The proposal provides extensive insight into a scientific perspective on program coordination. A number of hypotheses are presented about the coordination process and its outcomes. The approach provides narrative findings for the experience gained by CBFWA. The insights provide compelling analysis for developing a sound scientific perspective on program coordination early in the evaluation process.

Proposal strengths:

- The proposal is fully documented; methods and accomplishments are exhaustively described.
- The limiting factors statement addresses large-scale issues that have the potential to limit the effectiveness of the project. This is rare among proposals.
- The proposal provides extensive insight into a scientific perspective on program coordination.
- Performance metrics have been identified and used to evaluate project effectiveness.

Weaknesses:

- So much detail is presented that it's difficult for the reviewer to track proposal content. The project is not only complex in itself it is also undergoing significant structural change.
- It is unclear where sturgeon or anadromous fish fit into CBFWA activities.
- It is sometimes difficult for external reviewers to assess the effectiveness of the project.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The CBFWA proposal offers a detailed narrative review of the coordination history from 1989 to the present. It analyzes changes in coordination that have occurred and reasons for them. The proposal also raises a number of policy issues to be addressed by Bonneville and the Council.

Problem statement: The problem statement is overly long, but at its end a summary conclusion adequately states the problem the proposal is designed to address.

Objectives: The proposal is focused around seven objectives, but the implicit overarching objective of this proposal is to coordinate disparate regional coordination projects around subject-matter themes.

Each objective has several deliverables that include development and maintenance; communications; coordinating, implementing, and facilitating; collate and summarize; attend and participate.

Emerging limiting factors: The proposal identifies three limiting factors for effective regional coordination: 1) perception of fairness, 2) participation and buy-in, and 3) adequate funding for both facilitation and participation. The proposal aims to address recent changes in these limiting factors.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and history: This section provides an adequate description of a financial history complicated by inconsistencies in reporting and budgeting dates and by a changing project structure.

Performance: An adequate short description is provided.

Major accomplishments: A detailed description of the project's major accomplishments in its former version – the Annual Work Plan. Because it has been coordinating activities since 1989, CBFWA has extensive coordination experience and the proposal lists many insights. Further, the proposal provides detailed discussion on why some members have left CBFWA coordination and facilitation services. The new project configuration will begin with this funding cycle. Metrics of performance are numbers of meeting attendees and qualitative evaluation of outcomes made possible by actions of the CBFWA in various fora. A stakeholder survey was also conducted.

Response to ISRP comments: A complete description of ISRP comments and CBFWA response in terms of developing tools to monitor impact is provided.

Adaptive management: A good description of changes in CBFWA focus and configuration in response to changing circumstances in the region.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests of CBFWA encompass the entire Columbia Basin for both fish and wildlife. CBFWA's goal has been to include all sovereigns and action agencies in the coordination process. In addition, CBFWA encompass the Willamette/Lower Columbia, Middle Columbia, Upper Columbia, and Snake River Recovery areas.

Project relationships: The statement provides a history of the changing configuration of CBFWA and a long list of coordination, monitoring and other programs throughout the region with which it is coordinated.

Tailored questions, data: The proposal provides a long description of the Status of the Resource website and its function. Information provided in the presentation indicates that the project has added tribal data coordinators to the already participating agency representatives.

The narrative analysis of the regional coordination problem is excellent and provides useful insights; more attention to identification of a scientific component to the proposal would help to plan for future success.

More findings like this one would be valuable, "These factors illustrate in high relief the Fish and Wildlife Program's recognition that coordination efforts and funding should be focused through a set of functional activities that need coordination, and not necessarily on the basis of entities desiring coordination funding." This seems to represent a critical principle for organizing coordination activities. Another important set of coordination hypotheses, "solutions intended to increase coordinated efficiencies and effectiveness. This includes developing coordinated synthesis reports, sharing data and information through scientific papers and science/policy forums, holding regular workshops focused on specific species, methods, or geographic areas, and on several topics, the drafting of basin-wide management plans." In this same section, "CBFWA Members recognized the role the organization can play in delivering useful technical, science-based products associated with protection, mitigation and enhancement of the Columbia Basin's anadromous and resident fish, and wildlife."

The proposal suggests that "the adaptive management framework for which coordination" be used. "Adaptive management" is mentioned in 4 of the 7 project objectives, in many of the deliverables, and development of an "adaptive management framework" is frequently mentioned. Can this framework be more explicitly and specifically identified? How have the many lessons learned been built into each adaptive management cycle? What is the typical length of an adaptive management cycle? In the adaptive management section a very interesting process is described that suggests that funding arrangements changed the need and approaches to collaboration. This is a very interesting insight. It does not illuminate the adaptive management framework often discussed, but it does indicate that funding is an important driver as to participation in coordination activities. The identification of factors that may limit the effectiveness regional coordination including perception of fairness, participation and buy-in, and adequate funding for both facilitation and participation, is an insightful and useful hypothesis. Did the conduct of a consumer satisfaction survey in 2010 help in assessing these variables?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has 24 deliverables related directly to the seven objectives. Each is described in detail.

Project components: The project has eight components, each described in some detail: Data Management (5%); Monitoring and evaluation (10%); Developing and tracking biological objectives (5%); Review of technical documents and processes (10%); Project proposal review (5%); Coordination of projects, programs, and funding sources within subbasins 20%); Facilitating and participating in focus workgroups on Program Issue (25%); and Information dissemination (20%).

Work elements: CBFWA lists many work elements (11).

Methods and metrics: Methods are described in detail in several different sections. Metrics are also described. Measurement of performance is through numbers at meetings, outcomes of coordination, and a survey of stakeholder satisfaction.

One form of assessing effectiveness is the output of meeting results, documents, and other evidence of outcomes of coordination and facilitation actions. Another way to assess effectiveness is input from the state, federal, and tribal agencies involved in the process, who are well-positioned to assess this effectiveness. Other entities interacting with the program but not formally part of the CBFWA functions are also able to provide input. Some possible approaches to at least showing the degree of success would be, as a minimum, letters from each agency/tribe responding specifically to a series of questions as to how well the CBFWF program is meeting their needs in key areas and how the program might be improved. This request could also be addressed to some outside entities that participate with the workgroups. Some questions should address not only how well the CBFWA is meeting agency and tribal needs, but benefiting the salmon and other basin resources *in specific ways that otherwise would not occur*. It would also be of interest to know how the program involves entities such as the Oregon and Washington state agencies and the Corps of Engineers, and if more coordination among them and CBFWA entities is possible or can be expected.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the 11 work elements are published but do not provide adequate guidance on the methods and metrics. The project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives. The relative value of “electronic meetings” vs. “face-to-face sessions” would be useful to study. Another worthy topic for review is dimensions of “facilitation.”

What part of “the ISRP for reporting metrics for regional coordination (ISRP 2007-14)” will be implemented? The document suggests (ISRP 2007-14:4), “Metrics of Impact: (e.g., how effective is the project: what is its added value of the coordination project) changes in behavior, value to the members, user evaluation of product utility, lack of redundancy, member assessment of effectiveness and impact, benefits to fish and wildlife of enhanced coordination activities, specific projects or resources benefited by the project, specific effect of coordination

on conservation and management.” Where in the proposal are these suggested metrics of impact operationalized? A hypothesis worth testing is whether change in funding has led to decreased regional coordination.

[199803100](#) - Implement Wy-Kan-Ush-Mi Wa-Kish-Wit

Sponsor: Columbia River Inter-Tribal Fish Commission (CRITFC)

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

1. A report/memo that addresses previous ISRP comments is needed.
2. A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The ISRP's 2007-09 set of review comments provides qualifications on evaluation of outcomes that need to be addressed in the current proposal. ISRP comments include:

“Overall, the response misses the point and does not address the ISRP’s comments on the need for better self-evaluation and monitoring of CRITFC activities.”

“The sponsors need to take a more proactive approach to learn how to conduct an effectiveness evaluation and to conduct it. At present, effectiveness is asserted rather than documented.”

“Stating, ‘As already agreed to by the ISRP, monitoring of coordination effectiveness is difficult to evaluate quantitatively’ is again missing the point. Although it is difficult, it is both desirable and possible. The point is that careful thought should be given to what effectiveness would look like and how it can be measured, then develop a plan to measure it and evaluate it. Agreeing to ‘document any incidences of overlap or redundancy with CRITFC and individual tribal projects if they occur as a measure of effectiveness’ is not sufficient and does not address the central question of effectiveness.”

The proposal should be re-written to include a better statement of objectives as desired outcomes and separate from tasks. Some text that could serve as the basis for rewritten objectives is already contained in the proposal. The proposal should be more explicit about how adaptive management is conducted within this project, and about how methods of implementation can be measured and evaluated for success. Metrics to measure performance

should be identified beyond the general statement in the "objectives" section. A plan should be developed to use these metrics to evaluate performance, including stakeholder evaluation.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The project has five components. The percentage of project time spent on each is not identified.

Significance to regional programs: Wy-Kan-Ush-Mi Wa-Kish-Wit was publically presented in 1995 in CRITFC journal Wana Chinook Tymoo. To expand understanding of the background and concepts, a set of videos (Chinook Trilogy) presented the plan's background in tribal culture, the problems that led to the need for a tribal plan, and the basic elements of the plan. The proposal states, "The tribes' recommendations in Wy-Kan-Ush-Mi Wa-Kish-Wit are designed to: define problems, propose remedial actions, set objectives, and describe means to evaluate the actions." Wy-Kan-Ush-Mi Wa-Kish-Wit has had considerable impact on fish and wildlife actions in the Columbia Basin. The guidance from Wy-Kan-Ush-Mi Wa-Kish-Wit is relevant to the Fish and Wildlife Program, FCRPS BiOp, Fish Accords, and actions of other sovereigns.

Wy-Kan-Ush-Mi Wa-Kish-Wit lays out the perspectives of the Nez Perce Tribe, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes and Bands of the Yakama Nation, the members of The Columbia River Inter-tribal Fish Commission. One of the goals is to revise Wy-Kan-Ush-Mi Wa-Kish-Wit.

Problem statement: a complete description of the role of CRITFC staff in coordinating member tribes to implement the Wy-Kan-Ush-Mi Wa-Kish-Wit and the NPCC Fish and Wildlife Program.

From a regional-coordination, science perspective, addressing three questions more systematically would be helpful. First, how well are the concepts presented in Wy-Kan-Ush-Mi Wa-Kish-Wit understood by tribal and nontribal members in the region? Second, who is the audience for Wy-Kan-Ush-Mi Wa-Kish-Wit? When initially presented CRITFC leaders tried to help all residents of the Northwest understand the proposals in Wy-Kan-Ush-Mi Wa-Kish-Wit. What coordination activities are recommended for each of the target audiences? How are these methods of outreach, education, and information dissemination evaluated? Third, what is needed in the way of revision to Wy-Kan-Ush-Mi Wa-Kish-Wit? Have the members engaged in a coordinated approach to identify themes for revision? Are other Columbia Basin tribes joining the effort? Has science suggested the need for revision? Is revision needed to increase understanding or to add elements to provide a more complete picture? Are there missing elements that need to be incorporated and elaborated?

Objectives: The project has two objectives: 1. Implement and update Wy-Kan-Ush-Mi Wa-Kish-Wit; 2. Provide coordination and outreach to tribes. The proposal objectives of coordination

and outreach are worded as tasks rather than as desired outcomes. The deliverables include regional coordination, tribal coordination, outreach and education, “incorporating the principles of the tribal salmon plan, Wy-Kan-Ush-Mi Wa-Kish-Wit, into the Fish and Wildlife Program” and managing and administering the project.

Actual objectives in terms of outcomes statements are contained in the descriptions provided with the objectives. The proposal lacks any plan to observe and measure any to the objectives identified.

Emerging limiting factors: The statement refers to CRITFC projects related to climate change, toxics, water quality, habitats, and invasive species but does not address limiting factors as related to the implementation of this coordination project.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and history: Brief explanations of differences between expenditures and contracted amounts are given.

Performance: Brief description of most reports and deliverables on time.

Major accomplishments: A summary statement of major accomplishments for every year of project funding. The most recent year included a conference, outreach, testimony and comments.

Response to ISRP comments (also see Qualifications): The proposal sponsors did not respond to past ISRP comments asking for observation and measurement of outcomes from their activities. ISRP and Council comments from 2000 and 2007 should be incorporated into the proposal.

It is not clear from the content of this proposal that the Wy-Kan-Ush-Mi Wa-Kish-Wit project is meeting NPCC or tribal needs for regional coordination of watershed activities. Responses to past ISRP and Council comments have been inadequate. In particular, an effectiveness evaluation plan needs to be developed and explained in this proposal in order for the project to meet scientific criteria. Many sections of the proposal need to be re-written to adequately address the requested information (see Qualifications).

Adaptive management: A statement is given about transmitting information to member tribes, generating comments and actions. The proposal is not framed in an adaptive management framework.

ISRP Retrospective Evaluation of Results

The history of significant accomplishments in the proposal runs from 1998 to the present. The financials give history since 2006, which was the first year of Bonneville funding. In 2006, successes with Bonneville were summarized in CRITFC's Wana Chinook Tymoo journal. A PCSRF brochure highlighted success stories of cost-sharing with BPA. The most recent effort to communicate the outcomes from Wy-Kan-Ush-Mi Wa-Kish-Wit based approaches was the "Future of Our Salmon: A Vision of Restoration in the Columbia River Basin," held June 1-2, 2011.

The 2010 "Implement Wy-Kan-Ush-Mi Wa-Kish-Wit" annual report lists activities on revising the plan during FY 2010, but it includes no lessons learned or hypotheses tested and remaining. More investigation and analysis of how coordination activities will result in getting Wy-Kan-Ush-Mi Wa-Kish-Wit principles, objectives, remedial actions, and means to evaluate actions into the Fish and Wildlife Program would be desirable.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: listed are other CRITFC projects, PSC, PCSRF, and PNAMP

Regional coordination focus: Wy-Kan-Ush-Mi Wa-Kish-Wit is a Northwest regional project that directly affects the success of the Fish and Wildlife Program in the Columbia Basin. Wy-Kan-Ush-Mi Wa-Kish-Wit concepts are applicable to fish and wildlife, endangered species, BiOp, and issues within and outside the Columbia Basin.

The proposed work includes, "Review of technical documents and processes;" "Coordination of projects, programs and funding sources within subbasins;" "Facilitating and participating in focus workgroups on Program issues;" "Information dissemination (technical, policy, and outreach);" and "Project proposal review." In describing the work, mention is made of workgroups, forums, committees, conferences, outreach, brochure preparation, testifying. These are important inputs for gaining desired outcomes. The proposal, however, does not report any outcomes in the sense that the meetings, brochures, conferences, and other coordination activities had an impact that was intended or unintended. Further, there is no evaluation of which coordination activities worked to achieve specific objectives (see Qualifications).

