



Independent Scientific Review Panel

for the Northwest Power and Conservation Council

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Resident Fish, Data Management, and Regional Coordination Category Review

Preliminary Review of Proposals



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

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

Introduction

This report provides the Independent Scientific Review Panel's (ISRP¹) preliminary 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. In this preliminary review, the ISRP finds that 10 proposals meet scientific review criteria and 14 proposals meet criteria with some qualifications. The ISRP made a specific programmatic recommendation that applies to the 17 regional coordination proposals. ISRP recommendations described above should be considered final. In addition, the ISRP requests responses on 30 proposals. Project sponsors are provided an opportunity to respond to ISRP concerns by March 7, before the ISRP submits its final report to the Council on April 3, 2012. The ISRP also 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.

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:

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.

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

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 has identified programmatic issues – some old, some new – that are introduced here. These will be further discussed over the next two months and updated in the final ISRP report on April 3, 2012. Programmatic topics include non-native fish management, trout stocking strategies, monitoring and evaluation, regional coordination, results reporting, and process issues.

Finally, 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.

The ISRP Review Process

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.

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 major, multi-day tours of projects in the Intermountain, Mountain Columbia, Upper Snake provinces. These 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.

Next Steps

- March 7 - Project sponsor responses due to the ISRP
- April 3 - ISRP Final Report
- April 10 or 11 - ISRP presentation to the Council, Skamania, Washington
- May Council Meeting - Council staff recommendation to Fish and Wildlife Committee (tentative)
- June Council Meeting - Council decision (tentative)

For projects that the ISRP requested a response and/or revised proposal, the project sponsors should develop a point-by-point response to the ISRP's concerns and by Wednesday, March 7, 2012, submit the response via cbfish.org:

1. Log into www.cbfish.org (the Log In button is at the top right-hand corner of the page)
2. Click on the Proposals tab (at the top of the page)

3. Click on View Our Proposals
4. Find your proposal in the list and click on the Edit icon for it (looks like a pencil and paper)

At this point, your entire proposal can be edited. To edit your proposal, click on the desired menu option (e.g., Edit Objectives) and make the desired changes. Be sure to save your work as you go.

To enter your point-by-point response to the ISRP:

1. Click on the Respond to the ISRP menu option (has a yellow banana on it)
2. Enter and save your point-by-point response to the ISRP in the text field provided
3. When complete, click Save and Continue to load the Review and Submit Your Proposal page
4. Lastly, click the Submit to ISRP button

Proposals that received a “meets scientific review criteria” or “meets scientific review criteria (qualified)” recommendation do not need to submit additional material to the ISRP for the final review.

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 use:

- 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 some cases, the proposal contains adequate description of an approach but that approach is not sound, is redundant, or would not benefit fish and wildlife. In other cases, the ISRP recommends that initiating work be delayed until certain technical issues are properly addressed. Examples are proposals for both background assessment work and concurrent on-the-ground implementation that cannot be justified before results of the assessment are known. "In Part" is also used for proposals that are justified for a portion of the years proposed for funding, but would benefit from an interim review within those years – for example, a proof of concept research project for which methods need to be tested at a pilot scale before full implementation. 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.

(Qualified) is assigned to recommendations in the two categories above for which additional clarifications and adjustments to methods and objectives by the proponent are needed to fully justify the entire proposal. The ISRP expects that needed changes to a proposal will be determined by the Council and BPA in consultation with the project proponent in the final project selection process. The ISRP also uses "Qualified" in two other situations: (1) for proposals that are technically sound but appeared to offer marginal or very uncertain benefits to fish and wildlife and (2) when further ISRP review of a project's final implementation plan or analysis of results is needed before the project moves to full implementation. 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 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.

Programmatic Comments

Structured Decision Management

In previous ISRP reports the structured decision management (SDM) process has been described ([ISRP 2008-4](#), [ISRP 2011-25](#)). SDM is 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. We briefly mention SDM here, to further encourage its application because this review revealed many situations where SDM could be beneficial. For example, the decision processes for predator control involving lake trout, walleye, and northern pike, hatchery production goals, and resident fish recovery could be enhanced by including all stakeholders and agencies through use of SDM. 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.

Irwin et al. (2011) provide an excellent presentation on the application of SDM to recreational fisheries management. They emphasized the benefits of involving stakeholders, explicitly defining objectives and options, and modeling to recreational fisheries. The lessons are directly applicable to the Council's Columbia Basin Fish and Wildlife Program. While we strongly encourage stakeholder participation, proponents should undertake SDM, even if 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. The course catalog is available at <http://nctc.fws.gov/learn/courses.htm>. Expertise is available through these workshops 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).

SDM 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.

Resident Fish

The Need for Resident Fish Master Planning Documents

Many of the resident fish programs in the region involve a mix of habitat restoration activities, native trout species management, and non-native stocking programs, for example, programs associated with the Colville Tribe, Duck Valley Reservation, and Fort Hall Bottoms. Often efforts are separated with native fish in streams and non-native stocking focused on triploid fish in closed systems to support harvest objectives.

In most of the situations where the ISRP observed a mix of goals, native fish activities seemed to occur separately from projects that relied on stocked fish. Coordination and cost/time efficiencies might be gained if all resident fish activities were described and coordinated within a single umbrella Master Resident Fish Planning document for each land area. For example, one of the areas that might benefit from such a coordinated approach would be the recognition of the need to determine 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.

Resident Fish Projects that Involved Habitat Restoration

As a whole, resident fish proposals utilized habitat restoration methods similar to those used to improve habitats for anadromous fishes. Most of the proposed actions were well-known and commonly used methods founded on scientific studies of their general effectiveness. Actions included 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 ISRP wishes to make the following programmatic observations relative to habitat restoration in the current set of proposals.

- 1. While many proposals focused on improving harvest of resident fish in standing waters, most of the proposals dealing with flowing waters were oriented toward habitat conservation and restoration.*

There was a general difference in restoration emphasis between proposals for lakes and reservoirs and proposals for rivers and streams. It was clear from the proposals that the majority of harvest of resident fishes occurs in lakes and reservoirs. A few projects

acknowledged that some harvest takes place in rivers and streams, but proposals for enhancing put-and-take fisheries in flowing waters were essentially non-existent, perhaps because stocking fish into open systems without documented homing of fish may not be effective. Instead, most tributary actions dealt 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 were habitat improvement proposals that intentionally benefited non-native species such as brook trout, but overall these were rare. Salmonid fishes were the primary focal species for the majority of tributary habitat actions; projects tended to be targeted toward enhancing habitat of “redband” (interior resident rainbow) trout, cutthroat trout (westslope or Yellowstone), or bull trout. Restoration proposals were 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 were 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 were 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. Two proposals focused on adding nutrients to improve productivity in lake and reservoir systems, one a preliminary feasibility investigation in a large natural lake (Pend Oreille) and a second to enhance zooplankton response and kokanee growth and harvest in a large reservoir (Dworshak).

2. Trout stocking projects were 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 did 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 included planting hatchery fish or fertilized eggs in streams, there was a general lack of analysis of what the natural carrying capacity of the stream was 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 EDT, should be verified by field observations.

3. *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 to the expansion of non-native aquatic invertebrates as well as aquatic and riparian plants in the resident fish proposals with the exception of the aquatic diatom *Didymosphenia geminata*, which displaces 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).

Habitat References:

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- 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.

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 conditions 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, fish escapement, etc. 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.

It is recommended by the ISRP 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 stocking proposals, do not include these essential elements. In some proposals, there is a companion 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 is almost always absent.

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 (M&E) (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 and effects of nutrient additions, and other policy options, and provide tools and workshop-based opportunities to involve stakeholders in the decision management process.

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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 deserves 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. At the least, stock-recruitment relationships must be modified to accommodate the additional food and space requirements of resident adult forms, which occur in the presence of juveniles in many cases.

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 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, despite the fact that the processes limiting or regulating stream-resident populations remain poorly understood. Elliott and Hurley (1998) also found a resident trout population in the U.K. 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. The implications to priorities in habitat management and rehabilitation are apparent.

There are ISRP reviewed resident fish projects that will shed some light on these stock-recruitment differences. Current studies, for example 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.

Stock-recruitment References

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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. A clearer vision for sturgeon is needed in the Basin. 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 the differing approaches to addressing the recruitment issue, including recruitment limitation research, habitat restoration, and hatcheries.

Monitoring and Evaluation

MonitoringMethods.org: Inclusion of MonitoringMethods.org in the submission and review process is a step forward toward better documentation of monitoring. There is still a need for proponents to provide details describing how protocols are applied to specific locations. In our final report, we will provide further impressions on strengths and weaknesses of MonitoringMethods.com based on information received in the response loop.

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 analyzed 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 no larger than necessary is an important aspect of effective project planning.

Assessment opportunities with existing data: Numerous projects have collected data for 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 continuing the sampling, but in further analysis of the data to fill information gaps and test hypotheses of interest.

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 proponents 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).

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.

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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.

Data Management

Data management issues of concern to be examined more fully in the ISRP final report are:

Redundancy: When considering activities of the FPC, DART, StreamNet, NHI, PNAMP, Taurus, and CBFWA's Status of the Resource, the question of redundancy arises. If there is redundancy is it excessive, desirable, or negligible?

Gaps: Despite the plethora of data management projects are there gaps in data management that adversely affect the Fish and Wildlife program?

Distributed versus Centralized Databases: Some data management projects use, or propose to use, a distributed strategy, while others argue for using a centralized database. What advice can be provided to guide data management in the region?

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 19² 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.

Coordination science is emerging with The Science Coordination Group, Office of Everglades Restoration Initiatives, U.S. Department of the Interior and MIT, Sloan School of Management, and Center for Coordination Science as examples. However, the science is not developed enough, nor focused adequately, to provide adequate help to proposal proponents. However, 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 selected 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
Facilitating and participating in focus workgroups on Program issues	16.6
Information dissemination (technical, policy, and outreach) w/o Columbia Basin Bulletin	13.7

² 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).

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 coordination take money away from pursuing more important Fish and Wildlife Program activities?
- 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 face-to-face meetings, video conferencing, workshops, email, phone conferencing, etc. are most effective and efficient.
- What is the best design for effective meetings, e.g., leadership, facilitation, room setup, group size, etc.? Are meetings used too frequently or not used enough? What are the alternatives to meetings and when should they 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?
- 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 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 and

data, 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 an outcome if there is a goal to include certain groups or types of participants.

Sociobiogeographic Regions

The proposals cover a wide variety of scales from individual projects, to tribes, to subbasins, to tribal regions (upper Snake [USRT], upper Columbia [UCUT], CRITFC, lower Columbia, Intermountain, and Willamette), and to 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 regional divisions?

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 that shows project, province, and regional levels. A list of regional coordination activities and deliverables follows the figure. Two clarifications could be made to the diagram and list that would be helpful to project proponents. First, how do these levels relate to various regional coordination interests? Would it be desirable to clarify the regional coordination “landscape?” Most critical would be to clarify the tribal units and the role of subbasins in regional coordination? Second, add a list of observable outcomes to the activities and deliverables. Examples of outcomes could come from the key questions to be associated with regional coordination.

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 amendment 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” on page 247 of this report.

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

Review Process 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. Although the new form has achieved many improvements, the ISRP intends 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 which results 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.

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 and program fragmentation: What is the big picture? 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 could 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 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 project numbering 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, for example, the Umatilla Initiative Review and the Lower Snake River Compensation Plan's Spring Chinook Review are good examples to emulate.

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 that is part of a larger program which also includes artificial production and other activities, while 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.

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198503800	Colville Hatchery Operation and Maintenance (O&M)	Colville Confederated Tribes	Response requested	46
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199501100	Chief Joseph Kokanee Habitat Enhancement	Colville Confederated Tribes	Yes	78
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199101903	Hungry Horse Mitigation Habitat Restoration and Research, Monitoring and Evaluation (RM&E)	Montana Fish, Wildlife and Parks (MFWP)	In Part (Qualified)	170
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ISRP Recommendations and Comments on each Proposal

Resident Fish

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/>

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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 requested

Comment:

A table and narrative that summarizes the production including eggs received, fish hatched, fish reared, fish transferred, and fish released along with post release survival and harvest for kokanee each year since the last ISRP review should be provided in a response to complete evaluation and provide retrospective reporting to Council.