Value-added: This section describes a fish tagging training session and the Lamprey Technical Working Group recommendations. How did coordination affect the outcomes in these two instances? Did coordination improve the training session in some way? Did meeting improve the lamprey recommendations over other forms of coordination?

The proposal says, “Provided testimony to Environmental Quality Commission on Oregon water quality standards.” What was the outcome? Was the testimony developed through coordination among CRITFC members, others?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has five deliverables. Each has a brief description of work to be performed, and each is related to an objective.

In terms of deliverables, when will the update be completed? What are some of the projected changes, improvements, differences? Can the audience be more clearly identified? The proposal says that the purpose is, “advising tribal policy makers and tribal staff on technical, scientific, funding and policy issues, facilitating participation by tribal staff.” Isn’t the audience broader? How will Wy-Kan-Ush-Mi Wa-Kish-Wit be presented to the intended audiences?

The proposal says, says the CRITFC Watershed Department has managed the PCSRF (Pacific Coast Salmon Recovery Funds), implemented 153 projects. What has been the outcome of these projects in terms of achieving Fish and Wildlife Program goals and objectives? Should there be coordination between PCSRF projects and projects in the 2008 Columbia Basin Fish Accords Memorandum of Agreement? Could coordination between these two programs use resources more efficiently and more effectively?

Work Elements: The proposed work elements are listed without added detail: 99. Outreach and Education, 115. Produce Inventory or Assessment, 122. Provide Technical Review, 189. Coordination-Columbia Basinwide, and 191. Watershed Coordination. Only 99 has metrics, but they are more inputs rather than outcomes. The description of work is a list of coordination activities but is without discussion of outcomes, monitoring, measurement, evaluation, or lessons learned.

Can output metrics and methods be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Measures and metrics: Descriptions of work performed are provided in several places in the proposal. There are no metrics for measuring effectiveness, and no mechanism to get stakeholder feedback. There is a reasonable description of value added by the project to the tribes and to the region. No indicators such as the trend in number of projects, total dollars, or partnerships in tribally directed projects are offered.

In the current proposal, consider how will ensuring “implementation of Wy-Kan-Ush-Mi Wa-Kish-Wit principles and objectives in projects” be evaluated? What methods work best at communicating Wy-Kan-Ush-Mi Wa-Kish-Wit principles? How do monitoring, coordinating, updating, participating, commenting inform people about Wy-Kan-Ush-Mi Wa-Kish-Wit principles? What activities work best? What audiences are most important? How well do these audiences understand Wy-Kan-Ush-Mi Wa-Kish-Wit principles?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). The project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[200740700](#) - Upper Snake River Tribe (USRT) Coordination

Sponsor: Upper Snake River Tribes Foundation

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal should include 1) a better statement of objectives by separating them from tasks and deliverables to word them as outcomes; 2) a description of what and how work will be done; and 3) a description of how activities will be monitored and evaluated for effectiveness.

The proposal provides lengthy descriptions of the coordination needs of the USRT, the past history of the project, and the limiting factors facing the coordination. It presents far less detail on specifically how the project would address the stated need, and how it would measure the degree of its effectiveness.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The proposed work has seven components: 1. data management (10%); 2. monitoring and evaluation (10%); review of technical documents and processes (6-10%); project proposal review (6-10%); coordination and development of projects (20%); facilitation and participation in workgroups (20%); information dissemination (20%). Some activities are stated as being

contingent on the budget increase to add an assistant director. The budget request does not make a strong case for why additional personnel are needed to perform the coordination tasks described and for the expense estimated.

Significance to regional programs: The statement makes reference to tribal coordination and its relation to the implementation of 2008 FCRPS BiOp RPAs and the 2009 Fish and Wildlife Program, in particular, its coordination provisions. It also cites the relationship to the LSRCP and several other regional programs. The Fort McDermitt Paiute-Shoshone Tribe joined the CBFWA in 2011. Because of USRT problems with its previous executive director, this is essentially a new project.

The Burns Paiute Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes, and the Fort McDermitt Paiute-Shoshone Tribe make up the membership of the Upper Snake River Tribe Coordination (USRT). The Fort McDermitt Paiute-Shoshone Tribe is an addition to USRT with this proposal.

Problem statement: A very detailed problem statement begins with a description of the USRT goal "to facilitate Tribal unity to protect and nurture all Compacting Tribes' rights, languages, cultures and traditions in addressing issues related to the Upper Snake River Basin." This is followed by a history of Northwest Power Act implementation, the early role of the tribes in the Fish and Wildlife Program, and the tribes' eventual development of the USRT compact to better represent their collective interests. A good case is made for a strong need to coordinate among individual USRT member tribes that are dispersed over a large area, and for the benefits to members of having a collective voice. The problem statement also acknowledges the ISRP document identifying the need for output and impact metrics.

Objectives: The proposal has four objectives. Each of the objectives is worded as a task rather than as identifying desired outcomes. A short list of activities accompanies each objective. Proposed objectives seek to provide technical assistance and coordinate regarding fish, wildlife, and habitat; land, water, and air; cultural resources; and federal trust responsibility. The objectives will be accomplished through such deliverables as USRT commission meetings, policy decision documents, information sharing, assessments of fish and wildlife losses, regional coordination, contract administration and reporting, and outreach and education.

Emerging limiting factors: The statement notes the historical vulnerability of indigenous people to climate change and argues that holistic management approaches developed over time to address environmental variability supports the need for tribal sovereignty in management and the value of tribal approaches to regional adaptation to climate change. They argue for greater tribal participation in climate change policies.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and history: The project's budget since 2008 is presented. The project gets cost share from member tribes and the BIA. The financial history described actions taken to recover from past accounting irregularities and the implementation of better practices including services of a CPA, a financial policy, regular financial reporting, and other monitoring practices. The existing budget is considered by the sponsors to be inadequate to coordination needs; an increase is requested.

Performance: Recaps the history of financial problems and a high staff turnover rate. Reports have been completed but not by reporting deadlines. The statement indicates that with the hire of a new Executive Director the situation is stabilizing but sees timely reporting as contingent on receiving the requested increase in funding to be able to hire an assistant director.

Adaptive management: The proposal describes several management actions taken to improve coordination activities that demonstrate learning from experience and experimentation with new practices for the purpose of improving performance. These include rotating locations of intertribal coordination meetings, formation of an internal technical work group, and beginning to address data consistency issues.

ISRP Retrospective Evaluation of Results

The project financial history goes back to 2008. USRT has put into place many financial controls to prevent shortfalls in future budgets. During 2011 USRT members had to reallocate coordination funds to support USRT operations. USRT has not completed reports in a timely fashion due to patterns of the first USRT Executive Director, who was terminated for cause. Currently 100% of reports are completed. The new Executive Director has been extensively evaluated.

The proposal presents a very informative discussion of USRT's history and does an excellent job of assessing the problems USRT has faced and the actions taken to correct these problems.

USRT is being funded by the Environmental Protection Agency to establish an environmental program that will coordinate tribal actions related to climate change.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: the statement provides a long list of BPA-funded projects conducted by member tribes and coordinated through the USRT. It also states the intent to closely link to the

CBFWA coordination project. Can the effectiveness of regional coordination in these activities be evaluated?

Regional coordination focus: The geographic location of USRT members is the Upper Snake River and Great Basin. USRT is interested in the Fish and Wildlife Program for the Columbia Basin.

Tailored questions: a detailed description of projects that address issues surrounding the restoration of resident fish.

The proposal suggests that tribal knowledge, practices, and “long-term experience of holistically managing change may be what is needed to base climate change management decisions on.” Would a worthwhile coordination activity under outreach and education be to bring the EPA tribal communities website, Indigenous Peoples Climate Change Assessment Initiative, and Institute for Tribal Environmental Professionals activities to basin decision makers?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has seven deliverables. A brief description accompanies each. The deliverables duplicate the objectives, so each deliverable is related to a specific objective. All deliverables are associated with work done by the Executive Director and requested assistant director.

The project sponsor should consider a research plan to evaluate how outreach and education outcomes are observed and measured? Who are the key individuals and groups to be reached? What are the outreach and educational goals, methods to be used, and expected outcomes?

A list of positive accomplishments includes attendance at various regional meetings, hosting a workshop for Columbia River Tribes, and contribution to various regional processes. Can outcomes from these activities be identified and measured?

Seven work elements are identified – 99. Outreach and Education, 114. Identify and Select Projects, 115. Produce Inventory or Assessment, 122. Provide Technical Review, 174. Produce Plan, 189. Coordination-Columbia Basinwide, and 191. Watershed Coordination. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: methods of coordination are provided throughout the document in brief descriptions of objectives, deliverables, and accomplishments. The methods consist of meeting attendance, document development, and coordination and presentations. The proposal associates no metrics with any of the deliverables.

The statement is made that "The effectiveness this work will be monitored following the Independent Scientific Review Panel Memorandum (ISRP 2007-14) which provided NPCC input on evaluation of regional coordination projects." A plan detailing the measurement and evaluation approach should be included in the proposal.

Value added: The statement "Facilitation and coordination of USRT assists Council and BPA in achieving Fish and Wildlife Program objectives in a cost effective manner" is about value-added. Can specific examples of the value added and cost-effectiveness be provided?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the seven work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available is from ISRP (2007-14:2). The project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[200710800](#) - Upper Columbia United Tribes (UCUT) Coordination

Sponsor: Upper Columbia United Tribes (UCUT)

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

1. A report/memo that addresses previous ISRP comments is needed.
2. A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The ISRP's FY 2007-09 review commented, "The proposal would be strengthened by including more detail on the benefits to fish and wildlife of enhanced coordination activities. For example, what specific projects or resources are threatened if funding is not provided? How will conservation and management be affected if the funding is not provided?"

The ISRP's FY 2007-09 review further stated, "sponsors need to provide some measures by which the effectiveness of this coordination can be monitored and evaluated." According to the

proposal, "One specific metric that the UCUT Coordination uses to assess the value of our work is to gauge if impacts from a proposed action help one critical natural or cultural resource at the detriment or while causing harm to another critical component (e.g., if an action benefits anadromous fish downriver while causing harm to resident fish upriver. For many issues, stopping the harm is the main short-term objective required, with mutual benefits to all resident and anadromous fish and wildlife being the long-term goal." This is a very worthy metric, but difficult to quantify. What other metrics and methods might be used?

The proposal should be re-written to include a better statement of objectives worded as desired outcomes and separated from tasks. Some text that could serve as the basis for rewritten objectives is already contained in the proposal. The proposal should be more explicit about how adaptive management is conducted within this project, and about how methods of implementation can be measured and evaluated for success. It would be useful to have a more structured and defined approach to measuring effectiveness of methods, and an explanation of how cost-effectiveness is assessed.

The project sponsors raise good questions about the conduct of coordination project evaluations. The proposal is missing an opportunity to take a more systematic approach to coordination: to think about what the sponsors are really trying to achieve, how they will know if they are achieving it, and how they will adapt to changing circumstances or proactively test new approaches and learn from the outcomes? These would be good elements for a research plan.

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of regional coordination. Concepts like environmental justice, "ecosystem health, equitable commerce, governance, and sovereignty" are variables. Measurement of these variables could be discussed in the section on deliverables. Can measures be proposed and can these variables be related to regional coordination activities that provide for achievement of UCUT goals.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Proposed work includes coordination of projects and programs (25%), facilitating and participating (25%), review of technical documents and processes (15%), data management (10%), information and education (10%), monitoring and evaluation (5%), biological objectives (5%), and project proposal reviews (5%).

A claim is made for the benefits of coordination: "Through constant and effective communication, collaboration, and cooperation, the UCUT is able to reduce redundancy, prevent being left out of issues of local-to-regional impact, and increase efficiency and cost effectiveness of the PME efforts of the individual and combined UCUT." These are worthwhile and useful questions to study. Further, providing evidence for better understanding of tribal

views by stakeholders and the increased efficiency and cost effectiveness of the process would be very valuable when it comes to evaluating coordination expenditures.

Significance to regional programs: The project allows member tribes of UCUT to represent their collective issues in various regional programs and to present documents to the Intermountain Province Plan. “The five member tribes of UCUT (Upper Columbia United Tribes) are: the Coeur d’Alene Tribe, the Confederated Tribes of the Colville Reservation, the Kalispel Tribe of Indians, the Kootenai Tribe of Idaho, and the Spokane Tribe of Indians.” UCUT represents its interests and engages in technical and policy tribal, federal, state, and local governments and stakeholders. They relate to the FCRPS and the NWPCC’s Program, in order to protect and enhance the UCUT “rights, sovereignty, culture, fish, water, wildlife, and habitat, with scientific validity, and maximized fiscal and resource efficiency and effectiveness.”

Problem statement: The statement emphasizes that since UCUT’s 2005 departure from CBFWA its coordination functions have strengthened. UCUT now gets funds from each member tribe as well as BPA and employs a full-time policy analyst. Can the strengthening of coordination functions be measured or illustrated with narratives?

Objectives: The project has four objectives. The objectives are worded as tasks rather than as desired outcomes. However, explanatory text provided with each objective reflects desired outcomes. This text material could be used to restructure the objectives in the form of outcomes.

Objective 4 is about developing a strategic plan. How does the plan relate to the “Common Views” document? The “Common Views” document appears to have outcome measures that might be incorporated into the proposal.

For example: "Increase scientifically valid, effective, and cost efficient outcomes from participation in local, provincial, regional, national, and international decision making processes." "so that diverse decision-making includes outcomes that are consistent with fulfilling PME obligations of the CRPS..." "increase their understanding and support of conservation actions required to fulfill the PME obligations of the CRPS..." reference concepts that could be observed and measured (see Qualifications).

What are the outcomes from “Organized, facilitated, and provided reports,” “frequent computer, phone, and personal contact,” participation in meetings and processes, and “media and web outreach and education ...sharing valuable perspectives to tribal and non-tribal local-to-international governments” in terms of achieving the proposal objectives?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and history: Expenditures have been less than budgeted amounts due to delay in filling the policy analyst position. The financial history explains the establishment of a separate BPA funding accord for UCUT that will extend until 2020. Similar long-term funding accords have been developed between BPA and two UCUT tribes.

Project performance: An explanation based on changing contract performance periods is provided for the number of late reports.

Major accomplishments: A long and detailed statement describes contributions to regional documents, organizations, facilitation of and attendance at meetings, document review, outreach and education, all to represent the perspective and position of UCUT on a wide range of issues. Were outcomes from these contributions ones that UCUT expected or wanted to achieve? Can success or lack of success in having UCUT's position understood be explained?