The response should also include the harvest goal for kokanee in Banks Lake, the Banks Lake Kokanee Decision Tree and a summary of the information gained from the Banks Lake Fishery Evaluation project (200102800). The ISRP is concerned that few hatchery kokanee survive and contribute to the sport fishery in Banks Lake.

The ISRP understands and appreciates that the Ford Hatchery proposal to propagate kokanee uses monitoring data collected and then analyzed by the Banks Lake Fishery Evaluation project to complete evaluation. Even if much of the data and analysis is presented in the monitoring project, these items should have been incorporated into the accomplishments section, and perhaps adaptive management section of this project's proposal. A more complete description of the interaction of this project with BPA projects 200204700, 200300500, and 200205100 is requested. At this point in time this information should be provided in the response.

The Council's 1999 Artificial Production Review (NWPCC 1999-15) established that evaluating hatcheries based on numbers or pounds of fish produced and released was inadequate and that goals and objectives were required for post-release performance. The ISRP looks for clear metrics for performance in the hatchery including broodstock or egg collection goals, egg to fry survival, fry to sub-catchable or catchable survival, disease or other health inspections, and food conversion as well as post-release performance including survival for stated intervals, harvest, and fish condition. In addition facility related metrics for discharge water quality

should be included in the response. This information should be reported for the time period since the last ISRP review.

See the programmatic comments on fish stocking.

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

The sole objective of the Ford Hatchery Kokanee Production Program is to provide hatchery origin juvenile kokanee for release into Banks Lake. Artificial production was believed to be a feasible method for sustaining viable fisheries in Banks Lake. Fry produced at Ford Hatchery are to support a put, grow, and take kokanee fishery on Banks Lake. Annually, 800,000 eyed eggs will be received from Lake Whatcom Hatchery in January and February to produce 700,000 fall fingerlings at 60 fpp (BPA funded component). Of these, 572,000 will be directly planted into Banks Lake and 128,000 will be transferred to net pens, raised through the winter and released the following spring at a larger size of 15 fpp. All fish rearing will take place at the Washington Department of Fish and Wildlife (WDFW) Fish Hatchery in Stevens County Washington. All work will be performed by department hatchery staff. Monitoring will be done by the Banks Lake Evaluation Project, (BPA project 2001-028-00). Release strategies are subject to change based on data acquired by the evaluation project.

Significance to Regional Programs: The history of the Ford Hatchery as a component of the Grand Coulee Mitigation project was informative and the linkage to resident fish substitution for anadromous fish losses in the blocked area is adequate.

Technical Background: The information presented in the proposal is not adequate. While the Fish and Wildlife Program Ford Hatchery O&M project has the limited task of producing 700,000 kokanee for stocking either directly into Banks Lake or transfer to Electric City net-pens, there is a larger goal to provide harvest yield in Banks Lake. The Council APR (1999-15) clearly directs artificial production programs to establish biological objectives for post-release survival and contributions to fisheries. These are absent from this technical background. In addition, the technical background needs to include a reasonable description of the lake, fish community, fishing, and all of the activities at the lake that interact with this project. For example, the annual report indicates that Ford Hatchery produces 400,000 kokanee for release into Banks Lake in the spring using state funding rather than BPA. The technical background needs to include the rationale and justification for spring fry release, fall fingerling release, and spring yearling or post net pen reared activities and the associated numbers of individuals released. If the carrying capacity of Banks Lake is not sufficiently known, the release program needs to be conducted in an experimental framework and monitored so the capacity and fishery yields can be defined over time.

Project Objectives: The information presented in the proposal is not adequate. The project objective as specified in proposal form instructions should reflect the ultimate ecological

objectives of the project. For this project it seems the primary objective is to increase harvest. The project biological objective needs to include a harvest yield or fishery metric that can be monitored to establish the project effectiveness. Appropriate metrics could include fish caught, angler days, and/or angler satisfaction but fish released is not sufficient. There should be objectives and metrics for hatchery rearing including ability to obtain eggs, hatch rates, disease inspections, fish condition factor, and achieving release goals which should be reported in the accomplishments section.

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

Accomplishments and Results: The information provided in the proposal is not adequate. No information is provided regarding the hatchery's success in releasing the target of 700K fish annually. Is that target being met? The proposal refers the reviewers to the M&E proposal for Banks Lake. A succinct presentation of the production history and the post release performance needs to be included with this proposal. The production history from the 2010 annual report needs to be summarized in the accomplishments and results, with an explanation for years where production fell below the goals. Inspection of table 3 in the annual report indicates that in 2003, 2004, and 2005 production was about 75% of the goal and in 2008 less than 20% of the goal. These short-falls need to be discussed. Electric City net-pen releases indicate that survival in the pens is typically larger than 90 - 95%. How is the net-pen release number established? What is the variance of the release number?

Reference is made to the fact that M&E is being done under the Banks Lake Fish Evaluation Project (2001-028-00) and that stocking is done in Banks Lake because that M&E has in the past shown evidence that such stocking provides adequate return to creel. Discussion of the most recent results of this M&E component is needed here to indicate the stocking is continuing to bring tangible success.

From the current BLFEP proposal: Walleye are an apex predator in Banks Lake and past results and field observations have indicated that they have a high predatory impact on kokanee immediately following release and throughout the year. Past modeling scenarios indicate that annual consumption by walleye accounts for 90% of the total kokanee fry releases.

Adaptive Management: Very limited information is provided on adaptive management. More information should be provided on the fishery goals; timing and size of release to achieve fishery goals; and disease history of kokanee at Ford Hatchery. The project has shown some ability to adaptively change its practices. Fry releases produced few fish for harvest, therefore the hatchery increased production of fall fingerlings. The proposal states that it will be responsive to the findings and recommendations of the Banks lake Fishery Evaluation Project.

ISRP Retrospective Evaluation of Results

Insufficient information is available to provide retrospective evaluation of results.

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

Project Relationships: Discussion of relationship to other Lake Roosevelt and Banks Lake BPA funded Fish and Wildlife Program projects is adequate. Discussion of relationships to similar work executed through the Fish and Wildlife Program is absent. Participation and collaboration with APR reform measures are identified. The ISRP considers it important that a more complete description of the interaction with BPA 200204700, 200300500, and 200205100 be provided.

Emerging Limiting Factors: The information learned through 200102800 needs to be incorporated into this proposal.

Tailored Questions:

Opportunities to restore or reintroduce. The sponsors should include discussion of alternative sources of kokanee that may be more appropriate for Banks Lake than the coastal Lake Whatcom source. Are eggs from the Lake Whatcom kokanee going to be available in the future? The ISRP is under the impression that this source is going to lose disease certification.

Use of non-native fish species. Lake Whatcom kokanee would be considered "non-native" using a conservative definition and restrictive guidance on inter-basin transfers of fish. What are the policy guidelines in the State of Washington for stock transfers? How do these compare with adjacent states?

4. Deliverables, Work Elements, Metrics, and Methods

One deliverable, rearing and releasing kokanee, is identified. Metrics need to be provided for hatchery production, however. At a minimum this should include life-stage survival, growth, condition factor, and disease history.

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

None.

Intermountain-wide

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

Sponsor: Kalispel Tribe

ISRP recommendation: Response requested

Comment:

After careful consideration, reviewers are coming to think that many of our concerns are attributable to the sheer expanse of this proposal and especially how format requirements fragment the "story lines." It is not possible for the sponsors of one of the three separate programs included here (or for reviewers) to follow through from beginning to end (statement of problem, objectives, methods, etc.) without being "interrupted" by descriptions of the other programs. The smaller, less complex programs (Box Canyon and Priest Lake) are less affected than is the redband trout program.

That said, there are a number of items that need to be clarified in a response. Other comments, rhetorical questions, and suggestions are included as constructive feedback for sponsors. The response should address:

Redband trout

1. Reviewers see indications that work may be time-critical, and there is a risk that some of the populations might dwindle to very low levels before very many iterations (funding cycles) of the study transpire. If so, it is important that the upcoming efforts not merely "fill data gaps" but instead examine critical hypotheses and identify bottlenecks, especially those that can be eliminated by management. The current proposal lacks such content. A response should focus the proposed work in this context by better addressing imminent threats such as over-harvest, a predator gauntlet, or inadequate habitat at a specific life stage. Hypotheses should be framed where possible and descriptions of where the work should best be done, that is identifying what study locations might yield the most powerful information. A map or maps should be included. Please incorporate relevant results from completed studies, such as the Upper Spokane River 2007-09 work, when possible. Include a discussion of what are targets for sustainable levels of redband harvest, and what are current harvest levels.

Reviewers are not requesting a re-design of the redband trout proposal. If the material requested suggests that refinement of objectives and deliverables would strengthen the program, those should be noted.

2. A more complete justification is needed for the entrainment objective (#3). The proposal states "entrainment of hatchery triploid rainbow trout from Lake Roosevelt should be assessed in order to manage the subsistence and recreational salmonid fishery." Reviewers are not persuaded by that statement unless it is clarified to indicate just how such knowledge would be used. How might high entrainment be preventable?
3. For DELV 10: Mark and release hatchery coastal rainbow trout into Lake Roosevelt to evaluate negative interactions with wild redband trout during spawning – A rationale for a 10% tagging rate to identify if hatchery fish are interacting with wild redbands on the spawning grounds in Lake Roosevelt and upper Columbia River tributaries is given but is it scientifically defensible? Further details are also needed on the assumed negative impact of wild red band trout spawning together with hatchery rainbow.
4. For DELV-12: Estimate abundance of redband trout in the lower Spokane River – details are needed on the mark-recapture model to be used. An unbiased estimate is promised.

Box Canyon

1. A description is requested of why the data are needed and how they will be used to continue to adaptively manage pike and other species. Based on the sponsor's fairly extensive knowledge of the situation, what hypotheses can be tested, or indeed, need to be tested? One might be whether 55% annual exploitation of pike is adequate. What are the desired population targets in terms of species size and abundance?
2. This project will monitor the effectiveness of pike management measures by annually monitoring the northern pike population with Spring Pike Index Netting (SPIN) survey and periodically monitoring the resident warmwater fishery with standardized warmwater fish surveys (Bonar et al. 2000) to detect trends in abundance and population characteristics as a response to removal efforts. Temporal aspects of this monitoring program should be described in more detail. Periodic monitoring is not a sufficient description. What is the statistical basis for the work?
3. For DELV-14: Estimate abundance of northern pike in Box Canyon Reservoir – What is the statistical basis for deciding that the target sample size for marked and recaptured fish is 10% of the population?

Priest Lake

DELV 19-21 concern lake trout ecology in Upper Priest Lake and Priest Lake – The sponsors state “Lake trout suppression in Upper Priest Lake removes approximately 80% of the population annually” and “In anticipation of a largescale effort to reduce the

abundance, management needs accurate population estimates to model the effort required to crash the population through increased angler harvest and mechanical suppression.” Further details are needed on the proposed model that provides the rationale for this data need. How does this strategy/model compare with other lake trout suppression models, for example suppression models proposed for Flathead Lake?

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 CRB Science-Policy forum.

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

The JSAP - Joint Stock Assessment Project - is designed and guided jointly by fisheries managers in the blocked area above Chief Joseph Dam including the Kalispel Tribe, Spokane Tribe of Indians, Colville Confederated Tribes, and Washington Department of Fish and Wildlife. The project's purpose is to provide research, monitoring and evaluation (RME) for some 11 focal species by providing long-term trend and spatially extensive data that are nominally used to inform management and policy decisions. The Joint Stock Assessment Project is clearly very important for monitoring the population dynamics of resident fish in the blocked area. The stock assessment results on the six key focal species (rainbow trout, lake trout, interior redband trout, bull trout, northern pike, and westslope cutthroat trout) are significant to at least eight regional programs.

Although the technical background in the proposal is lengthy and somewhat disjointed, the information provided is comprehensive and important to the sponsors' rationale. Relationships with other projects are well developed and collaboration with other agencies is one of this project's strong suits.

The sponsors should be complimented for their thorough coverage of the literature outside the Columbia River Basin. However, they did not list citations past the letter “r” and therefore some crucial citations, for example those to Vashro concerning northern pike introductions, cannot be examined.

For the proposed funding period, there are eight objectives that involve several very different water bodies and several very different species. Seven are for active management/M&E, of which three are redband trout and Lake Roosevelt related, two are for Box Canyon pike and other species, and one is for lake trout in the Priest Lake system. One objective is for data management by CCT for the Kalispel Tribe. In essence this proposal is three proposals rolled into one proposal with 22 deliverables. This overall proposal appears to have been very difficult to prepare, and it was a challenge to review.

For redband, there is a summary of challenges and efforts to date, but these appear to be largely restricted to Lake Roosevelt proper. For proposed work there are four objectives: to manage subsistence and recreational harvest of stocks of wild redband trout in Lake Roosevelt and the upper Columbia River, to minimize impacts of the Lake Roosevelt hatchery rainbow trout program on wild redband trout, to assess entrainment of hatchery triploid rainbow trout from Lake Roosevelt, and to assess the redband trout population in a portion of the lower Spokane River. From fairly detailed and useful descriptions of redband status in the Problem Statement and from the brief three paragraph description of Accomplishments, much of the proposed work is justified, especially the work to minimize impacts (Obj 2). The least explained and justified objective is #3, assessing entrainment. The proposal states "entrainment of hatchery triploid rainbow trout from Lake Roosevelt should be assessed in order to manage the subsistence and recreational salmonid fishery." Reviewers request clarification that indicates just how such knowledge would be used. How might high entrainment be preventable?

For Box Canyon, the two objectives (conduct an annual status assessment of pike and an assessment of warmwater species every third year) are really deliverables, and are described in good detail in the deliverables section. What is needed is a description of why the data are needed and how the data will be used to continue to adaptively manage pike and other species. Based on the sponsor's fairly extensive knowledge of the situation, what hypotheses can, or need to, be tested? One hypothesis might be whether 55% annual exploitation of pike is adequate. What are the desired population targets in terms of species size and abundance?

Specific comments on individual objectives:

- OBJ-1: Manage subsistence and recreational harvest of stocks of wild redband trout in Lake Roosevelt and the upper Columbia River

There are 11 deliverables in support of this objective. They all seem to employ "standard" population dynamics and "habitat limitation" techniques. What appear to be missing are targets for sustainable harvest.

- OBJ-2: Minimize impacts of the Lake Roosevelt hatchery rainbow trout program on wild redband trout

A marking program is described as a deliverable in support of this objective. As per a comment on deliverables below, further details are needed on how the impacts will be assessed.

- OBJ-3: Assess entrainment of hatchery triploid rainbow trout from Lake Roosevelt

A PIT tag recovery program is described as a deliverable in support of this objective.

- OBJ-4: Assess the redband trout population in the lower Spokane River from Spokane Falls to TJ Meenach Bridge

The objective is to develop a baseline level of the population, with 2 deliverables of population dynamics data. This is a worthy goal and somewhat surprising that it has not been done before.

- OBJ-5: Monitor the abundance and population structure of northern pike in Box Canyon Reservoir, Pend Oreille River, Washington

Deliverables supporting this objective are to provide data on abundance and population structure in separate “packages”. This is a key objective for efforts at northern pike suppression. See comments below on the deliverables.

- OBJ-6: Monitor the abundance and population structure of resident fish in Box Canyon Reservoir, Pend Oreille River, Washington

The deliverable supporting this objective is to provide data on abundance and population structure in one “package.” This is a key objective for efforts at northern pike suppression. See comments below on the deliverables.

Concerning Objectives 5 and 6, the proposal would be improved by a description of the management plan for Box Canyon Reservoir, if there is one, and if not a management plan should be written.

- OBJ-7: Assess the lake trout population in Priest Lake and Upper Priest Lake

There are three deliverables mentioned in support of this objective. Population assessments are directed to key management questions. See comment below regarding deliverables.

- OBJ-8: Compile, digitize, and submit Colville Confederated Tribes resident fish data to regional databases

The objective is supported by one deliverable. The work is key to data management, but it is not clear how data are reported, stored, and synthesized. This is an important issue that should be addressed.

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

The sponsors have apparently been hampered by lack of personnel to complete a number of project deliverables in the past, notably reports on progress, but apparently now have staff to complete these assignments. Reporting of data in reports and especially journals has been slower than anticipated. The ISRP also mentioned this issue in the last round of reviews.

The primary description of results included focused on northern pike in Box Canyon Reservoir. A detailed, well laid out description was provided to tell the northern pike (NP) story from when they were first noticed in the mid 1980s to the development of a multimillion dollar fishery today. Adaptive changes in management are described. Results included a suite of descriptive analyses on size, diet, movement, catch rates, etc. These analyses have informed management options and decisions for eradication. The sponsors state, "To assess the feasibility of mechanical suppression with gill nets to increase mortality, KNRD and WDFW initiated a pilot removal project in 2011. Intensive gillnetting of sloughs and backwaters when pike are congregated for spawning has been demonstrated to be an efficient method for rapidly reducing their abundance in river systems (Ivey et al. 2011)" and concluded "that intensively netting NP in sloughs and backwaters from ice off through the spring freshet could drastically reduce the abundance of NP in Box Canyon Reservoir." The latter statement is apparently based on only one year (2011) of data. It would be helpful to find out if the Ivey et al. project, conducted in Alaska, resulted in long term reduction of the population or only short term decrease in population size.

Monitoring and research on westslope cutthroat trout below Albeni Falls dam has indicated life-history differences among fluvial and resident populations based on tagging analyses. The data from those analyses inform managers about the effects of the dam and habitat preferences and behavioral variation.

Work on redband trout and burbot was described with little discussion of how the information informed management. For redbands, three paragraphs on accomplishments emphasize the development of "standardized methods" and pilot projects. A three-year population study was to be done in the Upper Spokane River in 2007-09, but virtually no results are given.

For Priest Lake, efforts to date were clearly described. The sole objective is to assess the lake trout population in both lakes. The sponsors have been involved in the adaptive management measures for lake trout management in Priest Lake and Upper Priest Lake. Their work has been influential in the shift from a strategy of managing the lakes separately to a more realistic system of managing them together as one ecosystem unit, and as well promoting native fish.

The revision of the major geospatial database for the project is a concern. An earlier database and associated software has been abandoned and a new one constructed. It would be helpful to obtain further details on the latter. The new Geospatial Enabled Database Management System (GEDMS) could not be accessed using the links provided in the proposal.

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

The project has broad linkages to nearly all efforts in the Columbia River Basin above Chief Joseph dam. The project sponsors describe these linkages sufficiently.

Not much description is included for climate change as an emerging limiting factor, but more extensive are descriptions of problematic non-native species such as northern pike and lake trout. Not all non-natives are viewed as undesirable in part because of the loss of connection with downriver and ocean habitats and modification of the ecosystem in the blocked areas.

The proposal gives a useful discussion of the possible increased effects of entrainment at Albeni Falls dam on population dynamics of native and non-native resident fish.

RME: This project will monitor the effectiveness of control measures by annually monitoring the northern pike population with Spring Pike Index Netting (SPIN) survey and periodically monitoring the resident warmwater fishery with standardized warmwater fish surveys (Bonar et al. 2000) to detect trends in abundance and population characteristics as a response to removal efforts. Temporal aspects of this monitoring program should be described in more detail. Periodic monitoring is not a sufficient description. What is the statistical basis for the work?

4. Deliverables, Work Elements, Metrics, and Methods

The deliverables and work elements generally relate appropriately to the objectives. This proposal has one of the more extensive sections relating specific protocols to deliverables of the proposals reviewed. The sponsors also have done a fairly good job in incorporating previous ISRP comments and recommendations into this proposal.

There are 15 deliverables for proposed redband work. Fortunately these are nicely fitted into the relevant objectives or this would have been a mess. Proposal authors are to be congratulated for doing a good job working with a proposal format that is challenging for a large effort with diverse components.

The number of fish to be PIT tagged should be justified in terms of the deliverables that depend on pit tagging. Justification that the number of fish PIT tagged is sufficient, but not excessive, for the relevant deliverables should be provided. Will the number of redband trout detected be adequate to satisfy project objectives?

DELV-9: Provide the stock assessment data on redband trout in the lower Spokane River, Lake Roosevelt and upper Columbia River to managers to inform decisions – Further details are needed on the models used, e.g., the Fisheries Analysis Simulation Tools (Splike and Maceina 2001). References are not provided in the citation list.

DELV 10: Mark and release hatchery coastal rainbow trout in to Lake Roosevelt to evaluate negative interactions with wild redband trout during spawning – A rationale for a 10% tagging rate to identify if hatchery fish are interacting with wild redbands on the spawning grounds in Lake Roosevelt and upper Columbia River tributaries is given but is it scientifically defensible?

Further details are also needed on the assumed negative impact of wild red band trout spawning together with hatchery rainbow.

DELV-12: Estimate abundance of redband trout in the lower Spokane River – Details are needed on the mark-recapture model to be used. An unbiased estimate is promised.

DELV-13: Assess the redband trout population age structure for the lower Spokane River – The link to the random assignment method for scale selection does not work

DELV-14: Estimate abundance of northern pike in Box Canyon Reservoir, Washington – What is the statistical basis for deciding that the target sample size for marked and recaptured fish is 10% of the population?

DELV-16: Estimate abundance and assess population structure of resident species in Box Canyon Reservoir – What is the rationale for surveys every three years? Some of the faster-growing species may show response faster than that. The sponsors state, “The number of sections sampled by each gear-type is proportional to those available within the main river and sloughs and determined from power analysis to detect change in mean CPUE of principle species by gear type with predefined level of confidence, accuracy, and precision.” What is the predefined level?

DELV-18: Determine factors limiting redband trout populations in tributaries to lower Spokane River, Lake Roosevelt, and the upper Columbia River – The description of limiting factors is very general and needs more explanation and detail than “Redband trout limiting habitat factors includes the physical, chemical and biological components of the environment.”

DELV 19-21 concerning lake trout ecology in Upper Priest Lake and Priest Lake – The sponsors state, “Lake trout suppression in Upper Priest Lake removes approximately 80% of the population annually” and “In anticipation of a largescale effort to reduce the abundance, management needs accurate population estimates to model the effort required to crash the population through increased angler harvest and mechanical suppression.” Further details are needed on the proposed model that provides the rationale for this data need. How does this strategy/model compare with other lake trout suppression models, for example that proposed for Flathead Lake? 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: 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.

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

Methods for all sampling are given with a wide range of completeness.

The sponsors should consider a more modern condition factor index (e.g., lipid content, etc.) to replace the traditional Fulton index (1902).

There are several protocols for gill netting and electrofishing netting identified. It would be helpful to clarify which is the accepted method.

The protocol states, "The benthic invertebrate protocol is the same as that described by Hawkins et al. (2001). Benthic invertebrates should be collected at all sites. Collect 2 samples from the first 4 fast-water riffle habitats encountered at the site." No reference is provided for Hawkins et al (2001). What is the statistical basis for this sampling intensity?

[200811200](#) - Resident Fish Loss Assessment

Sponsor: Colville Confederated Tribes

ISRP recommendation: Response requested

Comment:

This was a very interesting proposal; however, it lacks sufficient focus or details at this point for scientific evaluation.

1. 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?
2. 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.

3. 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.

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

The resident fish mitigation program for the Upper Columbia River was designed primarily to offset the loss of anadromous salmonids when Chief Joseph and Grand Coulee Dams were constructed. This proposal calls for a three-year investigation of the effects of the construction of the two dams and the resultant inundation of riverine habitats by water impounded behind the Lake Rufus Woods and Lake Roosevelt dams on native resident fishes. It is difficult to relate the project to regional programs dealing specifically with the loss of resident, non-anadromous species because mitigation for the loss of salmon and steelhead through enhancement of mostly trout and kokanee resident species is the primary objective of nearly all other efforts.

Although the goals and objectives of the proposal were stated clearly, one of the objectives calls for a comparison of fish communities in historical riverine conditions, reference conditions or baseline conditions of the reservoirs functioning as natural lakes, and current conditions. However, the "reference conditions" concept requires further clarification, as it is not clear from the proposal how reservoirs functioning as natural lakes are fundamentally different from reservoirs functioning as water storage impoundments.

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

This is a new project that involves compilation of available literature and data on resident fish populations in the area of interest, or modeling the effects of dam operations on fish habitats and changes in biotic communities.

Other than the generation of reports on the effects of the two dams and reservoirs on resident fishes, no specific plans are presented for how the information would be used in a management context.