Response to past ISRP and Council comments and recommendations: The ISRP made two suggestions in their 2007 review. Neither suggestion appears to have been addressed. Rather, a statement of a rationale about why coordination projects are not appropriate for standard scientific review is provided, but it does not refer specifically to ISRP or NPCC comments.

Adaptive management: The statement describes coordination as dynamic and effective at reducing redundancy, ensuring UCUT representation, and increasing cost-effectiveness. However, it does not address how management changes happen or whether active experimentation in new coordination approaches takes place. Further, measuring cost effectiveness would be very useful in justifying funding for regional coordination.

ISRP Retrospective Evaluation of Results

The project financial history goes back to 2007, although no expenditures were made until 2008, when four Columbia Basin tribes left CBFWA. The tribes prefer to develop their own expertise and communicate directly in coordination processes. The 72% report completion rate is stated to be mostly a problem with contracting procedures.

Other historical data on performance are available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance."

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: The proposal describes the primary project relationships as being with the individual UCUT tribes, as well as the relationships between UCUT and entities in the larger region.

Regional coordination focus: The geographic interests are regional to the upper Columbia, national to the responsibilities of the United States toward American Indians, and international, especially regarding Columbia River Treaty negotiations between the US and Canada.

Emerging limiting factors: A detailed statement is provided describing participation in regional and international processes related to climate change, invasive species, northern pike predation and toxics. The statement also describes the inability to propose new needed work as a limiting factor. Could regional coordination activities identify, prioritize, and promote needed work that might increase its likelihood of being funded?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has 5 deliverables. Each deliverable relates to an objective and a short explanation of work that links the deliverable to an objective is provided.

“DELV-2: Educate and communicate with public and relevant stakeholders” seems important for dealing with environmental injustices (OBJ-3). Are these injustices part of the regional coordination process? Do they affect regional coordination outcomes? Are they outside the regional coordination process?

Should DELV-2 be concerned with communication of the “Common Views” document? Can the effectiveness of education messages, methods, and understanding be evaluated? Were the outcomes the ones expected when the education and communication programs were designed?

Five work elements are identified – 99. Outreach and Education, 122. Provide Technical Review, 161. Disseminate Raw/Summary Data and Results, 174. Produce Plan, and 189. Coordination-Columbia Basinwide. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics and methods be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: Detailed descriptions of work performed under each project component are provided in the "project coordination" section. Several assertions of cost-effectiveness, success, and the use of metrics are made, but without specific definition or analysis.

Value-added: The proposal claims that the project results in increased efficiencies and cost-effectiveness but does not provide specific analysis or examples of how this is the case.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the five work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). The project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[200716200](#) - Kalispel Tribe Coordination

Sponsor: Kalispel Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

Overall this is a well-written proposal that provides specific detail in accomplishments, project relationships, methods, and limiting factors. The proposal provides good detail as to why coordination is needed, how it is accomplished, and the outcomes that result. However, although objectives are well stated they are not written in a form to allow measurement of specific achievements.

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Concepts like environmental justice, conservation outcomes, "increase the values of projects or programs," and "improved our conservation outcomes" are conditions and variables that for which trends and change can be observed. Measurement of these variables could be discussed in the section on deliverables. Can measures be proposed and can these variables be related to coordination activities that provide for achievement of tribal goals.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Significance to regional programs: The description is adequate. The proposal notes that although the project has no direct relation to a single regional program, its purpose is to facilitate tribal coordination with several regional plans. It specifically mentions the goals of the Intermountain Province Plan and the Pend Oreille Subbasin Plan for increased coordination among stakeholders. It references the NPCC 2007 white paper on coordination.

Problem statement: The proposal contains a brief but adequate statement of the need for coordination and existing budget arrangements. The Kalispel Tribe has chosen to represent its interests and engage in technical and policy issues with resource managers in the Upper Columbia Basin.

Objectives: The project has four objectives that link coordination activities to project implementation and conservation outcomes. Overall these are well written objectives that tie the coordination activities to regional planning documents, project implementation, education, cost-coordination, and conservation. However, they are not written in a form to allow measurement of specific achievements.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Explanation of Recent Financial Performance: The description is adequate.

Explanation of Financial History: The description is adequate. The Kalispel left CBFWA because of inadequate and poorly timed communication about issues in the Upper Columbia region. The project financial history goes back to 2007. The Kalispel Tribe's "historical spending has trended toward under spending our contracted amounts."

Performance: Most of the contract deliverables have been on time.

Accomplishments: The project lists accomplishments, with examples, in the following categories: contribution to the regional coordination white paper, participation in meetings, provision of information and recommendations on Basinwide policy issues, provision of project-related reporting and policy-level education, coordination on FCRPS mitigation related issues, and representation of Kalispel Tribal issues throughout the Basin.

Past Accomplishments are well described, with specifics provided as to what was done, how it was done, and the value added.

Response to previous reviews: general information is provided regarding the intent to meet or exceed review criteria.

Adaptive management: A general description is provided but it is not applied specifically to the implementation of the coordination project.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests are regional to the Intermountain Province. The Kalispel are a member of UCUT and support its activities. They are concerned about Fish and Wildlife Program activities in the Columbia Basin.

Project relationships: Specific information is provided on relationships with other tribal coordination projects, regional monitoring and regional data projects. The proposal also notes coordination relationships to implement cost-share, conservation strategies, and project actions.

Limiting factors: These are described in terms relevant to coordination – the maintenance and support of existing relationships within the region to enable cost-effective project implementation and effective conservation outcomes.

Information is provided about efforts to reintroduce and restore native fish.

4. Deliverables, Work Elements, Metrics, and Methods

The proposal describes the breakdown of project efforts among eight tasks, with accompanying specific explanation: data management (10%); monitoring and evaluation (10%); biological objectives (10%); review of technical documents and processes (20%); project proposal review (5%); coordination of projects and programs (25%); facilitating and participating in groups and Program issues (10%); and information and education (10%).

Deliverables are worded as processes rather than evidence of outcomes; they include participate, educate and communicate, provide technical reviews, and summarize accomplishments and lessons learned. The explanation of how deliverables tie to objectives provides more detail and helpful specific examples, but still lacks a measurement link between activities and objectives.

Three work elements are identified – 99. Outreach and Education, 122. Provide Technical Review, and 189. Coordination-Columbia Basinwide. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Meetings are identified. What have been the outcomes from these meetings? How has coordination improved over the time when coordination was handled by CBFWA? The annual report for Project 2007-162-00, Contract No. 00046774, Reporting Period FY 2009, 4/1/10 - 3/31/11 gives very little detail on the results of attending meetings and the collaborations that took place. Were some meetings better organized, lead, structured than others? Does the organization of meetings affect the effectiveness of coordination?

More development of the education objective would be desirable. How has the website data dissemination project cited at www.gcs-research.net/KalispelTribe/ (site is not accessible w/o login id) been evaluated? Has it achieved its objectives? What is the primary audience? What are the key data included? Can this be placed in an adaptive management framework, where lessons learned inform the next project renewal and round of funding? The information in the annual report for Project 2007-162-00, Contract No. 00046774, Reporting Period FY 2009, 4/1/10 - 3/31/11 gives very little detail.

The proposal says, "The Kalispel Tribe's use of coordination resources are used specifically to promote the integrated implementation of all actions within our ceded lands in a manner consistent with the recovery of ESA listed species, the conservation of species at risk of listing under ESA, and the general knowledge and condition of native flora, fauna and associated habitats. We are dedicated to this end and specific opportunities to restore or reintroduce native fish to our area are covered in the various project proposals being submitted." What is the baseline of current conditions? How can coordination improve the situation? Who needs to be involved to make progress? Were the proposals submitted coordinated with other groups, government entities, or organizations?

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the three work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors can strengthen the science in proposals by developing metrics for the most important activities and identify methods for measurement.

[200710600](#) - Spokane Tribe Coordination

Sponsor: Spokane Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal describes a project that funds meeting attendance for the purpose of information dissemination, issues tracking, and internal coordination. The descriptions are quite general and lack specific examples of what outcomes are desired, how they are being achieved, and how they know they are being achieved. Many of the earlier ISRP review comments continue to apply.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

This proposal is to fund engagement of the Spokane Tribe of Indians (STOI) representatives in regional science and policy discussions, both to provide input to these fora on STOI positions and to keep STOI leadership informed of regional issues. The major issues for the STOI relate to the large areas of fish habitat blocked by the dams. These issues include management responsibilities for blocked areas as well as impacts from regional actions.

Significance to regional programs: The Spokane Tribe of Indians has chosen to represent its interests and engage in technical and policy issues with resource managers in the Upper Columbia Basin. The STOI wants to communicate its interests to “the Northwest Power and Conservation Council (NPCC), the Bonneville Power Administration, the Bureau of Reclamation and other entities that create issues that impact Lake Roosevelt and STOI F&W programs.” The STOI cooperates with “the Upper Columbia United Tribes (UCUT), Upper Snake River Tribes (USRT), the Columbia River Inter-Tribal Fish Commission Tribes (CRITFC) tribes and the Salish and Kootenai tribes of Montana (Flathead).”

Problem statement: The proposal presents the problem previously facing the STOI as a lack of timely information that created difficulty in effectively participating in discussions and diminished their ability to manage fish and wildlife resources. This problem was resolved by the relocation of coordination activities within the Tribe. The proposal states that STOI coordination assists in the mitigation of FCRPS impacts. The problem statement also notes that the STOI have not been given the opportunity to present new projects to support anadromous recovery,

although it is not clear whether this is a problem that existed before the STOI regional coordination or one that has continued since this project was first funded in FY07.

Objectives: The two objectives of this proposal are: 1. Improve coordination and communication on Lake Roosevelt impacts; 2. Anadromous participation. Objective 1 states a desired outcome but in terms that are too general to be measurable. The coordination and communication are stated only in unidirectional terms of conveying the Tribe's perspective to the region, rather than multidirectional communication. Objective 2 specifies a process rather than an outcome.

Deliverables include attending meetings, educate the region about STOI mitigation projects, coordinate on policy and technical issues, and provide reports. Deliverables are stated in "process" terms such as attendance at meetings. The proposal should include a description of how the desired outcomes of coordination, communication, and education will be measured and evaluated. How will you assess whether education or improvements in communication have taken place?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The STOI left CBFWA because of inadequate and poorly timed communication about issues in the Upper Columbia region. The project financial history goes back to 2007, although no expenditures were made until 2008, when four Columbia Basin tribes left CBFWA. The tribes preferred their own expertise and to communicate directly in coordination processes and issues.

Financial performance: The explanation of the project's financial performance is adequate.

Deliverable performance: All scheduled reports have been completed.

Accomplishments: Accomplishments could be better summarized and described. Instead of a list of types of meetings attended (these are inputs), some enumeration of the number and type, and a discussion of the benefits to STOI of meeting attendance, would better meet the requirement to present accomplishments (outputs). What was accomplished by attending these meetings? How did it contribute to coordination, communication or education? What is the evidence of better communication or education?

Adaptive Management: No information is provided of explicit attempts to evaluate past interactions, modify current practice, and assess the success of the modification.

ISRP Retrospective Evaluation of Results

Improvements are needed:

- Accomplishments are listed as inputs rather than summarized as outputs.
- The proposal should include a description of how the desired outcomes of coordination, communication, and education will be measured and evaluated.
- No specific examples of asserted improvements in coordination are provided.
- Many of the earlier ISRP review comments continue to apply.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests are regional to the Upper Columbia, national to the responsibilities of the United States toward American Indians, and international, especially regarding Columbia River Treaty negotiations between the United States and Canada. Further, there are significant issues in downstream pressures being placed on Lake Roosevelt that need coordination attention.

Project relationships: There is some mention of projects with similar structure and a general statement that the structural similarities allow coordination, but specifics as to how these projects are related are not provided.

Emerging limiting factors: The need for predator control is mentioned; the nature of the predator problem should be described.

The concepts and principles for STOI mitigation for Lake Roosevelt losses would be desirable to specify. The critical issues at Lake Roosevelt are that downstream users look to “Lake Roosevelt to be the answer for all Columbia system wide problems. Irrigators, Anadromous flows, Barge operators, Flood Control, Hydro Operation balance, Rehydration projects and others seek answers from the waters that lie on the lands of the STOI.” This seems like a very important coordination issue. Are these being addressed? Who are the key groups that have to be informed and what kinds of decisions are expected from these groups. The impacts to resident fish populations, cultural sites, and wildlife are variables that can be monitored and trends shown. Has coordination changed any of these trends? What has been the level of “savings to the above mentioned parties?” How have the savings been distributed? (see Qualifications)

What are the coordination issues in the negotiations regarding the Columbia River Treaty? What are the implications for the Fish and Wildlife Program, especially projects in the Upper Columbia.

More development of the education objective would be desirable. The primary audience appears to be local schools and universities. What are the key messages to be emphasized? What education styles or media will be used? How will effectiveness of understanding the message be monitored? Can this be placed in an adaptive management framework, where on project renewal, lessons learned could inform the next round of funding? The information in the annual report for Contract # 48252, Project # 207-106-00, Contract Period 08/15/2010 – 08/14/2011 gives very little detail.

Meetings are identified. What have been the outcomes from these meeting? How has coordination improved over the time when coordination was handled by CBFWA? The annual report for Contract # 48252, Project # 207-106-00, Contract Period 08/15/2010 – 08/14/2011 gives very little detail on the results of attending meetings and the collaborations that took place.

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination.

4. Deliverables, Work Elements, Metrics, and Methods

Proposed work includes monitoring and evaluation (50%), coordination of projects and information (25%), education and information (15%), data management (5%), and project proposal reviews (5%).

Monitoring and evaluation is described as 50% of the project. The project's use of meeting attendance for the purpose of monitoring regional issues is clear but the proposal does not describe how that has been done. It also shows little evidence of evaluation of these issues or of project performance. Although M&E comprise 50% of the budget, project coordination and information (25%) is listed as the primary task of this project.

The proposal states that over time coordination has improved both internally and externally, but no specific examples of this improvement are provided.

Three work elements are identified – 99. Outreach and Education, 122. Provide Technical Review, and 189. Coordination-Columbia Basinwide. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

This project does not contain a monitoring protocol, but it and other coordination projects would benefit from taking a more systematic approach to monitoring and evaluation of their performance.

The protocols for the three work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors should design the metrics into their proposal and identify methods for measurement.

[200901000](#) - Coeur d'Alene Tribe Coordination

Sponsor: Coeur d'Alene Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

Several thoughtful ideas are presented in the proposal. These could become the basis for a scientific component for the coordination activities discussed.

Proposal strengths:

- Objectives are written as desired outcomes
- Good examples of the specific work conducted are provided for each category.

Weaknesses:

- The problem statement does not directly address the problem to be addressed, but rather lists the activities to be undertaken.
- It is difficult to directly relate the list of accomplishments to the project's objectives.
- No project relationships are provided
- No emerging limiting factors are identified

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Coeur d'Alene Tribe (CDT) has chosen to represent its interests and engage in technical and policy issues with resource managers in the Upper Columbia Basin. "Tribal coordination through the Upper Columbia United Tribes venue enables a proactive voice in the Regional forums that may determine various outcomes at the programmatic and project level."

Significance to Regional Programs: The proposal relates the need for coordination to the Council's Fish and Wildlife Program, MERR Plan, Research Plan, and coordination white paper. It also relates to the need addressed by the UCUT Coordination Project. The "significance" statement includes a description of benefits of the coordination entities that could have been listed in the problem statement: input into the development of data program objectives, data collection methods, data interpretation, data presentation, use of data to implement restoration measures, and the development of consensus approaches to research, monitoring and evaluation.

Problem statement: The problem statement does not directly address the problem to be addressed, but rather lists the activities to be undertaken.

Objectives: The project has eight objectives written as desired outcomes. A deliverable is associated with all but one of the objectives. Deliverables include implemented projects and regional coordination, user evaluation of outreach and member assessment of effectiveness and impact, and gain benefits for fish and wildlife. With the exception of deliverable 5, none of the deliverables includes metrics with which to assess progress toward meeting the objectives.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The Coeur d'Alene Tribe left CBFWA because of inadequate and poorly timed communication about issues in the Upper Columbia region. A budget history since 2009 is provided, with a brief explanation of budgets, personnel and their effect on recent financial performance. No explanation of the project's financial history is provided.

Reports and deliverables have been completed either on time or ahead of schedule. Reports in Pisces were mentioned, but none were available for review.

Major accomplishments are listed as a number of different activities, without any assessment of the outcome or evaluation of benefit of those activities in contributing to the objectives. Most of the activities described pertain to monitoring the actions of other entities, primarily UCUT and NPCC. It is difficult to directly relate this list of accomplishments to the project's objectives. However, later in the proposal in the "Past Accomplishments" and "Value Added" sections the sponsors provide a good history of project accomplishments and value added. Past accomplishments are tied to outcomes beneficial to the Tribe. The value-added section

describes specific projects that have benefited from increased coordination among UCUT members. It also describes a situation of more effective tribal participation in regional fora, better communication and coordination, and the avoidance of redundancy within and across tribal projects.

Adaptive management: No management changes planned. However a later section of the proposal on assessment of effectiveness describes annual evaluation against objectives and planning adaptation to changing conditions with specific examples of strategies employed.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests are with agencies and stakeholders at the subbasin and provincial levels. The CDAT are a member of UCUT and support its activities.

No emerging limiting factors are listed.

What were the outcomes of “a regional funding allocation strategy to redistribute funds in a way that was more aligned to the environmental impacts within the region and its power benefits?” Were Fish and Wildlife Program objectives more effectively and efficiently achieved? Were funds saved, more efficiently used? Was the prioritization of projects better? How was there alignment made to environmental impacts?

Mention is made, “Coordinated efforts involve trend forecasting for multiple projects across UCUT member Tribes with sometimes divergent goals with regard to resource management.” This sounds like a very innovative process. Can it be described? Has it been assessed in terms of meeting UCUT goals, Fish and Wildlife Program objectives? What coordination processes work to resolve divergent goals?

Would the coordination process for an “assessment phase that evaluates the entities participation” work in other regions. What is the assessment that is conducted? What were the outcomes?

What are some of the specifics of “assessment of regional policies and directives that are consummate with Tribal cultural and policy values through the coordination with Tribal Council and policy representatives?” How do coordination activities figure into these assessments?

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination and how coordination procedures might be improved. This could be framed in an adaptive management context where the lessons learned from this project inform the next.

4. Deliverables, Work Elements, Metrics, and Methods

Program Coordination: The proposal lists eight categories of work to be undertaken, with proportional shares that don't sum to 100%. Two categories are each listed twice with slightly different texts. Shares don't sum to 100. The categories are coordination of projects and programs (25%), facilitating and participating (10%), data management (10%), information and education (10%), monitoring and evaluation (10%), biological objectives (10%), and project proposal reviews (5%).

Good examples of the specific work conducted are provided for each category.

Four work elements are identified – 99. Outreach and Education, 122. Provide Technical Review, 174. Produce Plan, and 189. Coordination-Columbia Basinwide. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the four work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors should design the metrics into their proposal and identify methods for measurement.

[201004400](#) - Colville Regional Coordination

Sponsor: Colville Confederated Tribes

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination. As this project gets more history it

will be desirable to provide specifics of what is being done and how it contributes to project objectives and to value-added for fish and wildlife. At present many of the statements are general and presented in conditional future tense, rather than specific examples of accomplishments.

The proposal sponsors refer to a number of procedures and processes that would be useful for coordination evaluations. These are referred to in a general way. References, reports, or descriptions of these procedures and processes would be helpful. Further, any data collected as a result of these activities would be valuable to report.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Colville Confederated Tribes (CCT) have chosen to represent their interests and engage in technical and policy issues with resource managers in the Columbia Basin. The project will allow the Colville Tribes “involvement in regionally important processes and programs related to fish and wildlife management issues within the Columbia River Basin.”

Significance to regional programs: The proposal places the project within the context of the Fish Accords, US Salmon Recovery Plan, the subbasin and provincial plans, the Fish and Wildlife Program.

Problem statement: The statement describes a need for the CCT to better represent itself in regional issues and coordination. It cites the conceptual foundation provided in the NPCC coordination white paper as well as the example provided by the Kalispell Tribe in managing its own coordination rather than working through a regional body. Funding for the CCT to conduct its own coordination activities began in 2010.

Objectives: The proposal lists three objectives. The objectives are worded as desired outcomes and are generally described.

Deliverables include “participate in Regional Fish and Wildlife Integrated Program related activities,” “educate and communicate with public and relevant stakeholders,” “provide for technical reviews of Fish and Wildlife Program projects and/or issues,” and report on milestones and deliverables.

Limiting factors: None are listed

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The Colville Tribes initially participated in UCUT. When the Kalispell Tribe left CBFWA in 2007, the Colville Tribes decided “that the traditional regional coordination funding could be better utilized through direct contracting with the BPA.” The first funding to the Colville Tribes was

awarded in 2010, but no funds were expended until 2011. No progress reports are available for review. One is pending.

Recent financial performance: A brief description of the project's activities. A statement about the multiple sources of cost share is included, although directly above this section is a statement saying there are no cost shares.

Accomplishments: These are described as various interactions, reporting and presentations for education. They are not directly tied to the project's objectives. This is a new project, so technically there are no results to evaluate. In the historical accomplishments section the proposal describes the realized accomplishments of meaningful engagement in regional processes and the development of products used in various policy processes. Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance."

Adaptive management: A brief statement of the intent to adaptively manage coordination to maximize efficiency and effectiveness.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The main geographic interest is "Colville Fish Accords and the Upper Columbia Salmon Recovery Plan." The coordination proposal is intended to "to allow the Tribe to represent its policies and issues regarding all regional plans and documents."

Project relationships: The project is related to other tribes' coordination projects, regional projects and programs.

Limiting factors: None are listed.

While this is a new proposal, thinking about scientific contributions that might be made during the current funding period is desirable. More specific attention to identifying a scientific component to the proposal help plan for future success. Under management the proposal says, "The project, through time, will adaptively manage the tools, strategies, and efforts to maximize efficiencies and effectiveness of coordination." Specifics on the adaptive management process, monitoring protocols, methods for capturing and applying lessons learned, and metrics for effective coordination and efficiency would be very helpful in evaluating and justifying this program. Several important processes and concepts are identified in this statement.

The proposal emphasizes, “engage, in a meaningful way.” Can his be measured or observed? Do other coordination entities reflect understanding of tribal principles? Does meaningful engagement increase trust; change the selection of projects, the text in plans, the patterns of collaboration; or results seen on-the-ground?

The proposal sponsors state “as a matter of practice, routinely re-evaluates our engagement in activities and processes within the Columbia River Basin.” Are there reports that might be referenced on this evaluation? Are there examples of changes made due to evaluation? Would this evaluation be a protocol that might be included in “Work Elements, Metrics, and Measures?” Having such a process might be valuable to others.

Meetings are identified. What have been the outcomes from these meeting? How has coordination improved over the time when coordination was handled by CBFWA? Does the structure of the meeting setting, meeting leadership, and seating of participants affect meeting outcomes?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: Four deliverables are generally described and are tied to the objectives.

Regional coordination activities: The proposal lists eight types of activities as methods of implementation. Data Management (10%)- Monitoring and Evaluation (20%)- Biological Objectives (5%)- Review of Technical Documents (5%)- Project Proposal Review (5%)- Coordination of Projects, Programs and Funding Sources within Subbasins (25%)- Facilitating and Participating in focus workgroups on Program issues (10%)- Information Dissemination (20%). These are generally described, without metrics. Other than a list of bullet points little else is provided.

Work elements: Two work elements identified are 99. Outreach and Education and 189. Coordination-Columbia. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the two work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors should design the metrics into their proposal and identify methods for measurement.

[201200900](#) - Salish-Kootenai Tribe Coordination

Sponsor: Salish and Kootenai Confederated Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal makes the very profound statement, “Regional coordination is an activity that will be required in perpetuity.” This likely is true, but it also carries the obligation to do coordination in the most effective and efficient way possible. Metrics for effectiveness and efficiency would seem to be very valuable for continuing coordination activities. The proposal says, “Regional coordination has two aspects that are pertinent to this project. First, coordination is a function that can be accomplished using phone calls, emails, postal services, and face-to-face meetings and briefings. Coordination also includes the instrument used to coordinate which includes oral communication and written materials. It is anticipated that all of these in various combinations will be used to accomplish this project. Second, the regional nature of this coordination will require travel at times to accomplish the work.” What are the best approaches given the decisions being considered? When does a teleconference work as effectively as a face-to-face meeting? Are videotaped briefings as effective as fact-to-face ones. Can new techniques and technologies improve coordination outcomes?

A strength of the proposal is the explicit recognition of the need to evaluate coordination effectiveness. However, much more detail is needed throughout this proposal.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Confederated Salish and Kootenai Tribes of the Flathead Reservation (CSKT) have chosen to directly represent their interests and engage in technical and policy issues with resource managers in the Upper Columbia Basin. The CSKT is “as a sovereign nation with jurisdiction, management authority and reserved rights for fish, wildlife, water, and other resources.”

Significance to regional programs: The statement lists the major regional plans and programs, the Salish and Kootenai Subbasin Plans, and related BiOps for which the Salish-Kootenai coordination is significant.

Problem statement: The statement references the Northwest Power Act requirements for coordination as well as the NPCC coordination plan and the Fish and Wildlife Program, and states that the project will assist the CSKT in meeting the regional coordination activities as outlined in these documents.

Objectives: The proposal has a single objective: To coordinate and facilitate efforts of the CSKT with other regional fish and wildlife managers, the NPCC and BPA. The objective is worded as a task rather than a desired outcome. A better statement of objective is found in the sentence accompanying the objective: “to maintain and enhance the functions of the Confederated Salish and Kootenai Tribes of the Flathead Reservation (CSKT) related to regional coordination capability and implementation.”

Deliverables include regional coordination activities and annual reports.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The Confederated Salish and Kootenai Tribes of the Flathead Reservation (CSKT) left CBFWA in 2011 “to protect its rights, interests, and sovereignty.” The tribes prefer to use their own expertise and to communicate directly on coordination processes and issues.

Project performance, financial performance, and major accomplishments: This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, “Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation.” See the section, “Reporting & Contracted Deliverables Performance.”

Adaptive management: No information is provided

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests are the “CSKT reservation in western Montana and Portland, Oregon where the headquarters of the NPCC, BPA, CBFWA, and other organizations requiring coordination are located.

Project relationships: The proposal lists the project numbers of other regional coordination projects without further explanation.

Emerging limiting factors: The proposal states that this does not apply to coordination projects.

While this is a new proposal, thinking about scientific contributions that might be made during the current funding period is desirable. More specific attention to identifying a scientific

component in the proposal would be desirable. Can a scientific research design list important activities and identify ways to report results? Can evaluation of results in terms of the project objectives be discussed? Could insights be included that summarize how hypotheses and methods may be changed or improved compared to what is done now? Is there a plan for how the proposed work could “contribute to or inform Program policy development; lead to broad-scale implementation; and be reported back to the Council.”

The vision of CSKT is that their participation will “improve and enhance exchanging information, finding consensus on difficult issues, the quality of decision-making, and the process of informing other regional decision-makers.” Several important concepts are identified here such as improve information, decision making, and process. The proposal sponsors go on to say, “Quantitative benefits cannot be readily estimated for these results, but it has been demonstrated that effective and efficient coordination provides for cost savings in highly controversial situations such as the Columbia River Basin that have conflicting rights and interests among a multitude of sovereigns and stakeholders.” A sound scientific approach should make an effort to provide evidence for the very valuable and important claims, especially the hypothesis that “coordination provides for cost savings in highly controversial situations.” For some this outcome may be obvious, but some evidence for cost savings would be very beneficial in arguing for coordination funding.

What are the coordination issues in the negotiations regarding the Columbia River Treaty? What are the implications for the Fish and Wildlife Program, especially projects in the Upper Columbia.

Meetings are identified. What have been the outcomes from these meeting? How has coordination improved over the time when coordination was handled by CBFWA?

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: the proposal lists two deliverables: 1. regional coordination activities; 2. annual progress report. A brief description of work to be performed is provided with each.

Regional coordination components: The project has five components: Review of technical documents and processes (10%); Project proposal review (5%); Coordination of projects, programs and funding sources within subbasins (75%); Facilitating and participating in focus workgroups (7%); and Information dissemination (3%). Other than a list of bullet points little research design for sound science is provided.

Work elements: One work element is identified – 189. Coordination-Columbia Basinwide. Can output metrics be identified to go with this work element? More development of the work elements, hypotheses related to objectives, research methods to observe outcomes, metrics to quantify outcomes, and reporting lessons learned would strengthen the scientific dimensions of the proposal. Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: Brief descriptions of methods are presented as part of the deliverables section. Specific explanations of methods and identification of metrics to be used to measure effectiveness are not provided.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

A protocol for the one work element is published but does not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors have to design the metrics into their proposal and not rely on the definitions for Work Elements.