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

The literature review and modeling efforts will be targeted at identifying the factors related to dam construction and reservoir operation most likely to have impacted native resident fishes. Although the deliberate or accidental introduction of many vertebrate and invertebrate non-native species has also resulted in significant impacts to the native fauna, as well as other types of anthropogenic habitat loss, the primary emphasis of the proposal seems to be on hydrosystem operations.

4. Deliverables, Work Elements, Metrics, and Methods

Three deliverables are identified: (1) evaluate the reference condition and biotic and abiotic factors controlling resident fish communities; (2) quantify the effects of dam construction and operation on fish communities; and (3) communicate the analytical findings to managers and policy-makers. The project is proposed to begin with the formation of an advisory team composed of regional fish managers, but beyond this step there was little description of how the loss assessment would occur.

Details of additional metrics and methods were not provided.

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

No protocols or methods specific to this project were uploaded to MonitoringMethods.org.

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

Sponsor: Colville Confederated Tribes

ISRP recommendation: Response requested

Comment:

1. Additional explanation and synthesis is required for the background/problem statement related to questions raised in the appropriate sections below. In addition, a summary of results is needed.
2. Provide an explanation of the evaluation and decision framework based on stream and lake sampling. The response should also include an explanation of the metrics used to evaluate hatchery production; stocking rates in lakes and streams; potential locations for stocking each species cultured in both lakes and streams; and a summary of field evaluations of harvest, survival, and fish condition. Explanation of these essential

elements of managing recreational hatchery supported trout fisheries needs to be included in the problem statement so reviewers understand the full scope of the endeavor.

3. Provide rearing and stocking history for all species since the last ISRP review and information on growth and survival in lakes and streams and on harvest. A table and narrative is requested that summarizes the production including eggs received, fish hatched, reared, transferred, and released. In addition, post release survival and harvest for each stock and year since the last review is required by the ISRP to complete evaluation and provide retrospective reporting to the Council.
4. The Council's 1999 Artificial Production Review (NWPCC 1999-15) established that evaluating hatchery based on numbers or pounds of fish produced and released was inadequate and that goals and objectives were required for post-release performance. The ISRP looks for clear metrics for performance in the hatchery including broodstock or egg collection goals, egg to fry survival, fry to sub-catchable or catchable survival, disease or other health inspections, and food conversion as well as post-release performance including survival for stated intervals, harvest, condition, and related measures. There may also be facility related metrics for discharge water quality. These should all be identified and reported for the time period since the last ISRP review.
5. Fish rearing is apparently limited by water quality and quantity at the hatchery and upgrading facilities is a work element. Please provide more information on facility capacity and how limitations are going to be reduced by facility improvements.
6. The Colville Hatchery O&M project is extensive; the project encompasses much more than simply raising and releasing resident fishes. The sponsors have developed tasks to evaluate stocking needs, harvest levels, relative abundance of hatchery fish in lakes and streams. This proposal needs to provide a summary of key findings, including numbers of hatchery and native fishes taken in lakes and streams as a result of the stocking program. The extent to which the hatchery program is meeting the needs of the Colville Tribe needs to be described. Risk management concerns about the release of non-native brook trout (char) and Lahontan cutthroat trout into the streams and lakes on the reservation needs to be explained. The program appears to release these fish in areas where few if any native redband trout occur, which is good. Nevertheless, it may be worthwhile for biologists to evaluate the potential impact of the non-native fish releases on key native fishes. The tribe is transitioning to sterile (98%) triploid trout, which grow to large size. The ecological effects of these triploid fish on native fishes should be investigated including competition, predation, and displacement from habitat.

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

The Colville Tribal Fish Hatchery is an artificial production program that addresses the loss of anadromous fish resources in the Upper Columbia Subregion within the "blocked area" created by the construction of Chief Joseph and Grand Coulee Dams. This project enhances resident fisheries located in the Intermountain and Columbia Cascade Provinces, specifically within the Colville Reservation portion of the Upper Columbia, San Poil, and Okanogan Subbasins. The project particularly mitigates for anadromous fish losses through protection/augmentation of resident fish populations to enhance fishery potential (i.e., in-place, out-of-kind mitigation). The Colville Tribal Hatchery (CTH) is located on the northern bank of the Columbia River just downstream of the town of Bridgeport, Washington on land owned by the Colville Tribes. The minimum production quota for this facility is 22,679 kg (50,000 lbs.) of trout annually. All fish produced are released into reservation waters, including boundary waters, in an effort to provide a successful subsistence/recreational fishery for Colville Tribal members and provide for a successful nonmember sport fishery.

Significance to Regional Programs: The information provided is insufficient to understand the project's contribution to achieving the goals of appropriate management and subbasin plans. The CCT have a Fish Management Plan dated 2006 that is linked to the proposal; the management plan includes a resident fish section. It is evident that the project contributes to meeting the goals of this management plan. It is not clear whether this is the only project/program to contribute to the resident fish production portion of the plan. It is not clear how many subbasin plans are involved in the geographic range of the fish stocking involved with this project; only the San Poil is identified. Omak Lake is understood by the ISRP to be located in the Okanogan subbasin, and Lake Rufus Woods is included in a section of the plan for the Intermountain province. The subbasin plan associated with all of the stocked lakes needs to be identified.

Technical Background: The information provided is insufficient. The sponsor states the program provides subsistence and recreational trout fishing opportunities to substitute for lost anadromous fishing. This overarching purpose is fine. The technical background does not provide sufficient information on the status of lakes and streams on the Colville Reservation, the policy and scientific guidance from tribal management plans to guide this program, history or the program, etc. It is important to know how many lakes there are, how many are open to tribal fishing only, how many are open to the public, the fishing opportunity in each lake, and the same information for streams. Some of this information can be gleaned from the 2009 annual report, but a succinct summary needs to be included in the proposal.

Objectives: Incomplete. There are two general objectives presented; 1. provide fishing opportunities and 2. avoid introgression between hatchery rainbow trout and native redband trout. Some discussion of fish rearing objectives is provided, but not enough. There should be a

quantitative objective for fish harvesting metrics - CPUE, total harvest, angler days, or angler satisfaction as well as quantitative objectives for fish growth and survival. None are provided in the proposal. Some of this information can be found in the linked 2006 Fish Management Plan. These quantitative objectives need to be in the proposal. Monitoring that provides data to evaluate whether the objectives are achieved should be described.

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

Accomplishments: Additional details from each year's production, at least from the last ISRP review in 2006 should be provided. A table of production for brook trout is provided. A similar table is needed for each species reared or purchased. These production tables should identify the sites of fish release for each year, species, and number. A table should be provided that identifies the post release survival and harvest objectives and data that indicates whether those goals have been achieved. If there are no goals this should be acknowledged, if there has been no evaluation of whether the goals have been achieved, this should be acknowledged.

More information and a clear explanation of the evaluation of relevant data is needed on the decision to abandon redband trout rearing and a return to producing domestic coastal rainbow trout. An explanation is needed on the data used to determine stocking levels for brook trout and rainbow trout in various locations. The data used to determine that Lahontan cutthroat trout in Omak Lake have not reproduced and require artificial production to maintain the population is needed. The project conducts creel census and electrofishing surveys to guide management. The monitoring of the lakes and streams is noteworthy. Hatchery fish are monitored after stocking. No examples of the data or decision framework are provided. Key findings need to be described in more detail than basic identification of the various types of projects.

For example, lakes with less fishing pressure have been censused using voluntary creel forms and end of year angler surveys. While data from these methods are useful, quality control checks using trail cameras in 2010 and 2011 indicated that less than 10% of the anglers fill out questionnaires and these anglers may not be representative of the average angler. After accounting for under-reporting the ISRP recommends that the level of effort be determined and the fish harvest be estimated to establish the benefit of the hatchery program.

Adaptive Management: The sponsors provide statements that production, stocking, and management has changed to reduce production and stocking with improve fishing quality. However, there is no linkage between these statements and data provided in the accomplishments and results section. The adaptive management section also makes statements regarding the attempt to rear redband trout, and that they have not lived up to expectation. While summary statistics in the adaptive management section are adequate, some of the details of the experiments need to be included in the results section. In the latest annual report for 2009, there is no indication this experimental effort has unfulfilled expectations.

Response to the ISRP: More information is required on the specific details of stocking and evaluation. For example, in paragraph 2, the sponsors state that stocking in Twin Lakes was reduced from 65% to 27% of the hatchery's production based on M&E studies. What information was collected, and how was it interpreted to indicate a reduction in stocking was warranted. Is this reduction in response to increased stocking from Rufus Woods net pens? The sponsor also states that following this change, catch rate, average size, and angler satisfaction was the best in a decade. The proposal should include a summary of the actual data, and an explanation of its interpretation.

ISRP Retrospective Evaluation of Results

Hatchery fish are only marked as needed for the specific analyses. This is reasonable, as described in the proposal.

The Tribe is planning to replace redband trout with sterile triploid rainbow trout because the performance of redband trout in the hatchery is lower than more domesticated trout stocks. The Tribe notes that the hatchery redband stock is not genetically close to the native redband, and they suggest continued stocking of hatchery redband will harm native redband.

The Tribe releases large numbers of non-native Lahontan cutthroat trout into Omak Lake, which is apparently land-locked. These fish support a popular sport fishery, but this non-native stocking operation is not sufficiently evaluated in the proposal.

The Tribe purchases 2000 large (>5 lb) triploid trout for release into reservation lakes. The impact of these fish on native fishes via predation and competition needs to be better understood. The harvest rate on these catchable trout could impact native fishes through incidental by-catch, including redband trout.

There is a plan to improve the creel survey. It would be good to provide some statistics on the extent to which tribal members harvest resident fishes, including hatchery stocks. To what extent is hatchery production meeting the needs of the tribe?

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

Project Relationships: Three BPA projects implemented by the CCT are identified. There is overlap in activities between the Hatchery O&M and the Twin Lakes oxygenation and Lake Rufus Woods net pens. The full scope of the interaction is not clear and needs to be better established. The relationship of this project to Tribal management outside of the BPA scope is not discussed. BPA funded trout rearing and stocking projects implemented by other sponsors are not identified. A programmatic topic is a potential need for standardized monitoring across trout rearing programs, and a comparative analysis of hatchery rearing and fishery benefits.

Standards for fish release, yield in fisheries, disease management, etc established by Washington State, that may apply to this project are not discussed.

Emerging limiting factors: The proposal identifies the ecological studies on Twin Lakes that investigated a hypothesized bass predation limiting factor in that location, and discovered that hypolimnetic anoxia and high epilimnetic water temperature actually were limiting trout survival and growth. As a consequence, oxygenation of Twin Lakes is being used to remediate the limiting factor. The 2009 annual report identified water quality, invasive species, and tributary water quantity at Omak Lake as limiting factors, but they are not discussed in the proposal. Additional discussion of the anticipated analysis of limiting factors and management strategies to address them needs to be included.

Non-native brook trout have been released onto reservation waters for 75 years. This alone is not a sufficient justification for continued stocking of non-native fishes. Brook trout reproduce in some of the lakes and stocking has stopped in those lakes. Appropriately, stocking does not occur in areas where native redband occur. The two species have interacted for nearly a century. Evaluating adverse interactions between brook trout and native fishes such as redband does not appear to be incorporated into project deliverables. If the Tribe has data indicating the interaction is minimal and therefore stocking is low risk given that some brook trout may infiltrate areas where native redband occur, it should be incorporated into the proposal problem statement.

Tailored Questions:

Resident Fish: Opportunities to restore or reintroduce resident native fish: Gold Lake has been stocked with westslope cutthroat trout and a self-sustaining population has been established. Currently stocking is suspended and monitoring takes place annually. It would be appropriate to summarize this effort in the accomplishments section. How has reproduction been confirmed, what is the standing biomass of trout in the lake, and what kind of fishing can the lake support without stocking?

Redband trout enhancement for harvest has not been successful. The ISRP concludes that the proposal does not provide sufficient information on the distribution of native redband trout, evidence of a risk analysis for stocking coastal rainbow, brook, or westslope cutthroat trout in the current enhancement areas, or a discussion of methods to evaluate the status of native redband trout as a consequence of implementing the hatchery O&M project.

Data Management: The sponsor is developing a data management plan. Data management is currently limited to local offices and not available regionally.

4. Deliverables, Work Elements, Metrics, and Methods

The brief summary information provides a snapshot of the project, but not enough is provided in other sections of the proposal to fully evaluate the sufficiency of the actions to meet the project goals. For example, electrofishing is used to estimate trout population abundance before and 30 and 60 days post stocking. But no information is provided to the ISRP on the precision of the surveys, what level of abundance triggers stocking, and how management decisions result from the pre- and post- stocking surveys.

The work elements, metrics, and methods are not presented in sufficient detail for evaluation. In general the correct assessments appear to be employed.

Project reports are on time.

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

No specific comments at this time.

Lake Rufus Woods

[200740500](#) - Rufus Woods Habitat/Passage Improvement, Creel and Triploid Supplementation

Sponsor: Colville Confederated Tribes

ISRP recommendation: Response requested

Comment:

Although the project is titled Rufus Woods Habitat/Passage Improvement, Creel and Triploid Supplementation, the proposal pertains only to the triploid stocking and sampling effort. The project sponsors have adopted a scientifically sound creel sampling strategy, but the ISRP needs additional information in order to determine the project's overall soundness.

1. 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.

2. 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?
3. 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.
4. 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?
5. 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?

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

This project had its genesis in the mid-1990s when triploid rainbow trout escaped from a commercial farming operation in Lake Rufus Woods, and subsequently turned up at very large size in the recreational trout fishery. Continued escapes of triploid rainbows, as well as some deliberate stocking, have supported a sizeable fishery that the Colville Tribe wishes to sustain to provide tribal income. The goal is to sustain an angler harvest rate of 0.5 fish per hour with an average fish size of 1.5 kg, with some fish reaching 10 kg or more, at a fishing intensity of 50,000 angler days per year. Based on evidence from a reservoir productivity review, the project sponsors feel these goals are feasible, and trophy trout can be produced in Lake Rufus Woods without the need to raise very large, expensive fish for release.

The project has been justified based on mitigation for lost anadromous salmonid production caused by Chief Joseph Dam. The technical background was explained in general terms, but without going into many details about previous findings related to rainbow trout food habits, losses to entrainment or predators, and changes in the productive capacity of the reservoir. Although the objectives were explained, they addressed only production goals and did not include conservation objectives for native fishes as reflected in the habitat/passage language in the project title.

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

The history of the Lake Rufus Woods trophy trout fishery was given and the graphs of angler days, catches per unit effort, and fish counts were useful. More information is needed concerning the EcoAnalysts report on reservoir productivity. If "densities of benthic invertebrates were within the normal range for many trout fisheries, but tending toward the "low end" and if "More than 25 % of the rainbow trout stomachs examined were empty" (p. 5 of the proposal), and further if "nearly 50% of the released fish disappeared each month" (following paragraph), it is difficult to follow the logic that releases of smaller, less expensive trout would achieve the project's trophy trout and catch rate goals. Perhaps there is more information in the findings to date that were not given in the proposal, but based on the data presented it does not appear that the suggested release strategy is likely to produce the anticipated benefits. What is the evidence to support the belief that smaller fish will achieve the growth rates needed to reach the target sizes at harvest?

Additionally, the importance of entrainment losses and possible predation losses to non-native fishes such as walleye need a more complete description of what has been learned to date. Because smaller trout are likely to be more vulnerable to predation and to downstream displacement through the dam, an earlier, smaller release strategy might be counterproductive, especially if smaller fish are released closer to Chief Joseph Dam.

The section of the proposal dealing with adaptive management also needs clarification. It is mentioned elsewhere in the narrative that stocking schedules might be modified based on incidences of escape from the net pens, but it was not clear if numerical criteria for such modifications have been developed or if these will be part of the long-term management plan. How is the carrying capacity of the reservoir figured so that overstocking can be prevented? How does the movement of fish from Lake Roosevelt into Lake Rufus Woods affect trout behavior or growth rates?

ISRP Retrospective Evaluation of Results

The proposal has clearly-stated goals but has not incorporated testable hypotheses into changes in management strategies. For example, it is apparently assumed that prolonged rearing of triploid trout to large size and high cost can be largely replaced with a stocking strategy involving smaller, less expensive fish that will result in abundant large trout for the recreational harvest. However, the ISRP is not convinced that the evidence is strong enough at this point to support such an assumption; rather, it should be treated as a testable hypothesis, and a management experiment should be put in place to evaluate it. Assumptions about how many trout the reservoir can support, and at what size distribution, should also be treated as testable hypotheses before full-scale implementation of intentional releases of triploid trout.

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

The sponsors have adequately described the work's relationship with other salmonid enhancement projects in the Colville Reservation area. However, more information is needed on how this project affects conservation efforts for native interior rainbow trout (redbands). Will the program result in incidental catch of adfluvial lacustrine redband trout and how will this be monitored, if it occurs? The proposal notes that a risk assessment for native species has not been completed (p. 11), but it would seem prudent to do so in view of the considerable effort to protect the native redband trout in Lake Roosevelt. Walleye are listed as a secondary focal species, but walleye abundance, predation by walleye on young rainbow trout, or possible changes in walleye regulations are not discussed. This information should be included in the proposal.

It is mentioned that some early research showed that redband trout did poorly in a hatchery environment. It does not appear that there will be any hatchery supplementation of redband trout, but if any releases occur how will they affect the triploid rainbow fishery program in Lake Rufus Woods, or vice-versa?

The question of how the released triploid trout are going to obtain enough food to achieve the growth rates need to reach the 1.5 kg target rate for the fishery remains to be answered. Given the other information in the proposal about average benthic invertebrate densities in Rufus Woods, the relative scarcity of fish or other large-bodied prey in rainbow trout diets, and the general absence of evidence that other Columbia River reservoirs can sustainably support a trophy trout fishery similar to the one envisioned in the management plan, it would seem that understanding the food web of Rufus Woods is a key to project success. The ISRP strongly recommends that more effort be devoted to food web research in this ecosystem. It seems possible that post-release/escape growth rates of triploid trout might be fueled by residual food from the net pen operations.

4. Deliverables, Work Elements, Metrics, and Methods

The deliverables were clearly stated but more information was needed on some of the metrics and methods. The creel census was adequately described and is based on sound scientific sampling principles. Additional details are needed on stomach sample analysis including sample size; timing and location of sampling; stomach content determinations and statistical methods; and on the procedures to be used in developing the long-term management plan including specific fishery objectives, interim targets, tracking metrics, and adaptive management guidelines.

The proposal would be improved by an explanation of the rationale for the stomach sample and cobble basket study. Presumably this is an attempt to determine if food supplies are limiting

growth and survival of the trout. The sponsors are referred to the ISAB food web report for information on how bioenergetics models could help.

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

The creel survey developed by Dr. Skalsky was well explained. No details specific to the Rufus Woods triploid rainbow trout release protocols or to the stomach sampling program were uploaded to MonitoringMethods.org.

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

Sponsor: Colville Confederated Tribes

ISRP recommendation: Response requested

Comment:

The proposal needs major revision including:

1. an expanded explanation of significance to regional programs/plans
2. a revised technical background giving a more complete history of lost fisheries and the need for resident fish substitution
3. objectives that are specific and measurable
4. deliverables and work elements that specifically describe the tasks needed to meet objectives
5. detailed methods for raising the net pen fish or a sub-contractors specifications and methods
6. a description of the evaluation and decision framework used to establish stocking location and numbers, and how this stocking is integrated in the Colville Tribal Hatchery rearing and stocking plans.

See the ISRP's programmatic comments on fish stocking.

The Council's 1999 Artificial Production Review (NWPC 1999-15) established that evaluating hatcheries based on numbers or pounds of fish produced and released was inadequate and that goals and objectives were required for post-release performance. The ISRP looks for clear metrics for performance in the hatchery or net pen including in-pen survival and growth, disease monitoring or other health inspections, percentage of triploid trout, net pen water quality compliance inspections, and food conversion as well as post-release performance including survival for stated intervals, harvest, and fish condition. These should be identified and reported for the time period since the last ISRP review. The Rufus Woods net pen project provided data for in-pen survival and growth, but there was no information on survival and

harvests of these fish in Twin Lakes and Rufus Woods. The proposal should also identify impacts of the stocked fish on resident fishes in each of the receiving waters, including elevated harvest rates on native trout in response to higher fishing effort for example in Rufus Woods. The ISRP understands that post release data may come from other projects, but the information should be summarized in the net pen proposal.

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

Significance to Regional Programs: Insufficient information was provided. The proposal identifies that the CCT Fish Management Plan includes elements that the project fulfills, but those elements should be described. The linkages to elements in subbasin plans beyond the San Poil are likely since fish are intended for release in Lake Rufus Woods. The proposal should identify how it is linked to other relevant regional planning efforts such as the Lake Roosevelt Guiding Document, the Lake Roosevelt Fisheries Evaluation Project, and the Council's Fish and Wildlife Program. Additionally, the numbers of fish to be purchased and released into Lake Rufus Woods by this project should be described. Interactions with the Lake Rufus Woods Creel and Supplementation (2007-405-00) project and the Resident Fish above Chief Joseph and Grand Coulee Dams (1997-004-00) need to be stated.

Technical Background: Insufficient information is provided. The sponsor states the program provides subsistence and recreational trout fishing opportunities to substitute for lost anadromous fishing. This overarching purpose is fine. The technical background does not provide sufficient information on the specific lakes on the Colville Reservation that might be stocked using fish from this project. A decision framework, for example a regional resident fish stocking plan, that identifies the policy and scientific guidance from tribal management plans to direct the annual stocking is needed. This framework should be described in a comprehensive residence fish stocking plan that encompasses all hatchery activities in the upper Columbia region. A brief description with references of lost anadromous fisheries is needed to demonstrate the need for the resident fish substitution.

Objectives: Incomplete information is provided. There are three objectives identified: supplement fishery to provide harvest; increase efficiency and decrease the cost; relieve pressure on Colville Tribal Hatchery. These objectives need quantitative standards identified as goals that can be evaluated by metrics. There are no quantitative objectives for fish rearing success or for subsequent harvest. There should be quantitative objectives for fish harvesting metrics such as catch per effort, total harvest, angler days, and angler satisfaction as well as quantitative objectives for fish growth and survival. None are provided in the proposal. Monitoring is needed to evaluate whether the objectives are achieved.

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

Accomplishments: The project has one year of fish rearing experience from net pens stocked with 22g redband trout in June 2010 and released fish in the spring of 2011, under emergency circumstances because of gas super-saturation. Accurate estimates of survival are needed and observed survival should be compared with a goal in order to evaluate effectiveness of net pen rearing. The proposal did not describe whether or not juvenile fish, presumably rainbow trout, were stocked into net pens during the spring/summer of 2011 for release in 2012. No information is provided on harvest from the fish stocked.

Adaptive management: The evaluation of redband trout culture and switch from redband trout to triploid rainbow trout was provided as a management response.

ISRP Retrospective Evaluation of Results

The first year of operation (2010) determined that the performance of redband trout in the hatchery and Rufus Woods net pens was insufficient to meet program needs. The project plans to transition to rainbow trout, but no information on rainbow trout net pen operations was provided for 2011.

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

Project Relationships: The proposal notes that the Rufus Woods Net Pen Project works directly with the Colville Hatchery O&M (#1985-038-00) and Rufus Woods Creel and Supplementation (#2007-405-00). However, the project also interacts with the Twin Lakes oxygenation project and Resident Fish above Chief Joseph and Grand Coulee Dams (#1997-004-00). The full scope of the interactions is not clear and needs to be better established. The relationship of this project to Tribal management outside of the BPA scope is not discussed. BPA funded trout rearing and stocking projects implemented by other sponsors are not identified. Standards for fish release, yield in fisheries, disease management, etc. established by the State of Washington, that may apply to this project are not discussed.

Emerging limiting factors: The proposal focuses primarily on limnological conditions, dissolved gas in Lake Rufus Woods and fish health concerns during net-pen rearing. Both of these limits need to be discussed in more detail in the problem statement and/or accomplishments section. The brief discussion of the health issues, in addition to dissolved gas, needs additional details.

Tailored Questions: Adequately answered and discussed.