[200902500](#) - Grand Ronde Tribe Coordination

Sponsor: Confederated Tribes of Grand Ronde

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal is very comprehensive in its presentation and provides good detail about work accomplished and anticipated. It identifies a number of very fruitful areas for monitoring and measurement over the duration of the project. Because of the many items identified that are worth study, the proposal sponsors will have to prioritize areas of research.

The objectives could be improved by restatement as desired outcomes, such as noted in the review comments under "major accomplishments."

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Confederated Tribes of Grand Ronde Community of Oregon (CTGR) has chosen to represent its interests and engage in technical and policy issues with resource managers in the Willamette/Lower Columbia Basin. For the CTGR, fish, wildlife, and botanical resources “provided the basis of cultural customs, tribal identity, and had significant spiritual connections.”

Significance to regional programs: The project's significance is placed within the consultation requirements of the Northwest Power Act, the need to represent the CTGR perspective on fish and wildlife recovery issues within the CRB through interaction with the NPCC, Action Agencies, BPA, ODFW and other entities. A focus is on meeting the requirements of the 2008 Willamette BiOp and contributing efforts to strengthen the emphasis on Willamette Basin issues within the Fish and Wildlife Program.

Problem statement: A complete problem statement emphasizes the cultural importance of fish and wildlife resources to the CTGR. Some history is provided on the decline in resources traditionally used by the CTGR. The problem statement notes the complexity of managing resource recovery within the context of human development and competition for limited resources. The CTGR seek coordination funding to enable more effective participation as a partner in resource planning, development of decision documents and decision making.

Objectives: The project has two objectives: 1. Support tribal participation; 2. Manage BPA contract. Neither is worded in terms of desired outcomes. Deliverables include participation on the Willamette Action Team for Ecosystem Recovery (WATER), participation in Columbia Basin and regional coordination, management, administration, and reporting of contract outcomes.

Limiting factors: The proposal presents a good statement tying the ability to participate in various regional meetings to the ability to track emerging limiting factors such as human population growth and international trade. The proposal credits the NPCC monthly meetings as an excellent forum for information transmission on issues such as global warming, gas saturation, and invasive species.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The Confederated Tribes of Grand Ronde Community of Oregon (CTGR) seek coordination support because, “On many occasions, Tribal comments appear to be merely filed as the apparent federal draft action becomes final with no incorporation or discussions with the Tribe on their issues. The project financial history begins in 2010. The Grand Ronde Tribe Coordination report in Pisces is one of the most comprehensive and complete of the current reports that are available to regional coordination proposal reviewers.

Financial performance and history: A budget history is provided. Tribal cost share is acknowledged.

Major accomplishments: This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, “Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation.” See the section, “Reporting & Contracted Deliverables Performance.” The proposal’s detailed statement begins with reiterating the importance of funding to the effective participation of the CTGR Tribe in the development and implementation of the Fish and Wildlife Program. Actions taken are presented with explanations as to their significance. They note that accomplishments are “stepping stones” in meeting the larger desired result, which is to ensure that the NPCC Fish and Wildlife Program and the Willamette Subbasin Plan reflect the Tribe's preferences. As a desired outcome, this could be listed as an objective of the coordination funding.

Adaptive management: This section is focused on the need to incorporate tribal perspectives in various documents so that adaptive management can effectively function.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interest is primarily the Willamette Basin in the Willamette/Lower Columbia region. In addition, CTGR works with Basinwide programs to restore bull trout.

Project relationships: No project relationships are described, although the list of interactions and participation on various regional efforts presented as accomplishments would suggest that this project is at least communicating with other projects.

Limiting factors: A good statement tying the ability to participate in various regional meetings to the ability to track emerging limiting factors such as human population growth and international trade.

While this is a new proposal, thinking about scientific contributions that might be made during the current funding period is desirable. More specific attention to identifying a scientific component to the proposal help plan for future success. Comparing the three major RME coordination activities, WATER Habitat Technical Team, Willamette Wildlife Mitigation Group, and Willamette BiOp implementation, are there insights about coordination approaches that are particularly useful or not useful?

The proposal says, “Tribal technical staff has minimal access to agency data and information, which in many instances, this inaccessible data resources tend to drive decision making

processes for the Willamette BiOp.” A proposal outcome would be to observe the adequacy of data and its relation to Fish and Wildlife Program and Willamette BiOp outcomes.

An observation is made, “The parties will use an ecosystem approach, which means that wildlife projects under the Agreement are expected in many cases to provide dual benefits for both wildlife and fish, and may also address other species and resources of interest to Tribes and regional stakeholders that would benefit from the wildlife projects.” This seems like a very important concept in which more is achieved in terms of Fish and Wildlife Program objectives than with single species approaches. Can data be gathered to show how coordination improves or does not improve an ecosystem approach? Does this suggest changes to Fish and Wildlife Program objectives?

This proposal identifies a number of very important issues that could be framed as one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination and how coordination procedures might be improved. This could be framed in an adaptive management context where the lessons learned from this project inform the next.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has seven deliverables related to participation and reports. The deliverables are well described and related to the objectives.

Regional coordination activities: The proposal describes planned work in six areas: Data management (5%); monitoring and evaluation (20%); develop biological objectives (5%); review of technical documents and processes (30%); coordination of projects, programs and funding sources (30%); and information dissemination (10%). A detailed description of how the work is performed is provided for each.

Work elements: Five work elements are identified – 99. Outreach and Education, 114. Identify and Select Projects, 122. Provide Technical Review, 189. Coordination-Columbia Basinwide, and 191. Watershed Coordination. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the five work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors should design the metrics into their proposal and identify methods for measurement.

[201101200](#) - Cowlitz Tribe Coordination

Sponsor: Cowlitz Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

This is a new project so it is reasonable that it does not have a lot to report by way of accomplishments. However, it describes a wide array of tasks that will allow it in future to report progress toward meeting objectives and to include assessment of project performance and an evaluation of project effectiveness. Objectives are appropriately worded as desired outcomes. The sponsors are encouraged to take this evaluative approach to its interactions with other entities for the benefit of adaptive management.

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships would be very valuable in showing the value of coordination and how coordination procedures might be improved. This could be framed in an adaptive management context where the lessons learned from this project inform the next.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Purpose: The Cowlitz Indian Tribe has chosen to represent its interests and engage in technical and policy issues with resource managers in the Willamette/Lower Columbia Basin. For the Cowlitz Indian Tribe habitat is a primary concern.

Significance to Regional Programs: Significance is placed within the context of the resource history of the Cowlitz Indian Tribe (CIT), its culture, and present legal status. The proposal mentions the adverse effect of the FCRPS on resources and the critical importance of Cowlitz County habitat. This project enables the CIT to coordinate with the NPCC, Action Agencies and

other entities in advancing the objectives of the subbasin plan and implementing habitat restoration projects.

Problem statement: The statement emphasizes the importance of the CIT's cultural knowledge for the restoration of Lower Columbia resources. It emphasizes habitat actions that the CIT is taking in coordination with other entities and the need for the coordination funding to enable full participation and coordination.

Objectives: The project has two objectives worded in terms of desired outcomes: 1. Support Tribal Participation; 2. Develop and Implement Habitat Restoration. The project objectives include enabling the Tribe to better coordinate and participate with many Lower Columbia partners and to implement habitat restoration in the Lower Columbia region. Deliverables include basin wide coordination, technical reviews, habitat restoration projects, project management, and outreach and education.

Limiting factors: Climate change and its potential effect on priorities for habitat restoration are discussed.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Financial performance and financial history: The project is very new, so no financial history exists. The Cowlitz Indian Tribe feels that its input is a “necessary part of finding solutions to the negative impacts of contemporary society.”

The proposal states that the project is on schedule in performing its tasks.

Accomplishments: This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, “Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation.” See the section, “Reporting & Contracted Deliverables Performance.” The project has delivered its first report in advance of deadline.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interest is primarily Cowlitz County and the Lower Columbia region. In addition, the Cowlitz Indian Tribe works at a range of scales with Lower Columbia River Estuary Partnership's (LCREP) Science Work Group, coordination meetings with the Columbia Land Trust (CLT), Washington State Department of Fish and Wildlife (WDFW), the Columbia River Estuary Study Taskforce (CREST) and the Action Agencies (BPA, USACoE), Watershed Councils, diking districts and individual landowners.

Project relationships: The proposal states that because of its Lower Columbia location, the project is related to all CRB projects. More specifically, the project focuses on working with Action Agencies to meet FCRPS BiOp obligations.

Limiting factors: Climate change and its potential effect on priorities for habitat restoration are discussed.

Proposed work includes coordination of projects and programs (50%), facilitating and participating (20%), data management review of technical documents and processes (10%), project proposal review (10%), and information dissemination (10%).

While this is a new proposal, thinking about scientific contributions that might be made during the coming funding period is desirable. More specific attention to identifying a scientific component in the proposal is needed. Can a scientific research design list important activities and identify ways to report results? Can evaluation of results in terms of the project objectives be discussed? Could insights be included that summarize how hypotheses and methods may be changed or improved compared to what is done now? Is there a plan for how the proposed work could “contribute to or inform Program policy development; lead to broad-scale implementation; and be reported back to the Council” (see Qualifications).

What are the outcomes of “a regional funding allocation strategy to redistribute funds in a way that was more aligned to the environmental impacts within the region and its power benefits?” What fish and wildlife objectives were better achieved? Were funds saved, more efficiently used? Was the prioritization of projects better? How was the alignment made to environmental impacts? Does this suggest modifications to Fish and Wildlife Program objectives?

Would the coordination process for an “assessment phase that evaluates the entities participation” work in other regions? What is the assessment that should be conducted? Is there a report on outcomes? Does this improve achievement of fish and wildlife objectives?

What are some of the specifics of “assessment of regional policies and directives that are consummate with Tribal cultural and policy values through the coordination with Tribal Council and policy representatives?” How do coordination activities figure into these assessments?

4. Deliverables, Work Elements, Metrics, and Methods

The project has five components: Reviewing and evaluating technical documents (10%); Reviewing project proposals (10%); Coordination of projects, programs and funding sources (50%); Facilitating and participating in focus workgroups (20%); and Information dissemination (technical, policy, and outreach) (10%). Tracking biological objectives and data management are not part of this project.

Deliverables: The project has five deliverables. These are adequately described and are related to project objectives.

Work elements: Seven work elements are identified – 99. Outreach and Education, 114. Identify and Select Projects, 115. Produce Inventory or Assessment, 122. Provide Technical Review, 189. Coordination-Columbia Basinwide, 191. Watershed Coordination, and 193. Produce Land Management Plan. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the seven work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors are encouraged to design of metrics into their proposal and not to rely solely on the definitions for Work Elements.

[201200500](#) - Siletz Tribe Coordination

Sponsor: Siletz Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal lacks specific information in several areas: problem statement, significance to regional programs, project relationships, adaptive management, limiting factors, methods and metrics.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Confederated Tribes of Siletz Indians (CTSI) has chosen to represent its interests and engage in technical and policy issues with resource managers in the Willamette/Lower Columbia Basin. The CTSI have received no prior coordination funding.

The project has six objectives. The objectives are worded as tasks instead of as desired outcomes. Deliverables include summarize meetings, coordinate and cooperate with restoration partners, document participation and communications, provide outreach and information dissemination, and manage, administer and report.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance."

No information is provided about how the project will apply adaptive management.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interest is the Willamette Basin and the Columbia River Estuary regions. The project will enable participation in "meetings and workgroups concerning (1) the Willamette Wildlife Mitigation Advisory and Program Development Group, (2) Willamette Wildlife Mitigation and Restoration Activities, (3) Willamette Biological Opinion Habitat work group processes, and (4) the Lower Columbia River Estuary Project restoration processes."

Proposed work includes 50% coordination activities for Willamette basin, 20% project proposal review, 15% project development, 15% Focus workgroups. The proposal gives no explanation of concepts, hypotheses, monitoring and measurement procedures, or evaluation that will be associated with the proposed work.

The proposal says, "CTSI staff will educate and inform Federal, State, local governments, the NPCC, and NGOs about Siletz tribal history, traditions, tribal policies, and areas of interest." Can specific themes of this education be identified? What techniques will be used to accomplish the education? How will the outcome of the education and methods used be evaluated? Are the educational messages being understood as intended?

This proposal identifies a number of very important issues that could be framed into one or more hypotheses that would show the value of coordination. Monitoring of these relationships

would be very valuable in showing the value of coordination and how coordination procedures might be improved. This could be framed in an adaptive management context where the lessons learned from this project inform the next.

4. Deliverables, Work Elements, Metrics, and Methods

Six deliverables are listed; each duplicates an objective.

The project has four components: coordination activities for Willamette basin (50%); project proposal review (20%); project development (15%); focus work groups (15%). The time allocated to proposal review seems disproportionately high.

Nine work elements are identified – 5. Land Purchase and/or Conservation Easement, 92. Lease Land, 99. Outreach and Education, 114. Identify and Select Projects, 115. Produce Inventory or Assessment, 122. Provide Technical Review, 174. Produce Plan, 175. Produce Design and/or Specifications, 189. Coordination-Columbia Basinwide, and 191. Watershed Coordination. Only 5, 92, and 99 have metrics. In a scientifically sound approach, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project.

The methods are briefly described under each deliverable. Descriptions are quite general.

4a. Specific comments on protocols and methods described in [MonitoringMethods.org](#)

The protocols for the nine work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors are encouraged to design of metrics into their proposal and not to rely solely on the definitions for Work Elements.

[201200600](#) - Nez Perce Tribe Coordination

Sponsor: Nez Perce Tribe

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

Several parts of this proposal provide excellent detail. The out-of-basin emphasis of this proposal is a valuable idea and coordination is a very important part of addressing this issue. Development of the proposal to strengthen this insight would be very useful. Proposal sponsors should be able to add greater detail about methods, the approach they will take to adaptive management, the project's relationship to other projects, and how effectiveness will be assessed (see Qualifications).

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The Nez Perce Tribe has chosen to represent its interests and engage in technical and policy issues with resource managers in the Upper Columbia Basin. "The primary programmatic goal of Nez Perce Tribe regional coordination is to support effective protection, mitigation and enhancement of Columbia Basin fish and wildlife resources by actively engaging in and contributing to key regional forums, processes and initiatives."

Significance to regional programs: The sponsors relate the project to the subbasin plan, coordination to address out of subbasin effects, lamprey restoration, MERR, the FCRPS BiOp, and other regional fora and processes.

Problem statement: The statement makes the point of the complexity of implementing the 2009 Fish and Wildlife Program, given the many competing interests, and how this complexity requires good coordination among the many interests. The proposal describes the Nez Perce interests in effective Fish and Wildlife Program implementation, especially as it pertains to salmon and lamprey.

Objectives: The proposal lists four objectives. The objectives are worded as desired process outcomes. The sponsors could consider working some of their explanatory text into their statements of objectives to explain desirable achievements beyond process.