4. Deliverables, Work Elements, Metrics, and Methods

The general description of the primary deliverable consisting of purchasing triploid trout eggs from WDFW, hatching eggs and rearing fish to 22g, and then contracting for rearing to catchable size for a put-and-take fishery is clear. There needs to be quantifiable elements attached to the deliverables. For example, the explanation of how the deliverables meet the objectives needs additional detail. How will objectives 2 and 3 be evaluated, and what is the threshold for success?

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

Apparently, no protocols or methods were submitted to MonitoringMethods.org.

[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.

Lake Roosevelt and Tributaries

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.

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 requested

Comment:

In order for the ISRP to complete evaluation and provide retrospective reporting to the Council on progress since the last review a response containing a table and brief narrative is required that summarizes the production including eggs received, fish hatched, fish reared, fish transferred, and fish released as well as post release survival and harvest for each stock and year since the last ISRP review. The response should also include a diagram of fish transfers and relationships between the Spokane Tribal Hatchery, Sherman Creek Hatchery, and the Lake Roosevelt Monitoring Project.

The ISRP understands and appreciates that the Spokane Tribal Hatchery uses monitoring data collected and then analyzed by the Lake Roosevelt Monitoring Project to complete evaluation. Even if much of the data and analysis are presented in the monitoring project, these items should have been incorporated into the accomplishments section, and perhaps adaptive management section of this project's proposal. At this point in time these items should be included in the response to the ISRP.

The Council's 1999 Artificial Production Review (NWPC 1999-15) established that evaluating hatcheries based on numbers or pounds of fish produced and released was inadequate and that goals and objectives were required for post-release performance. The ISRP looks for clear metrics for performance in the hatchery including broodstock or egg collection goals, egg to fry survival, fry to sub-catchable or catchable survival, disease or other health inspections, and food conversion as well as post-release performance including survival for stated intervals, harvest, and fish condition. There may also be facility related metrics for discharge water quality. These should all be identified and reported in the response to the ISRP for the time period since the last review.

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

Significance to Regional Programs: The proposal is adequate with linkages to the Fish and Wildlife Program and individual subbasin plan elements provided in reasonable detail.

Technical background: A lengthy explanation of the history of Fish and Wildlife Program kokanee and rainbow trout artificial production programs within the Lake Roosevelt watershed is provided. The summary included information on the original justification for selecting kokanee as a focal species, challenges the program has encountered since its inception with entrainment from Lake Roosevelt, predation by walleye, and more recently by smallmouth

bass, difficulties with assessment, and current production targets and harvest goals. The length of text and information extending beyond the proposal distracted from the primary elements of what was being proposed. The background section would be improved by including a flow chart of egg and fish transfers among projects at Lake Roosevelt.

Objectives: The overall objective of providing harvest and an egg source for kokanee production and harvest for rainbow trout is consistent with the Fish and Wildlife Program and this project.

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

Accomplishments and results: The information provided is inadequate. A clear description of the metrics used for evaluation of the hatchery and post release performance including survival, harvest, and interactions with native resident fishes needs to be presented in tabular form along with a brief narrative. The extensive text in the problem statement provides a comprehensive narrative about the history of the program but does not identify metrics for the hatchery and post release project phases and an indication that performance standards have, or have not, been achieved. Some of this information does appear in annual reports. However, the ISRP needs this concise presentation for both evaluation of the proposal and retrospective reporting to the Council. The questions are: Can the project obtain the rainbow trout and kokanee eggs it needs? What are the survival of eggs to hatch or first feeding, survival to distribution, condition factor, fish health, and facility monitoring for water quality and discharge? What are the growth, survival, condition factor, and harvest post release into Lake Roosevelt? This should be presented for each year since the project was last reviewed by the ISRP.

Adaptive Management: The explanation of the project history in the problem statement provides a reasonable summary of the changes in management.

ISRP Retrospective Evaluation of Results

To be completed by the ISRP following sponsor's response.

The kokanee portion of the project is showing some improvement. The goal of 5% kokanee harvest following release should be compared with other systems to justify this small level of survival and harvest after only a few months in the reservoir. The goal for the rainbow trout program of 50,000 to 150,000 fish harvested or 20% of release also needs to be considered in comparison to other large reservoir systems for the ISRP, Council, BPA, and stakeholders. This comparison will help place this program in context with other similar put-grow-and-take efforts, for example Lahontan cutthroat trout in Pyramid Lake, Nevada and rainbow trout in Flaming Gorge in Wyoming/Utah.

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

Project Relationships: The proposal is adequate for consideration of Lake Roosevelt BPA projects. Additional consideration is needed with Washington trout stocking programs, and whether this project is consistent/compliant with the State of Washington policies on hatchery operations, fish release, harvest yields, and native species interactions.

Emerging Limiting Factors: Consideration of predation on project fish by walleye, smallmouth bass, and northern pike is mentioned and discussed in detail in the problem statement. Reservoir operations and other environmental considerations, namely climate change, are briefly identified. Absent from the list is interactions with native redband trout and native kokanee. The problem statement suggests the status of kokanee remains unsolved. The wild kokanee might be progeny from reservoir spawning local fish, but spawning locations and documentation of early life stages remains undocumented. The problem statement also identifies that native redband trout inhabit reservoir tributaries and regions below Lake Roosevelt. The project seems to have been initiated with little explicit consideration of these native populations. Some genetic and tagging efforts are intended to improve the knowledge of interactions, and the project is using triploid rainbow trout to avoid introgression. Explicitly addressing the effects of the hatchery/harvest program on native resident fish is needed. If consequential impacts are detected it could influence the fate of the project.

Tailored questions:

1. Describe opportunities to restore or reintroduce resident native fish: The response indicates that other projects are involved in sturgeon and redband trout restoration and habitat enhancement. If so, descriptions and linkages should be provided more clearly in the proposal.
2. A resident fish loss assessment has not been completed.
3. Impacts of non-native fish releases on native fishes need to be more clearly identified and discussed. The sponsors' statement that the rainbow trout and kokanee released by the project are "native," may be technically true, but operationally it is not. The rainbow trout are a stock derived from the coastal California subspecies, and the kokanee from Lake Whatcom are from a coastal location in Washington, substantially differentiated from the interior wild fish, namely redband trout, based on recent genetic investigations. The sponsors include an adequate discussion of the operating hypothesis that stocked rainbow trout and kokanee are primarily planktivores. The monitoring plan for the program needs to continue to evaluate the potential for impacts on native

kokanee, redband trout, and non-game fish. Impacts to forage fish species could have trophic effects that would require management decisions.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables are presented clearly as 750,000 triploid rainbow trout, 3.7 million kokanee fry, and 250,000 kokanee yearlings.

The metrics for fish production including life-stage survival, condition factor, and fish health as well as facility operations including water discharge and invasive species inspections are not presented and need to be included.

The RM&E protocols and methods section states: "There are no RM&E protocols identified for this proposal." The ISRP questions this and believes M&E needs to be sufficient to meet the Council Program's Artificial Production standards.

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

Sponsor: Lake Roosevelt Development Association

ISRP recommendation: Response requested

Comment:

In order for the ISRP to complete evaluation and provide retrospective reporting to Council on progress since the last review, a table and brief narrative should be provided in a response that summarizes the production of trout including the number and size received from each hatchery and released from each net pen site, as well as post release survival and harvest for each year since the last ISRP review. A concise description of methods to determine these metrics should be included in the response.

The response should also include a diagram of fish transfers and relationships between the Net Pens, Spokane Tribal Hatchery, Sherman Creek Hatchery, and the Lake Roosevelt Monitoring projects.

The ISRP understands and appreciates that the Lake Roosevelt Net Pen Project uses monitoring data collected and analyzed by the Lake Roosevelt Monitoring Project. Even if these data and analyses are presented in the monitoring project, they should have been incorporated into the accomplishments and adaptive management sections of this proposal. For example, what is the harvest rate on native redband trout in the rainbow trout fishery, and is this harvest rate detrimental to the native population? At this point in the review process, these items should be included in a response to the ISRP.

The Council's 1999 Artificial Production Review (NWPC 1999-15) established that evaluating hatcheries based on numbers or pounds of fish produced and released was inadequate and that goals and objectives were required for post-release performance. The ISRP looks for clear metrics for performance in the hatchery or net pen including in-pen survival and growth, disease monitoring or other health inspections, percentage of triploid trout, net pen water quality compliance inspections, and food conversion as well as post-release performance including survival for stated intervals, harvest, and fish condition. These should all be identified and reported in the response for the time period since last ISRP review.

In the latest annual report, the sponsors note that due to high snowpack and resulting short water retention time in Lake Roosevelt many fish were entrained through Grand Coulee dam last year. This comment should be expanded upon and any estimates of entrainment provided in the response.

See the programmatic comments on fish stocking.

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

Significance to Regional Programs: The proposal provides an adequate presentation and linkages to the Fish and Wildlife Program and individual subbasin plan elements.

Technical background: A lengthy explanation of the history of kokanee and rainbow trout artificial production programs within the Lake Roosevelt watershed is provided. The summary includes information on the original justification for selecting kokanee as a focal species, challenges the program has encountered since its inception with entrainment from Lake Roosevelt, and predation by walleye, and more recently by smallmouth bass, and difficulties with assessment as well as current production targets and harvest goals. The length of text and information extending beyond the proposal distracted from the primary elements of what was being proposed. The background section would be improved by including a chart of fish entering and exiting the net pens each year, and their growth within the pens.

Objectives: The overall objective of providing harvest for rainbow trout is consistent with the Fish and Wildlife Program and this project.

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

Accomplishments and results: The information provided is inadequate. A clear description of the metrics used for evaluation of the net pens and post release performance including survival, harvest, and interactions with native resident fishes needs to be presented in tabular form with a brief narrative. The extensive text in the problem statement provides a comprehensive narrative about the history of the program but does not identify metrics for the project phases (hatchery and post release) and an indication that performance standards have (or have not)

been achieved. Some of this information does appear to be included in annual reports. The ISRP needs this concise presentation for both evaluation of the proposal and retrospective reporting to Council. The questions are: What was the survival while rearing in the net pens, growth, fish health, net pen monitoring for sediment quality, etc.? What were the growth, survival, condition factor, and harvest rate after release into Lake Roosevelt? What was the harvest rate on native redband trout during the fishery on rainbow trout? This should be presented for each year since the project was last reviewed.

Adaptive Management: The explanation of the project history in the problem statement provides a reasonable summary of the changes in management.

ISRP Retrospective Evaluation of Results

To be completed by the ISRP following the sponsors' response.

The harvest goals for rainbow trout (20% of release or 150,000 harvested fish) needs to be considered in comparison to other large reservoir systems so that the ISRP, Council, BPA, and stakeholders can put this program in context with other similar put-grow-and-take efforts such as Lahontan cutthroat trout in Pyramid Lake, Nevada and rainbow trout in Flaming Gorge, Wyoming/Utah.

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

Project Relationships: Information in the proposal is adequate for consideration of Lake Roosevelt BPA projects. Additional consideration is needed with Washington trout stocking programs, and whether this project is consistent/compliant with State of Washington policies on hatchery operations, fish release, harvest yields, and native species interactions.

Emerging Limiting Factors: Consideration of predation on project fish by walleye, smallmouth bass, and northern pike are discussed in detail in the problem statement. Reservoir operations and other environmental considerations, such as climate change, are briefly identified. The proposal notes that these coastal rainbow trout are planktivores, not predators on native fishes, and that zooplankton levels are adequate for hatchery and native salmonids. The proposal indirectly notes the potential effect of recreational harvests on native redband trout but acknowledges little data exist. This is an important data gap that needs to be filled. Some genetic and tagging efforts are intended to improve the knowledge of interactions, and the project is using triploid rainbow trout to avoid introgression. If consequential impacts are detected, it could influence the fate of the project.

Tailored questions:

1. Describe opportunities to restore or reintroduce resident native fish: The response indicates that other projects are involved in sturgeon and redband trout restoration and habitat enhancement. If so, descriptions and linkages should be provided more clearly in the proposal.
2. A resident fish loss assessment has not been completed and is needed.
3. Impacts of non-native fish releases on native fishes need to be more clearly identified and discussed. The sponsors' statement that the rainbow trout released by the project are "native", may be technically true, but operationally it is not. The rainbow trout are a stock derived from the coastal California subspecies. The sponsors include an adequate discussion of the operating hypothesis that stocked rainbow trout and kokanee are primarily planktivores. The monitoring plan for the program needs to continue to evaluate the potential for impacts on native kokanee and redband trout, and other non-game fish. Impacts to forage fish species could have trophic affects that would require management decisions.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables are presented in a straightforward manner as 750,000 triploid rainbow trout released from net pens.