Deliverables include participation in meetings and other communications, coordinated planning and implementation forums for Pacific lamprey restoration, recommendations to amend the Fish and Wildlife Program, and coordinated assessments for salmon and steelhead. These are mainly inputs to coordination. What were the outcomes from meetings, communications, forums, and recommendations?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Although the Nez Perce Tribe has been a member of CBFWA, this is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services

provided through the Columbia Basin Fish and Wildlife Foundation.” See the section, “Reporting & Contracted Deliverables Performance.”

Reference is made to the Nez Perce contribution to adaptive management through CBFWA. The proposal would benefit from adopting an adaptive management framework.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The geographic interests are regional to all out-of-basin areas affecting returns of salmon, steelhead, and lamprey to the Upper Snake River basin.

Project relationships: Reference is made to the previous relationship to the CBFWA coordination project. No additional projects are listed as related to this project

Emerging limiting factors: This is a good summary that includes climate change effects on precipitation, predation dynamics and alterations in food webs.

Tailored questions: The section on data sharing is excellent. The Nez Perce Tribe has data that Upper Snake River runs cannot be restored to upriver basins unless out-of-basin factors are addressed. These include “estuarine and ocean conditions, hydropower impacts such as water quality and fish passage, mainstem Snake/Columbia river water quality and quantity conditions, and downriver and oceanic fisheries—are key factors limiting recruitment of anadromous spawners to the upper Snake River basins.” This is a very valuable systems perspective on the difficulties facing salmon, steelhead, and lamprey restoration. Relating out-of-basin issues to the effectiveness or lack of effectiveness in coordination could provide valuable insights to the Fish and Wildlife Program.

The restoration of lamprey is of special concern.

Meetings are identified. What have been the outcomes from these meeting? How does coordination differ from that handled by CBFWA? In what ways is it more effective and efficient?

More development of the information dissemination work element would be desirable. The primary audience appears to be local schools and universities. What are the key messages to be emphasized? What education styles or media will be used? How will effectiveness of understanding the message be monitored. Can this be placed in an adaptive management framework, where on project renewal lessons learned inform the next round of funding. The information in the annual report for Contract # 48252, Project # 207-106-00, Contract Period 08/15/2010 – 08/14/2011 gives very little detail.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: Four deliverables are identical to the objectives. Adequate detail is provided for each.

Regional coordination components: There are eight project components: Data management (10%); participating in Basinwide Data Sharing Strategy (10%); participating in the Anadromous Salmonid Monitoring Strategy (10%); participation in forums (40%); Project proposal review (10%); Coordination within subbasins (5%); Focus workgroups on Program issues (10%); and Information dissemination (5%). Good examples are provided for each component.

Work elements: Six work elements are identified – 99. Outreach and Education, 114. Identify and Select Projects, 122. Provide Technical Review, 159. Transfer/Consolidate Regionally Standardized Data, 160. Create/Manage/Maintain Database, and 189. Coordination-Columbia Basinwide. Only 99 has metrics, but they are more inputs rather than outcomes. Can output metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: Some information is provided in the descriptions of work components and deliverables. As a new project, no information is provided regarding value added or assessment of effectiveness.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the six work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors have to design the metrics into their proposal and no rely on the definitions for Work Elements.

[201200200](#) - Oregon Regional Coordination

Sponsor: Oregon Department of Fish and Wildlife

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The proposed work includes data management (storage, management, and reporting) - 10%, review of technical documents and processes - 40%, facilitating and participating in focus workgroups on Program issues - 50%. Many meetings are identified and draft documents were prepared. One of the outcomes of coordination was “filling of the gaps” in monitoring. Projects were implemented and data monitoring was improved. The role of coordination in these activities could be clarified, key variables identified and observed, and hypotheses on how coordination improves data management and project implementation formulated. How did these coordination activities add value or achieve desired goals?

On significance to regional programs, a detailed statement describes several regional fora in which the ODFW participates and to which project funding will be applied to enable coordination, assessment, monitoring, and evaluation. Oregon is a participant in the process of conserving and restoring Columbia Basin fish and wildlife that are affected by the building and operation of the hydro system. Oregon’s primary goal is to assure that decisions and actions to recover fish and wildlife populations “are informed by Oregon’s perspective and benefit from Oregon’s expertise.”

The statement about limiting factors does not really identify issues that may limit the effectiveness of the coordination, but instead lists benefits of coordination and notes that the Council's Fish and Wildlife Program is implemented through an adaptive management approach that will ensure that climate change and other sources of uncertainty will be addressed. Could a hypothesis about relevant expertise or "effective communication and collaboration with a myriad of federal, tribal, and other state agencies and other pertinent organizations to coordinate efforts related to the implementation of the Council's Fish and Wildlife Program ...ensure that regional decisions on appropriate actions to recover fish and wildlife populations ...benefit from Oregon expertise” be limiting?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Performance: The proposal states that all deliverables were completed on time since ODFW separated from CBFWA. One report is shown as "red"

Major accomplishments: The proposal summarizes participation in meetings, presentations, and contributions to various documents and processes. These are useful for assessing participation. Important for coordination is what were the outcomes from participating in meetings, presentations, and contributions to documents and processes?

Adaptive management: The proposal notes the importance of adaptive management. It contains a very good discussion of the adaptive management process and identifies 8-steps to implement it. The 8-step process is a good beginning for the framing of one or more hypotheses that would show the value of coordination. Transparency, accountability, and effective planning are all variables. Measurement of these variables could be discussed in the section on deliverables. Can measures be proposed and can these variables be related to coordination activities that provide for transparency, accountability, and effective planning. For example, is the face-to-face nature of meetings beneficial for establishing trust and transparency, or are other activities more effective? An assumption is that coordination meetings and activities provide more effective plans. Is there evidence for this relationship? What are ideas for the evaluation process mentioned in step 7? Can a monitoring protocol be identified for evaluating both the occurrence and the effectiveness of this process? There is no discussion of adaptive management approaches taken within this project. Nor does the project have an adaptive management design.

ISRP Retrospective Evaluation of Results

The problem statement describes the 2010 separation from CBFWA and the need to continue funding for the individual states to continue to participate in the implementation of the Fish and Wildlife Program through the coordination and information transmission that was formerly accomplished through CBFWA. This is a new project, so technically there are no results to evaluate.

Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance." The proposal contains a very insightful discussion of the changing coordination "landscape," which resulted in Oregon withdrawing from CBFWA in 2010.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: The statement describing the changing landscape of coordination and the different needs and opportunities presented by these changes could be the basis for scientific research on regional coordination. A short summary of the types of coordination that are most needed by ODFW, and a list of projects doing similar work and with which they coordinate is provided and could be built upon.

Regional coordination focus: The geographic interests of the State of Oregon overall encompass the Willamette/Lower Columbia, Middle Columbia, and Snake River Recovery areas.

For situations where, “Some of the changes have diminished the need for regionally-based coordination among the Basin's fish and wildlife managers,” does this mean less effort needs to go into coordination? The insights under “Additional Relationships Explanation” are useful and could serve as the basis for developing hypotheses about what regional coordination is needed and what coordination is no longer relevant. What are the most effective ways of organizing and coordinating? What types of coordination activities work best? What percentage of the meetings is facilitated and does this improve outcomes? Does coordination provide value? How would the value of coordination be measured and compared against the costs?

Under value-added, the proposal makes the point, “Participation in the basinwide coordination resulted in identifying and implementation of projects which filled gaps in the monitoring of listed Snake River Basin spring/summer Chinook salmon and steelhead and other Columbia Basin fish and wildlife populations.” This section summarizes ODFW staff activities enabled by this funding. It includes a summary of outcomes that directly result from the project. Could more insight be included about the specific outcomes with respect to the Fish and Wildlife Program? Are these projects likely to show improvements in recovering listed species?

4. Deliverables, Work Elements, Metrics, and Methods

Work elements: The project has three work elements – 114. Identify and Select Projects, 122. Provide Technical Review, and 189. Coordination-Columbia Basinwide. These work elements have no metrics identified. Can output metrics and methods be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Deliverables and methods: a summary list of meetings attended, coordination activities performed and contributions to documents is enumerated. Metrics are based on inputs, for example numbers of meetings attended, rather than outcomes. What was achieved in the meetings?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the three work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[201200300](#) - Washington Regional Coordination

Sponsor: Washington Department of Fish and Wildlife

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal is missing an opportunity to take a more systematic approach to coordination: to think about what the sponsors are really trying to achieve, how they will know if they are achieving it, and how they will adapt to changing circumstances or proactively test new approaches and learn from the outcomes. In several places the statement, "WDFW will monitor and report ..." is used. What actually will be monitored? How will the variables monitored be measured? Are there hypotheses about relations between these variables?

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The proposed work includes data management (storage, management, and reporting) - 10%, monitoring and evaluation (framework and approach) - 10%, developing and tracking biological objectives - 10%, review of technical documents and processes - 10%, project proposal review - 10%, coordination of projects, programs and funding sources within subbasins - 20%, facilitating and participating in focus workgroups on Program issues - 20%, and information dissemination (technical, policy, and outreach) - 10%.

Significance to regional programs: A lengthy statement lists and describes various projects, workshops, programs and fora that WDFW participates in as part of the implementation of the Fish and Wildlife Program through the research plan, subbasin plans, and MERR plan. Can outcomes from these activities be identified?

Problem statement: This describes the 2010 separation from CBFWA and the need to continue funding for the individual states to continue to participate in the implementation of the Fish and Wildlife Program through the coordination and information transmission that was formerly accomplished through CBFWA. A statement of the problem to be addressed is contained in the first paragraph of the "significance to regional programs" section.

Objectives: The project has specific four objectives. Each objective is stated as a task rather than as a desired outcome.

In general, the Washington Department of Fisheries and Wildlife is one of the active participants in the process of conserving and restoring Columbia Basin fish and wildlife that are affected by the building and operation of the hydro system. "WDFW provides the technical and scientific expertise needed to address mitigation issues related to fish and wildlife management in the Columbia River Basin." How will the outcomes associated with the four project objectives be measured?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Explanation of performance: short statement indicating that deliverables have been on schedule.

Major accomplishments: WDFW has participated in the formation of a tri-state coordination effort and continued participation in various fora. Participation in a variety of meetings is enumerated. The proposed plan of work offers few specifics. "Past accomplishments" lists meetings, conference calls, and briefings. This is a good sample to provide information on outcomes and what coordination activities lead to better outcomes.

Management Change: The statement is made, "It should involve stating hypotheses then implementing actions, monitoring, reporting, and evaluating outcomes to provide a clear sequential structure to decisions required in the continuing evolution and implementation of the Program." Expanding this statement into hypotheses for the plan of work would be desirable.

Adaptive Management: An 8-step process for coordination is identified. A reference should be made to BPA [Bonneville Power Administration]. 1997. Wildlife mitigation program final environmental impact statement. DOE/EIS - 0246. U.S. Department of Energy, Portland, OR., "Each of the following eight steps is required to support a transparent, accountable, and effective planning, implementation and evaluation process." What is presented is a general statement of the principles of adaptive management, without specific indication of how the project will incorporate it in its operations. Could this process be filled in for one of the key coordination issues?

ISRP Retrospective Evaluation of Results

This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance."

Financial performance and history: "Beginning April 1, 2011, WDFW began coordination as an entity independent of CBFWA." This project has no financial history or review of progress.

Previous work was completed under the management of the Columbia Basin Fish and Wildlife Foundation. No explanation of financial performance or financial history is provided.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: A list of related coordination projects is provided without explanation of the specific types of interaction.

Emerging limiting factors: A brief description of strategies employed to address climate change and invasive species, with links to references. Are there regional coordination limiting factors?

Geographic interests: The Columbia Basin and specifically for the State of Washington overall, which encompass the Lower Columbia, Middle Columbia, Upper Columbia, and Snake River Recovery areas.

Value-added: The proposed plan of work offers few specifics. The list of 85 meetings, conference calls, and briefings is a good sample to provide information on outcomes and what coordination activities lead to better outcomes. The value-added describes just a couple of outcomes. Can coordination outcomes be related to "improving the status of fish and wildlife resources in the Columbia Basin"? "Regional coordination includes but is not limited to participation in various forums, technical committees, and workgroups associated with implementing the MERR Plan, Subbasin Plans, and the Council's Research Plan." These are essentially inputs to coordination. What are the outcomes from these regional coordination activities? How do they improve the status of fish and wildlife resources? How, for example, can the statement, "Increase the efficiency and effectiveness of RM&E efforts by facilitating communication and coordination among project sponsors and funding agencies within the Basin," be measured and documented? Listed are some 30 statements that might be converted into hypotheses or used as cases for testing hypotheses. What are the most effective ways of organizing and coordinating? What types of coordination activities work best? What percentage of the meetings is facilitated and does this improve outcomes? Does coordination provide value? How would the value of coordination be measured and compared against the costs?

Deliverable 3 is about documentation. Where are the specifics of documentation addressed?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has six deliverables related to the objectives. These include documentation of participation in meetings and types of coordination, and the preparation of reports. A summary list of meetings attended, coordination activities performed and contributions to documents is enumerated. It would be desirable to develop metrics about outcomes and measures of outputs from coordination activities.

Methods and metrics: These are described in greater detail in the "objectives" section than in the "deliverables" section because the objectives are written as tasks. Not much detail is presented on how these activities will be accomplished or metrics to be used to evaluate performance.

Work elements: Two work elements are identified – 122. Provide Technical Review and 189. Coordination-Columbia Basinwide for which no metrics are associated. Can metrics be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

The program coordination part of the work elements section provides more specific enumeration of coordination activities. Value added by these activities is generally referenced in the case of fish passage and lamprey recovery but without specific examples of the contribution of WDFW staff. The same comment applies to opportunities to evaluate performance – it is presented as a possibility but without a specific plan.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the two work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[199506425](#) - Policy, Plan and Technical Support of Washington Department of Fish and Wildlife (WDFW)-Yakima/Klickitat Fisheries Project (YKFP)

Sponsor: Washington Department of Fish and Wildlife (WDFW)

Recommendation: Not applicable, contextual project

Comment:

Specific comments and suggestions for improving this contextual proposal are listed below.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The description of significance of the Yakima/Klickitat Fisheries Project (YKFP; # 199506325) to regional programs was adequate, but the need for a separate project to fund WDFW for routine management and coordination activities at the watershed level was not clearly justified, as

these activities may not meet the Council's needs for regional management and coordination projects. The proposal would be improved by further discussion of these issues.

The ISRP views the project as part of an ongoing experiment in co-management for the purpose of implementing objectives of the Fish and Wildlife Program and principles and actions in Wy-Kan-Ush-Mi Wa-Kish-Wit. The YKFP major focus is a number of supplementation experiments. The YKFP works on three key limiting factors in the Yakima Subbasin Plan – habitat, population performance and response, and institutional efficiency. Institutional inefficiency is a clear topic for program coordination science and so is the effectiveness of co-management. The proposal would be improved if the project was designed to address these scientific components.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

A complete statement and explanation of financial history and performance is provided. Project expenditures have been under-budget. The proposal describes a good record of report delivery and a publication record that has exceeded expectations. A long list of milestones and publications is presented. Perhaps the best global statement of accomplishment is "The Yakima/Klickitat Fisheries Project (YKFP) is on schedule to ascertain whether new artificial production techniques can be used to increase harvest and natural production of spring Chinook salmon while maintaining the long-term genetic fitness of the fish population being supplemented and keeping adverse genetic and ecological interactions with non-target species or stocks within acceptable limits."

ISRP Retrospective Evaluation of Results

This project funds Washington Department of Fish and Wildlife (WDFW) technical management and administration of the Yakima/Klickitat Fisheries Project (YKFP) #199506325, specifically participation in meetings of the Policy Group, Scientific Technical Advisory Committee, and Monitoring Implementation and Planning Team, technical review, environmental compliance documentation, and report and publication writing. The project has a single stated objective: "Achieve the quantitative objectives identified by the YKFP." Because the results of this WDFW project, as presented in reports and an impressive list of publications, are entirely derivative of the larger YKFP project, a detailed retrospective evaluation of scientific results is deferred to that project.

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

The proposal provides a long list of specific projects which together comprise the total YKFP effort and to which this data management and coordination project is related. It is not clear why these activities are not part of the YKFP M&E project.

Emerging limiting factors identified in the proposal include predation, habitat, water availability, flow, and water temperature as limiting factors. Representatives of the YKFP are engaged in processes addressing these existing or potential limiting factors. The project is 50% RM&E-Data Management and 50% Coordination. Answers to the tailored data management questions are complete, but tailored coordination questions were not addressed. Answers to the RM&E questions are limited to providing links to ongoing RME projects that relate to YKFP. The proposal would be improved by revision to address these questions.

The geographic focus for YKFP is the upland areas of the Yakima Subbasin. The project has both hatchery and institutional implications for the whole Columbia Basin, but the specific geographic focus is just the YKFP area. The proposal would be improved by greater attention to regional aspects of the project.

More specific attention to identifying a scientific component to the proposal associated with program coordination issues would help to plan for future success. Can a research design be developed to study these or other outcomes from the coordination activities discussed in the proposal?

The co-management aspect of this project is a very important piece of program coordination. Neither the annual reports nor the proposal say much about co-management. Co-management could be used in many other projects throughout the Basin, thus some insights on its operation in the YKFP would be desirable. How do the co-managed Policy Group, Scientific Technical Advisory Committee, and Monitoring Implementation and Planning Team make decisions? What is the leadership structure? What is the composition? How well does each group work? What about coordination in the YKFP has been “replicated throughout the Columbia Basin”? Some comments raise questions about the effectiveness of co-management. For example, how are different values within and between cultures managed? The proposal provides funds for WDFW co-managers to participate on joint YN and WDFW committees. The language used raises the question of whether this is in fact co-management or whether there are co-managers from YN and WDFW.

The proposal also makes the point that institutional inefficiency is one of the limiting factors, yet this concept is not discussed, monitored, or measured in the proposal. Resolving institutional inefficiencies would seem to be one of the primary goals of program coordination.

YKFP is a very important program, but assessment of lessons learned in the co-management and institutional inefficiency areas are not developed in any systematic way. The experiments taking place in the project are very important to goals of the Fish and Wildlife Program. YKFP is a very uniquely structured program in order to deal with many program coordination issues in the subbasin. More on the outcomes of program coordination in this context would be very useful.

4. Deliverables, Work Elements, Metrics, and Methods

A good description of activities conducted to produce the deliverables is provided. Information on work elements is not provided in standard format. Methods are described under "deliverables" and in the problem statement. No metrics to evaluate success of the project are identified, nor are plans to assess effectiveness. Adaptive management is described in terms of the larger YKFP project but there are no RME protocols identified for the coordination project.

Five work elements are identified. None of these work elements have metrics associated with them. Can metrics be identified to go with these work elements? Can output metrics and methods be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the data management and coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

4a. Specific comments on protocols and methods described in MonitoringMethods.org

RM&E for this project involves project implementation/compliance monitoring. There were no RM&E protocols identified for this proposal. The project is 50% Coordination and 50% RM&E and Data Management with five work elements. None of the work elements is associated with metrics in MonitoringMethods.org; however, it would be useful for retrospective evaluation of project results to develop quantifiable metrics for these work elements that could be used to track trends in data management project results.

[201200400](#) - Idaho Regional Coordination

Sponsor: Idaho Department of Fish and Game

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal is missing an opportunity to take a more systematic approach to coordination: to think about what the sponsors are really trying to achieve and how they will know if they are achieving it.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

The proposed work includes data management (10%), review of technical documents and processes (40%), and facilitating and participating in focus workgroups on Program issues (40%). Several documents are identified as being developed. How did participation in workgroups or other coordination activities affect these documents? What coordination process improved their quality?

Significance to regional programs: A list with brief descriptions of the various regional programs and fora for which the coordination project will fund IDFG participation. Idaho is an active participant in the process of conserving and restoring Columbia Basin fish and wildlife that are affected by the building and operation of the hydrosystem. The Idaho Fish and Game Department participates in coordination and consultation efforts related Fish and Wildlife Program, the FCRPS BiOp, the Upper Snake River BiOp and other activities in the Columbia Basin.

Problem statement: The brief statement of the need for coordination and integration of actions should include a research question.

Objectives: The proposal should include a better statement of objectives (separate them from tasks - word as outcomes) and a description of how activities will be evaluated for effectiveness. The project has two objectives.

OBJ 1: emphasizes, "participate, collaborate and communicate effectively and efficiently." These would be useful variables to measure. What are effective and efficient participation, collaboration, and communication? A deliverable could be testing hypotheses about these relationships and monitoring them in coordination activities.

Mention is made, "Department staff were actively engaged in coordination activities related to review, information development and negotiation related to wildlife impacts ..." Could some of these activities be reviewed for their effectiveness and efficiency?

The proposal states, "decisions on actions to recover fish and wildlife populations and mitigate for lost productivity due to construction and operation of the Federal Columbia River Power Supply are informed by Idaho's perspective and benefit from Idaho's expertise. Achieving the objective requires communication, participation, and attendance at regional forums. The outcomes we seek are commonly recognized guidance materials that are considered, used, and followed by the Fish and Wildlife Program and other areas as appropriate." Could the outcomes mentioned be used to rewrite the objectives in measurable "desired outcome" form?

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

The project began as a stand-alone in 2011. No description of financial performance or history is provided, or expected.

A summary and enumeration of the meetings attended by IDFG staff is provided. Presentations to the NPCC, workshop participation, technical review, tour conduct, and meeting attendance are also listed. What outcomes were achieved in these coordination activities?

Regarding adaptive management, a summary statement identifies research gaps and planned changes in data infrastructure that have resulted from participation in regional coordination contracts. Could the capture of lessons learned and their feedback into coordination activities be more explicitly developed?

ISRP Retrospective Evaluation of Results

“The Idaho Department of Fish and Game intends to formally withdraw from CBFWA April 1, 2012.” This project has no financial history or review of progress. Previous work was completed under the management of the Columbia Basin Fish and Wildlife Foundation. “Additional Relationships Explanation” gives background regarding withdrawal from the CBFWA. This is a useful and insightful analysis.

This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, “Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation.” See the section, “Reporting & Contracted Deliverables Performance.”

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: The proposal lists a number of regional coordination projects with which it is related, without explanation of specific relationships.

Geographic focus: The geographic interests are stated as basinwide. Examples given reflect primarily on the portion of the Snake River Basin and most examples include the Upper Snake Salmon Recovery area.

Emerging limiting factors: A brief summary of IDFG's participation in various regional fora addressing climate change, non-native species, predation increases and toxics notes the benefit to Idaho from expertise gained through this participation. Are there emerging issues related to regional coordination? Could elements of effective coordination be identified based on these experiences? Could coordination be phrased in an adaptive management framework?

The proposed plan of work identifies many meetings, workshops, technical reviews, forums, tours, discussions, along with other forms of participation. Could the representative list of meetings be used to draft hypotheses and identify variables be used a data points to evaluate effective and efficient coordination during the proposal period? Could these activities be used to develop some hypotheses, lessons learned, and actions to make change to better achieve goals? Did any priorities change? Were insights gained from others? Focus more on results and less on the inputs to get results. What outcomes and relationships might be observed that relate to coordination? What is the value-added as a result of coordination?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The project has two deliverables: 1: Staff participation in Regional Forums and meetings; 2: Provide Technical and Policy Review. Because the objectives are written as tasks, the deliverables are close to identical to the objectives.

Work elements: Two work elements are identified – 122. Provide Technical Review, and 189. Coordination-Columbia Basinwide. These work elements do not have associated metrics. Can output metrics and methods be identified to go with these work elements? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: Methods of performing the work are described as workshop participation, presentations to the NPCC, participation in the development of various documents and reports, and participation in meetings. A representative list of meeting participation is provided. No metrics are provided to assess effectiveness.

Value-added: a summary description of actions taken that would not have been possible without the support of coordination funds. Can the outcome of these actions be assessed in some systematic way?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the two work elements are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

[201200800](#) - Montana Regional Coordination

Sponsor: Montana Fish, Wildlife, and Parks

ISRP recommendation: Qualified - See programmatic comments on coordination projects

Qualifications:

A sound scientific proposal should respond to the six questions and related material at the beginning of the regional coordination section.

Comment:

The proposal contains very little specific detail on what MFWP is trying to accomplish with the proposed coordination. It is missing an opportunity to take a more systematic approach to coordination: to think about what the sponsors are really trying to achieve, how they will go about it, how they will know if they are achieving their objectives, and how they will adapt to changing circumstances or proactively test new approaches and learn from the outcomes.

“Montana proposes to shift the emphasis of regional coordination funding to supporting specific forums and efficient processes that facilitate implementation of tangible benefits to fish, wildlife, and their habitat.” The Montana proposal raises an important issue about the value of coordination in relation to completion of projects. The cost reduction theme and the relation between coordination and project effectiveness would be very useful themes to put into a research plan.

1. Purpose: Significance to Regional Programs, Technical Background, and Objectives

Proposed work includes coordination of projects, programs, and funding sources within subbasins (75%); review of technical documents and processes (10%); facilitating and participating in workgroups (7%); information dissemination (3%); and project proposal reviews (5%).

Significance to regional programs: A summary statement describing the regional programs and fora that relate to fish and wildlife issues in Montana and in which regional coordination funds MFWP participation.

Problem statement: The statement emphasizes the current cost of the process in the Fish and Wildlife Program and BPA's goal to reduce the proportion of direct spending on process activities. A link is made to the cost reduction potential of Montana's coordination project.

Objectives: The project has five objectives, each with a brief description. The objectives are written as tasks and desired outcomes are not identified.

OBJ 1: "Reduce the percentage of project funding that is spent on planning and process." Good, written as a measurable hypothesis. But, this is not developed in the deliverables. The proposal calls attention to the tension between coordination funding and project funding. This implies that coordination activities need to be evaluated for their efficiency and effectiveness.

2. History: Accomplishments, Results, and Adaptive Management (ISRP Review of Results)

Major accomplishments: The statement refers back to accomplishments under the CBFWA coordination and the present entities who are Montana's major collaborators.

Adaptive management: The statement notes that regional coordination benefits from adaptive management, notable in efforts to reduce costs by streamlining processes to eliminate redundancies and sharing effective mitigation tools. Putting these questions into an adaptive management framework and designing a research plan would make this proposal much stronger and help achieve the objectives of the proposal sponsors.

ISRP Retrospective Evaluation of Results

"Montana will formally withdraw from the Columbia Basin Fish and Wildlife Authority at the end of the contract period in April 2012." This project has no financial history or review of progress. Previous work was completed under the management of the Columbia Basin Fish and Wildlife Foundation.

This is a new project, so technically there are no results to evaluate. Historical data on performance is available with the project, "Proposal RESCAT-1989-062-01 - Program Coordination and Facilitation Services provided through the Columbia Basin Fish and Wildlife Foundation." See the section, "Reporting & Contracted Deliverables Performance."

3. Project Relationships, Emerging Limiting Factors, and Tailored Questions for Type of Work (hatchery, RME, tagging)

Project relationships: The proposal provides a general list of regional entities with which the MFWP coordinates.

Geographic focus: The geographic interests are stated as, "Montana proposes to shift the emphasis of regional coordination funding to supporting specific forums and efficient processes that facilitate implementation of tangible benefits to fish, wildlife and their habitat.

...Montana's regional coordination facilitates implementation of the Flathead and Kootenai Subbasin Plans." This is a desirable goal, but does it reflect regional coordination? Is it affected by regional coordination?

Emerging limiting factors: The proposal states that the coordination project will not directly address limiting factors. However, it notes that for agencies, states and tribes to address limiting factors in a cost-effective way, coordination is required. Some examples of limiting factors requiring coordination are briefly described and could be developed as research questions.

Under adaptive management, the proposal emphasizes, “The most significant change planned for Montana's regional coordination funding is to streamline processes, so that a larger percentage of Fish and Wildlife Program funding is directed toward on-the-ground actions.” Thus, a deliverable might be a reduction in the ratio funds going to coordination and an increase in the ratio going to projects.

The emphasis on "trust" as a variable affected by personal contact is insightful and important. Building a research plan on the dimensions of this insight would be valuable.

The proposed plan of work is mainly about inputs. What outcomes and relationships might be observed that relate to coordination? Measures for the primary goal of shifting funding from coordination to projects would be a desirable indicator of achieving the proposal’s major concern.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables: The proposal lists a single deliverable - Montana Regional Coordination - that relates to each of the objectives. How does “Montana Regional Coordination” meet all the objectives? How does this deliver anything or meet any objective? The deliverable is a general task statement and should focus on outcomes; the objectives are more specific task statements.

Work elements: One work element is identified: 189. Coordination-Columbia Basinwide. This work element has no metrics associated with it. Can output metrics and methods be identified to go with this work element? Ideally, the hypothesis(es) developed in the proposal would be measured during the course of the coordination activities and results presented in the report on this project. There are many ideas discussed in the proposal that are amenable to this approach. Selecting a few of the most important questions, concerns, or hypotheses and monitoring them is recommended.

Methods and metrics: These would be developed in a scientific regional coordination research plan.