The metrics for fish production (life-stage survival, condition factor, fish health) and facility operations (sediment quality, etc.) are not presented and need to be included.

The RM&E protocols and methods section states: "There are no RM&E protocols identified for this proposal." The ISRP questions this, and believes M&E needs to be sufficient to meet the Council Program's Artificial Production standards.

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

No information on protocols and methods was provided in the proposal or on MonitoringMethods.org. As noted above, the some basic metrics need to be measured and methods need to be described.

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

Sponsor: Washington Department of Fish and Wildlife (WDFW)

ISRP recommendation: Response requested

Comment:

A response is requested to provide metrics for hatchery production, and reporting on harvest, growth, and survival in the reservoir. Metrics should be included in a table and brief narrative that summarizes the production including eggs received, fish hatched, fish reared, fish transferred, and fish released as well as post release survival and harvest for each stock in each year since the last review. This information is required by the ISRP to complete evaluation of the proposal and provide retrospective reporting to the Council.

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

Technical background: The problem statement provides a reasonable history of using artificial propagation of kokanee and rainbow trout in Lake Roosevelt to attempt to provide subsistence and recreational fishing to mitigate the loss of anadromous salmon due to the construction of Grand Coulee and Chief Joseph Dams. The organization of the problem statement, however, is cumbersome. It is difficult to locate information relevant to questions that arise elsewhere in the proposal. For example, the sponsors identify in the adaptive management section that stocking of rainbow trout has increased from 500,000 to 750,000 fish and state elsewhere that the reservoir has the capacity to support the additional stocking. Information on survival rates and condition factor would support the hypothesis, but is not conveniently located to confirm this conclusion.

Significance to regional programs: The use of hatchery fish to support subsistence and recreational angling is a strategy recognized by the Fish and Wildlife Program and subbasin plans. The proposal states that Sherman Creek Hatchery, as part of the Lake Roosevelt Fisheries Evaluation Project (LRFEP) is consistent with objectives defined in the MERR. The specific components of the MERR and specific tasks and deliverables in the LRFEP or Sherman Creek Hatchery O&M proposal are not identified.

Project objectives: Proposal instructions state that a project objective should provide a biological and/or physical habitat benchmark by which results can be evaluated. For the Sherman Creek Hatchery O&M proposal the ultimate objectives of increasing or providing subsistence and recreational harvest is fine, but no benchmarks are provided for establishing the benefits from the project. This proposal needs metrics for hatchery production including fish reared, fish survival, fish condition, and fish disease history as well as post hatchery performance including survival, fish condition, and contribution to harvest. In addition measures of social and economic benefit of the fisheries would be valuable. The Spokane Tribal

Hatchery O&M proposal indicates that there is a harvest goal of 50,000 to 150,000 for rainbow trout (20% of release) and a 31,000 kokanee harvest goal (18,500 from fry releases [0.5% of release] and 12,500 from fingerling releases [5% of release]). The proposal needs to justify the harvest goals based on reservoir capacity and ecology, and provide a self-evaluation of achieving these benchmarks. The Sherman Creek O&M proposal needs to confirm that these numbers of harvested fish represent the appropriate end point for evaluation.

Emerging limiting factors: The proposal provides a thorough discussion of limiting factors from predation by walleye and smallmouth bass in the problem statement section. However, challenges in managing fish harvest using out-of-basin hatchery stocks such as coastal Washington Lake Whatcom kokanee and coastal California triploid rainbow trout, in the presence of native kokanee and redband trout is not thoroughly acknowledged or considered. Introgression is mentioned, but risk management beyond the use of triploid fish is absent from the proposal. If the status of native kokanee or redband trout declines, the project scope may need to be reevaluated. The effects of toxic wastes from Canada are not fully considered.

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

Accomplishments and results: A focused summary is needed of the annual hatchery and post-release performance. The performance indicators and their standards, such as life-stage survival need to be identified, and the programs results need to be presented including disease inspection history and facility standards, for example discharge water quality. The proposal states that fish rearing follows WDFW fish culture guidelines. The guidelines should be provided, the methods of testing identified, and the results presented.

Adaptive management: The information provided is adequate, especially when considering the material included in the problem statement.

ISRP Retrospective Evaluation of Results

The ISRP's retrospective evaluation of results will be added following a response by the sponsors summarizing hatchery production history and follow-up performance metrics.

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

Project Relationships: The information provided is adequate for consideration of Lake Roosevelt BPA projects. Additional consideration is needed with Washington trout stocking programs, and whether this project is consistent/compliant with the State of Washington's policies on hatchery operations, fish release, harvest yields, and native species interactions.

Emerging Limiting Factors: Consideration of predation on project fish by walleye, smallmouth bass, and northern pike is mentioned and discussed in detail in the problem statement. Reservoir operations and other environmental considerations, for example climate change are briefly identified. Absent from the list is interactions with native redband trout and native kokanee. The problem statement suggests the status of kokanee remains unsolved. Wild kokanee might be progeny from reservoir spawning local fish, but spawning locations and documentation of early life stages remains undocumented. The problem statement also identifies that native redband trout inhabit reservoir tributaries and regions below Lake Roosevelt. The project seems to have been initiated with little explicit consideration of these native populations. Some genetic and tagging efforts are intended to improve the knowledge of interactions, and the project is using triploid rainbow trout to avoid introgression. Explicitly addressing the effects of the hatchery/harvest program on native resident fish is needed. If consequential impacts are detected they could influence the fate of the project.

Tailored questions:

1. Describe opportunities to restore or reintroduce resident native fish: The response indicates that other projects are involved in sturgeon and redband trout restoration and habitat enhancement.

2. Loss assessment: A resident fish loss assessment has not been completed.

3. Impacts of non-native fish releases on native fishes: The sponsors' statement that the rainbow trout and kokanee released by the project are "native," may be technically true, but operationally it is not. The rainbow trout are a stock derived from the coastal California subspecies, and the kokanee from Lake Whatcom are from a coastal location in Washington. These fish are substantially differentiated from the interior wild fish based on recent genetic investigations. The sponsors include an adequate discussion of the operating hypothesis that stocked rainbow trout and kokanee are primarily planktivores. The monitoring plan for the program needs to continue to evaluate the potential for impacts on native kokanee, redband trout, and non-game fish. Impacts to forage fish species could have trophic effects that would require management decisions.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables are presented in a straightforward manner as 750,000 triploid rainbow trout, 3.7 million kokanee fry, and 250,000 kokanee yearlings.

The metrics for fish production including life-stage survival, condition factor, fish health as well as facility operations including water discharge and invasive species inspections are not presented and need to be included.

The RM&E protocols and methods section states: "There are no RM&E protocols identified for this proposal." The ISRP questions this and believes that the monitoring and evaluation needs to be sufficient to meet the Council Program's Artificial Production standards.

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

There are no RM&E protocols identified for this proposal in MonitoringMethods.org.

[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 requested

Comment:

The response requested is that the sponsors develop a habitat M&E plan for representative sites. The habitat and passage improvement plan should coordinate closely with the Tribal fish M&E program. A clearer explanation of the details of the evaluation provided via the monitoring project (200810900) is required.

Assessment and rehabilitation components should proceed with some improvements identified here. There is a need to review the life history of resident rainbow trout and assess the limiting life stage by estimating abundance and survival through each stage, then determining which factors are responsible for this limitation. The rehabilitation effort should then focus on these limiting factors, and evaluate the treatment effectiveness. Linkage to species and site-specific life histories, habitat use, and migration patterns is needed to relate these to limiting life stages and limiting causes through assessment. For example, monitoring of resident fish via snorkel or trapping in select treatment and control sites should be possible.

Application of EDT to resident streams will be a challenge, but engaging professional assistance will be useful in continuing this assessment process. Results may be applicable to other resident fish streams.

See the ISRP'S programmatic comments on fish stocking.

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

The purpose of the proposed work is to protect and enhance stream habitat to benefit redband rainbow trout on the Colville Confederated Tribes reservation. These items were adequately addressed in the proposal and consisted largely of a process of inventory and assessment towards rehabilitation works in resident fish habitats within tributaries to Lake Roosevelt.

Evidence of a science-based approach was clear from the references listed, and a procedure for establishment of priorities was defined. The sponsors will follow an approach based on the primary scientific literature on watershed and stream habitat restoration. Their general approach is first to conduct a systematic habitat inventory and assessment and then, based on the findings of the inventory and modeling, they will prioritize sites for enhancement work. The rehabilitation options were, nonetheless, a list of tools, some of which will require detailed assessment, development, and experimentation, such as planning and monitoring, while others, such as nutrient addition and fencing will not. A guiding document was also referenced, and there was good indication of underlying ecological concepts and processes towards a sequenced plan for rehabilitation works.

The sponsors provide a logical, systematic, step-by-step approach for conducting inventory, assessment, and prioritization. The ISRP is pleased to see such a thoughtful approach. However, effectiveness and status and trend monitoring should be discussed in more detail. Justification for relying on results from other projects was inadequate. There is a need to more completely define an M&E plan. Linkage to species and site-specific life histories, habitat use, migration patterns and similar is standard procedure, and the sponsors need to link these to limiting life stages, limiting causes, and more thorough assessment, prescription, rehabilitation, and experimental evaluation and truly adaptive management.

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

This habitat project has been ongoing for over twenty years, so it may seem odd that habitat inventory, assessment, and prioritization had not been done. In fact it has, but the sponsors assert that previous work was done in a “haphazard” manner and they discuss its many difficulties. The current Project Manager began working for the Tribe in 2011. The ISRP, in our review of the 2007-09 proposal, seems to concur with the sponsors: “Reviewers continue to maintain a position (as detailed in ISRP preliminary comments) that past results are below a standard of adequacy in terms of quality and quantity of efforts to benefit fish when compared with similar projects throughout the basin.” The sponsors assert that, because of these difficulties, habitat inventory, assessment, and prioritization essentially need to be done over, as though it were a new project. The ISRP agrees.

The previous assessments and rehabilitations, as well as status and trend monitoring since 1990 were failures. Perhaps introduced coastal rainbow trout confounded previous analyses, but it was unclear if these introductions will continue into the future. Salmon carcass or carcass analog additions of the past were inadequately evaluated for fish response, and showed no significant difference in invertebrate response. The record of past accomplishments seems relatively good, but a poor record of evaluation is evident, thus few useful lessons were learned. Poor statistical power was present in several of the post-treatment evaluations. This lack of learning from previous efforts emphasizes the need for an effectiveness evaluation in

such projects. Previous efforts were summarized in tables, and some results analyzed, which indicated no statistically significant differences. The suggestion is that new staff and management will correct previous inadequacies and follow a better science-based approach, as described. The content of the proposal suggests this will be the case, through an improved focus on habitat protection and rehabilitation. However, there were inadequacies in the section on status and trends monitoring and there is a lack of a solid RM&E plan. Adaptive management will not be possible without these evaluations. The sponsors currently do not plan to monitor a response in fish habitat or populations within this project, but such monitoring is necessary.

There is need to add N and P to the list of water quality monitoring parameters, as well as monitoring for toxics and contaminants.

ISRP Retrospective Evaluation of Results

See comments above. This is a renewed effort.

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

The sponsors' discussion of emerging factors is exceedingly brief and sheds no light on how factors such as climate change will affect their watersheds and streams, and how their work will help lessen these effects. Genetic introgression with non-native coastal rainbow is mentioned as a problem, but little is said about how the work will help resolve the introgression problem.

The sponsor's comments on RM&E are somewhat perplexing. They will do no status and trends or effectiveness monitoring but will instead "rely on other M&E efforts" like CHaMP and ISEMP. It would have been helpful if the sponsors explained exactly how the results of these other M&E efforts will be used in lieu of their own M&E and why this is justified. In other words, what does "rely on" mean? At this point it is uncertain whether results from ISEMP and CHaMP will be applicable to this project and when they will be available. The sponsors should ensure that monitoring and evaluation occurs on at least on some representative sites.