Value-added: The hypothesis is offered that less funding should go to coordination and more to projects. This is an important issue. Can it be documented? One might offer the alternative

hypothesis that without regional coordination project funds are wasted on duplicative and low priority projects. How is it that describing the value-added is not applicable?

Assessment of effectiveness: What are the measures that demonstrate this effectiveness? What are the expected outcomes from providing “records of attendance for all meetings and events, as well as any materials published for the purposes of coordination as well as document the outcomes of coordination?” Can more specifics on the deliverables be included? What are the appropriate outcome measures?

4a. Specific comments on protocols and methods described in MonitoringMethods.org

The protocols for the work element are published but do not provide adequate guidance on the methods and metrics. Guidance is available from ISRP (2007-14:2). Project sponsors can strengthen the science in proposals by developing methods and metrics for the most important project objectives.

VI. Attachment: Comments on the draft Resident Fish and Wildlife Monitoring Strategies

The ISRP was provided the draft resident fish and wildlife monitoring strategies to aid with the review of resident fish, data, and regional coordination proposals. Council staff asked the ISRP to provide feedback on whether the strategies provided useful context for the reviews and to suggest ways to improve the strategies. The ISRP's feedback follows below.

This attachment is also provided as a separate, standalone memo (ISRP 2012-6A).

A. Comments on Resident Fish Monitoring Strategy

The Resident Fish Monitoring Strategy (RFMS) provides a useful roadmap for managing population, habitat assessment, and artificial production data. The authors have made a good start at developing an implementation plan for resident fishes in the blocked area by compiling RME approaches for each project (Phase 1). Their approach is consistent with MERR and indicates some regional coordination and cooperation among managers and researchers. Phase 2 (not yet completed) will include "compilation of guidelines for study designs and quality standards" and Phase 3 will entail development of a protocol for data management, sharing, and reporting. The RFMS document asserts that completion of these three Phases will result in a basinwide RME plan for all focal species of resident fish.

The RFMS identifies several impediments to developing a common RME strategy for resident fish that are applicable region-wide. These impediments include the need to manage diverse fish species; differing fisheries management goals, objectives, and interests among regional entities; establishing effective and efficient regional coordination; and the existence of previously established monitoring and evaluation (M&E) programs and protocols. Given these caveats it is difficult to envision the regional M&E plan and how useful it will be. Only some aspects of monitoring, evaluation, and research can be standardized across provinces and subbasins. It is unclear whether it is possible to develop guidelines for such factors as study design, sample size, metrics, and analytic procedures that can be generally applied region-wide and yet be specific enough to be useful for individual projects, or whether the plan will simply provide general principles that investigators can follow. Resident fish monitoring would benefit from coordination through focused workshops on selected focal species and/or habitats that identify the optimum mix of standard protocols and new methods to move the science and management forward. It may not be possible to address this concern until Phase 2 commences.

With regard to Phase 2, there is continuing debate about what constitutes acceptable levels of data accuracy and precision. Variability can be partitioned into two general categories: observer

error and natural environmental variation. The first category refers to departures from a “true” reading caused by imperfect measurement technique or observer error; the second category includes variation caused by temporal changes in conditions over time. The categories are fundamentally different. Reducing observational error may be achieved by improving techniques, sampling more frequently over a short time period, or utilizing multiple observers. Reducing variability caused by natural patchiness in space and time can be achieved by expanding the number of sample sites or sampling over a longer time period. One component of natural environmental variability, when looking at trends over time, is called process error. Process error cannot be reduced and may be the limiting source of variation in long-term monitoring projects. As Phase 2 progresses, it would be useful to develop standards and criteria for these categories of variability.

The RFMS is envisioned to integrate information across multiple spatial scales, monitoring programs, and species. It is unclear what the specific purpose or expected outcome of this integration will be and, given the identified impediments, how it will be accomplished. While the ISRP strongly encourages integration, the purpose must be clear and it must be attainable. One of the purposes is to effectively and efficiently allocate Fish and Wildlife Program resources and to prioritize long-term goals as to desired outcomes.

The resident fish monitoring strategy should focus more on ecosystem monitoring, for which protocols and procedures, and systems models have been developed elsewhere. An ecosystem monitoring program needs to consider the suite of available management decisions then conduct ecosystem simulations to explore the modeled results of these decisions on key response variables, which will guide the monitoring itself (www.ecoissues.ca/index.php/Ecosystem_Monitoring and <http://environment.gov.ab.ca/info/library/7738.pdf>).

RFMS Table 2 includes management questions, high level indicators, program indicators, and potential metrics and is helpful. However, it would benefit from additional development. Definitions and sub-questions are needed for the management questions. The program indicators and potential metrics need to be constructed so they are accurate and easily understood measures of how projects and programs are achieving subbasin and Fish and Wildlife Program goals. For example, the second question – Are Columbia River Basin ecosystems healthy? – has a requirement for a watershed health indicator and should include more than non-native species and focal species population status metrics. The health metric should evaluate the resilience of focal species and include natural and anthropogenic threats to the focal species within some geographic domain.

These threats would include factors outside the boundaries of the Council domain such as mining in Canada for the Flathead system; hybridization with non-natives for bull trout and cutthroat trout; habitat fragmentation and connectivity; and changes in economic development goals. Threats would also include factors within the boundaries of the hydrosystem management such as drawdown, lake level management in a number of the reservoir systems, and changes in water use patterns.

Several issues such as land-use changes, food webs, non-native species, climate change, and socioeconomic values mentioned briefly in the outline deserve additional discussion because they represent factors that have a high potential to influence the status and trends in resident fish populations, but are often undervalued in current monitoring programs.

Below, the ISRP offers feedback on basic questions on the usefulness and coverage of the strategies.

What parts are useful?

All parts are useful in providing context. Specifically, information on the relationship to the MERR plan is important to emphasize. As well, organization of the Fish and Wildlife Program projects by species, province, and subbasin in RFMS Table 1 is helpful. Ideally, this table would also include non-Fish and Wildlife Program projects, too. The information is useful, but it does not yet show how well the projects are linked and coordinated across basins and whether they are collecting information that needs to be collected and if they are effectively and efficiently meeting Fish and Wildlife Program goals.

Do the plans add important contextual information for our review?

Yes, it would have been useful to be aware of outputs from Phase 1 in conducting the reviews of individual proposals. In many cases the sponsors did not make the reader aware that they were in active contact with the other projects. Table 1 provided useful context for the ISRP during the response loop.

Do the plans show that the set of projects are well coordinated, aren't redundant, and are aligned to meet Fish and Wildlife Program goals?

This has not been achieved. Phase 1 has compiled the projects and grouped them by focal species, subbasin, and so forth. The tabular approach used in the spreadsheets shows the projects and what they do, but there is inadequate guiding text elsewhere in the document to clarify how complete and thoroughly linked the activities are. There is no evidence that activities are coordinated, aren't redundant, or are collectively aligned to meet Program goals. Further, it is not clear how this will be achieved. Collecting data at a central location is a start but it does not, in itself, achieve understanding. More thought and planning is needed in this regard.

What parts need expanding?

Table 2 needs additional development as mentioned above. In addition to using non-native species as an HLI in Table 2, it would be worthwhile to show the degree to which habitats have been altered by human activities throughout the basin.

The population metrics should keep natural and hatchery stocks separate when possible, or identify when the metric is based on combined populations. Naturally-produced fishes reflect the condition of the habitat and ecosystem to support them, whereas metrics involving hatchery fish may not fully reflect ecosystem condition.

The ISRP recommends establishing the overall goals, questions, indicators, and metrics before moving on to the Phase 2 study design. It is not clear which portions of resident fish RM&E are watershed specific and require little integration and which portions actually require compatible assessments, although bull trout assessments probably need very clear coordination in order to achieve the goals of recovery plan status assessments. Also, interactions among practitioners of invasive species removal should be beneficial in sharing lessons learned.

What parts could be dropped?

The paragraphs addressing the anadromous aspects could be dropped. They detract from a focus on what is needed for resident fishes.

What are the gaps?

The overall goals need additional clarification. An important gap is the emphasis on fish to the exclusion of other parameters related to the ecological system. More emphasis on measures of riparian and other habitat, food web processes, and diversity, as well as a more comprehensive evaluation of non-natives and land uses would be beneficial. For example, the relation between resident fish substitution and potential effects on native species in ecosystems should be included. Native species also include species other than fish, such as aquatic macroinvertebrates (e.g. native crayfish, *Pacifastacus leniusculus*). In that regard, monitoring metrics should be used to address diversity and ecosystem function as metrics.

Appendix A should include duration of the effort. Appendix B might identify whether the monitoring involves hatchery fish only, natural fish only, or both together because hatchery fish are unmarked. Contact information for the entity storing the information might be included. The provided information is useful, but it does not yet show how well the projects are linked and coordinated across basins, and whether they are all collecting information that needs to be collected.

What are the tangible products of these efforts?

It is not completely clear what the tangible product(s) will be or what the long-term goals are. Will an infrastructure be developed to provide a central server, computer, and staff that will be responsible for implementing and evaluating the management strategy? Is there an objective to provide higher order analyses? If so, how will it be accomplished?

B. Comments on Draft Wildlife Monitoring Implementation Strategy (WMIS)

The document is a good step forward. It provides a basinwide context for RME and reporting to help communicate the strategy for implementing the Fish and Wildlife Program and provides context for ISRP review of the Program and its projects. The ISRP provides comments on strengths and weaknesses of the draft WMIS as constructive comments for consideration to improve the process.

The ISRP found the definition and description of the three types of monitoring to be useful for providing context for the discussion. Identification of both specific wildlife objectives that require tracking habitat units (HUs) and standard classification systems for habitat types is a beneficial step. In addition, the ISRP concludes that the list of implementation strategies includes the essential elements and the concepts the wildlife managers considered in developing WMIS are valid and important. Appendix A provides valuable contextual information. Appendix B would be more useful if, in addition to the list of Focal Habitats obtained from the subbasin plans, it also contained an additional column that listed several Focal Wildlife Species of special concern in each, i.e., what species or groups of wildlife species is management in the various focal habitats aimed specifically towards? This species list may also provide guidance toward specific management activities needed in each focal habitat based on species requirements.

In terms of the process, the fact that the Forum had some major areas of agreement indicates that a framework exists to resolve disputes. The fact that the Forum dedicated much effort and was unable to resolve all issues could jeopardize this portion of the Program. A structured decision management framework could help in solidifying these areas of agreement and resolving difficult issues that are still a problem. The discussion of the reporting framework stated that designated projects for each HLI category may be necessary to implement the reporting mechanism. If adequate funding is provided, this framework is a strength. However, if funding is not adequate, this framework is a weakness. Using a central repository to identify protocols is a good strategy as is having a dedicated project acquire data for management, sharing, and reporting.

The ISRP is concerned that Ecosystem Health is not included as an HLI and recommends this indicator be developed and included as soon as possible. Another ISRP concern is the WMIS emphasis on measuring abundance of habitat with an inventory of the entire basin rather than focusing on repeated measures over time to measure trends. The document should focus more on repeatable and economical sampling of the resources, and then on statistical estimation of the abundance of habitat.

The ISRP understands that the Council is responsible for implementation of strategies while co-managers require strategies to support their own decision processes. This situation could potentially create inconsistent strategies, especially because the Council does not expect any of the regional partners to formally adopt the implementation strategies. This is a particularly fruitful area for regional coordination. A related question is not clear, have the metrics, Habitat Units as measured by the Habitat Evaluation Procedures(HEP) process or the Combined Habitat Assessment Protocol (CHAP) method been accepted by all entities in the region? Another potential weakness is that sample designs for obtaining focal species information may vary and yield inconsistent information, if there is no strong pressure to standardize.

It is not clear why the WMIS emphasized the following projects: Upper Columbia Monitoring and Evaluation Project, Ecological Integrity Assessments, Monitoring and Evaluation of Wildlife Areas in Washington; the Kootenai River Floodplain Ecosystem Operational Loss Assessment, Protection, Mitigation, and Rehabilitation Project; and the Habitat and Biodiversity Information System for Columbia River Basin project. More explanation of why these projects are featured would be useful. The level of specificity in the conceptual work plan (Appendix C) may be a weakness if taken to mean that the project sponsors have already been, in effect, identified.

The ISRP has a few suggestions for organizational changes to the document. The description of the distinction between HLIs and FWIs should be presented earlier in the document. Figure 1 provides little value as presented. The figure should be deleted or more information provided to add value. A table should accompany Figure 3 to present differences in habitat changes between the two scenes. These differences could be framed to be valuable to readers if the table provided High-level Indicators. This might be a good figure to also address the scale ideas in Figure 1. Table 1 (p. 27) is useful, so incorporating the most important pieces of Table 1 (p. 15) into Table 1 (p. 27) text is suggested. The Implementation Strategy section could be improved with an introductory paragraph written to identify which major actions, such as Mapping of Landscapes and Ledgers, will follow in this section.

Too much material is repeated in the report. Suggestions for combining sections and deleting others as organizational revisions are: Move/incorporate "Types of Monitoring" (p 8) into current "Completion of Wildlife Monitoring Implementation Strategy"; Incorporate part of "Considerations for Wildlife" (p 13) into "Completion of Wildlife Monitoring Implementation Strategy"; Incorporate Figure 1 section (p 17) into discussion of "mapping" in "Framework: Basinwide strategies"; Move examples, given on page 10, for project effectiveness and action

effectiveness monitoring, to later sections. More information should be provided about the methods and analysis being used and evaluated by the projects used as examples on page 11.

Some gaps in content to consider:

- Include acknowledgement that mapping activities may utilize models and these models must be scientifically evaluated rather than automatically accepted as valid.
- For continued development of WMIS, the document must very clearly identify who will do the compilation and reporting and that individual projects must make the data available.
- A description of how information on invasive weeds will fit into the programs described in this document is needed.
- Examples relating maps to HLI's and implementation strategies at the basin scale would be useful.
- The species in the Council's Program concerning Wildlife Mitigation Priorities, Construction and Inundation Loss Assessments should be listed in the WMIS document.
- A list of acronyms and their meaning should be provided as an appendix. The authors should be diligent in defining acronyms the first time they appear.
- A weakness of the document is that the need for so many additional projects is stated it is difficult to keep them straight. A summary identifying and briefly describing the new projects would help, as well as how each project meets Strategy goals.
- It is unclear what constitutes an effective project from a statistical perspective. That is, what are the targets, plus/minus 10%, 25%, or 50% of reference sites? If targets have not been determined, what are thoughts about how to determine targets at this point in the evolution of these plans?
- If a project is effective, there ought to be discussion for actions required for maintaining this effectiveness. What are the plans for making these decisions?

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