4. Deliverables, Work Elements, Metrics, and Methods

The Deliverables provide reasonable steps toward accomplishing the objective of habitat inventory, assessment, and prioritization of projects. Methods are derived from standard protocols, for example CHaMP and ODFW protocols, and appear sound, but see the comments above regarding M&E.

Lake Roosevelt White Sturgeon and Burbot

[200811600](#) - White Sturgeon Enhancement

Sponsor: Colville Confederated Tribes

ISRP recommendation: Response requested

Comment:

A response is requested that identifies the coordination and collaboration with 199502700. A diagram that clarifies which project is responsible for which task is needed. The ISRP cannot determine if duplication is present.

The variety of actions proposed in this document, such as physical mapping/modeling and contaminant monitoring requires subcontractors, but most of them have not been identified nor have they provided specific information on methodologies. The response should provide information about who is conducting the work and what specific methods will be used.

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

This proposed project responds to objectives in a number of regional plans and programs including the NPPC Fish and Wildlife Program (2009), the Spokane Subbasin Plan, the Upper Columbia White Sturgeon Recovery Plan, the MERR Plan, and the Lake Roosevelt Guiding Document.

The technical background is detailed and provides good background information, citing many references.

There are 2 objectives for this project.

- OBJ-1: Monitor the status and trend of the Transboundary Reach white sturgeon population.
- OBJ-2: Identify factors limiting natural recruitment of white sturgeon in the Transboundary Reach.

The level of detail is adequate for describing what will be done, but not how the elements will be achieved. For that we need to see some fairly detailed methods.

The experimental approach involving the collection of larvae is an important approach. However, given that somewhat high recruitment was observed in 1997 when high flow coincided with spawning, it seems that flow should be a key hypothesis to test, if feasible. Ideally, flow should be manipulated to determine the extent to which flow manipulation can

influence recruitment. In the absence of the ability to alter the flows, the capture and transport approach is reasonable.

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

This section does a good job of outlining the history of activities on sturgeon related to 200811600; it also applies nearly verbatim to 199512700 with nearly the same text used in both proposals.

ISRP Retrospective Evaluation of Results

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

This project will coordinate with and share data with a fairly large number of other related BPA projects.

Potential future effects of non-native species and climate change on white sturgeon are discussed. Tagging protocols and types to be used were detailed.

It is difficult to understand if activities listed in this proposal do or do not overlap with 199502700.

4. Deliverables, Work Elements, Metrics, and Methods

Although the broadband sonar work does show some promise for identifying surgeon, the high number of false positives in Brundage and Jung (2009) made it difficult to apply accurately. This problem may be greater in Lake Roosevelt, especially for certain sizes of fish. At this time, and based on results of previous work, it is not clear how well this approach will work. As described, in terms of field evaluation, a small test is a more appropriate start.

For the stock assessment work, it is unclear how this proposed work and that outlined under 199502700 are to be divided up. It appears that there is considerable duplication of effort. This relationship should be clarified.

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

The sponsors state that "In order to evaluate the larval transport/habitat mis-match hypothesis, we propose to conduct hydrographic surveys of the upper Roosevelt Reach to characterize geomorphology, substrate typology, and hydrology. Following data acquisition, we will subcontract the development of a hydrodynamic model, modeling of dynamic habitat conditions (velocity, depth, temperature) under various hydro-operation scenarios, and

multivariate statistical analyses to determine relationships between habitat, hydro-operations, and historic recruitment." This is a large undertaking that will be mostly, if not totally subcontracted, yet no subcontractors are identified nor their methods described. This component should ideally be written up *for this proposal* by collaboration of the sponsor and a willing subcontractor. The same approach limitation occurs for the efforts to assess bioaccumulation of toxicants. No subcontractor is identified and no methods outlined. Reviewing the literature without outlining proposed methods in the proposal is not adequate. For the heavy metals assessment, a potential subcontractor is at least identified (USGS) although they provide no details, hypotheses, or methodologies.

[199502700](#) - Lake Roosevelt Sturgeon Recovery

Sponsor: Spokane Tribe

ISRP recommendation: Response requested

Comment:

1. Results are lacking for 2009-2011. Annual reports are behind schedule. Two or three years of data may change the direction and rationale of the study. The sponsors should provide a summary of recent results to the ISRP for review.
2. More rigorous and detailed methods and approaches are needed for several of the tasks outlined, specifically describing how the field work will translate into answered questions. Refer to the next paragraph for issues to address in the response.

Despite a reasonably sound and useful overview of sturgeon problems in this portion of the basin, several items in the proposal are in need of clarification. First, although the need for more understanding of the recruitment failure is well articulated and on target, designing studies to address this issue is an extremely difficult process and requires a more detailed, critical approach than is outlined here. The goals of the recruitment failure work are laudable. However, because of a lack of detail provided in the proposal, the ability of the proposed work to answer the key questions and meet those goals is very questionable. For example, it is not enough to answer if some sturgeon are eaten; it must be shown that this is a cause of the recruitment failure. Similarly, it is not enough to look at some fish food habits and invertebrates; it needs to be shown objectively that these factors are a cause for the recruitment failure. These are difficult questions to answer. Detailed study approaches are needed.

3. Information that details how work elements proposed under 200811600 and this project are to be divided up should be provided in the response.
4. A description of the expertise and specific roles of personnel should be provided so responsibility for every project activity is clear.

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

The Lake Roosevelt Sturgeon Recovery Project (LRSRP) is an ongoing project implemented to monitor population status and conduct recruitment failure research on white sturgeon in the Roosevelt Reach of the upper Columbia River. The primary goal of the project is to conserve and restore white sturgeon in Lake Roosevelt and the upper Columbia River. Their hypothesis is that sturgeon cannot get from the hiding to rearing life stage due to contaminants and predation. This project is closely linked to project 200811600.

The significance of this project is described as responding to many regional plans and programs including: the Lake Roosevelt Guiding Document and Management Plan, the Upper Columbia White Sturgeon Initiative and Recovery Plan (2002), the NPPC Fish and Wildlife Program (2009), the Spokane Subbasin Plan, the MERR Plan, and others.

The technical background is described in the Problem Statement and is extensive, contains many good references, and provides sufficient detail regarding the current status and problems of white sturgeon populations in the Columbia River Basin. Past work is well described.

The objectives are listed as:

OBJ-1: Prevent further reduction in upper Columbia River sturgeon distribution, density and genetic diversity by implementing LRSRP/UCWSRI long-term measures.

OBJ-2: Implement research examining hypotheses to determine the cause of upper Columbia River white sturgeon recruitment failure.

These objectives are too general. The deliverables which follow, however, are the work elements and are at a reasonable level of detail.

Even though the importance of rebuilding white sturgeon in the Upper River is well documented and well-justified in this proposal, some details remain vague. The intent to "rebuild the natural age-class structure lost during the recruitment failures of the last 30 years (UCWSRI 2002, Recovery Plan Measure 5.5.3)" raises the question of whether this historical age structure is well-known, or is it just assumed that recruitment occurred every year or nearly every year? The data in Figure 2 demonstrate the lack of recruitment very clearly but do not necessarily indicate steady recruitment of the past. It is also not separated by sex, so with

sexual size dimorphism of sturgeon, it gives little indication of actual yearly recruitment. Care must therefore be used in designing the stock composition target that is part of the rebuilding effort. There seems to be no evidence that recruitment in this section of the river was necessarily a yearly event or even very consistent.

Regarding the goal of 1000 mature individuals in an approximately 1:1 sex ratio at maturity, there will of course not be such a sex ratio at maturity because the males will mature several years before the females so there will be more mature males from a cohort starting at a 50-50 sex ratio.

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

Overall, the sponsors did a nice job providing the status of sturgeon populations for this part of the system. Accomplishments are adequately summarized in the proposal. However, there has been a serious lack of reporting since the last ISRP review of this project. Completed reports are lacking for three recent years. Although the ISRP lauded the reporting in the previous review, the major lapse in reporting since then is cause for concern about project direction.

Regarding growth, the authors reported that "the estimate of growth co-efficient, K, was substantially greater in magnitude, and resulting growth trajectories predicted that sturgeon in the Roosevelt Reach attain larger sizes at younger ages than observed in other areas of the Columbia River (Howell and McLellan *in prep*; Figure 5)." It is confusing as to why the growth of the Lake Roosevelt fish would be faster than others but from Keenleyside slower than the others. This does not appear to make sense. Clarification would be helpful.

ISRP Retrospective Evaluation of Results

The sponsors present a thorough review of sturgeon activities to date and do a reasonable job of focusing in on the knowledge limitations remaining. There does not seem to be a 2009, 2010, or 2011 Annual report, and there does not seem to be much, if any, history of refereed publications resulting from this long project. The ISRP will expand on its retrospective analysis following the response.

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

The sponsors provided a good description of how this project relates to and coordinates with many other BPA projects plus state and Canadian programs.

Potential limiting factors are identified in the review section. There is a general description of how the sponsors are aware of emerging limiting factors such as non-natives and predators.

Adequate answers were provided to the tailored questions. Tagging descriptions were provided in good detail. Database development and sharing is described in reasonable detail.

It is not clear exactly who is doing the work. There is no recent annual report to clarify this issue. The sponsors state, "Stock assessment study design, analysis, and implementation will be led by the Spokane Tribe Lake Roosevelt Sturgeon Recovery Project (1995-027-00) in Washington and by BC Hydro in British Columbia. The CCT, under the White Sturgeon Enhancement Project (BPA project 2008-116-00), will provide a support role in population monitoring by providing a field crew, equipment, and technical advice. CCT participation will help increase sampling effort, and sample sizes, to improve precision of capture-recapture abundance and survival estimates, as well as indices of growth and condition to facilitate inferential statistical analysis." The one person mentioned as involved in this study is from neither entity but from WDFW, even though this is a Spokane Tribe proposal. The roles of the participants in achieving each objective are unclear and need to be clarified. Who exactly is doing various portions of this work?

Some duplication appears to occur in 200811600 with regard to database management. Both agencies have sizeable budgetary resources dedicated to this effort, although it is the lead of 2008-116-00. The roles here need to be more clearly defined. We would request a diagram showing how work elements proposed under 200811600 and this project are to be divided up. There seems to be some duplication, and a diagram may show otherwise.

4. Deliverables, Work Elements, Metrics, and Methods

Details of several work elements are not clearly articulated. For example, regarding predation: "Under the recruitment failure hypotheses assessment completed by the UCWSRI, several potential proximate mechanisms have been identified as potentially limiting survival of white sturgeon in the recovery area. The LRSRP proposes to examine predation on white sturgeon early life-history stages (ELS) by conducting diet analyses on predators collected from the transition zone from July through October using a combination of short duration gill net sets and by trawling with sampling being stratified by depth and by time of day." This approach intends to sample fish and look at stomachs, but it is not clear how the presence or absence of sturgeon will be translated into a quantitative assessment of the effect of predation and therefore on recruitment failure. The collection of the data is much more direct than the translation of the results into a predation effect on recruitment failure, and the approach should be described in more detail.

Similarly, with regard to food limitation, the sponsors state, "We also intend to compare histology of post-feeding stages of white sturgeon collected during field surveys with reference specimens to identify starvation effects in wild fish, thus determine the role food availability plays as a limiting factor in sturgeon survival." Has this approach been used successfully elsewhere? Please provide background and references.

Although year class strength has at least tentatively been associated with higher flows, it does not seem that any recommendations have been forwarded to test flow augmentation during late spring early summer to improve natural reproduction and recruitment. Has this topic been adequately investigated? Have recommendations been made?

There may be some value in using otoliths to find hatching dates for larval fish.

More details are needed of the contaminant work to be performed and the protocols and methods.

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

The protocols and methods have been entered in MonitoringMethods.org. The basic protocols and methods were fairly complete and the level of detail for the methods is almost sufficient to be able to replicate the study data collection. Methods outlined in these sections often do not greatly exceed in detail that presented in the proposal. More details of the proposed experimental designs for predation should be provided. What might be the role of sculpins and how might it be evaluated?

Under food resource availability, no details of methods are provided. How can sampling some stomachs clearly lead to conclusions regarding possible "starvation"? Have the sponsors clearly visualized and laid out how the starvation hypothesis can be evaluated?

[200737200](#) - Lake Roosevelt Sturgeon Hatchery

Sponsor: Spokane Tribe

ISRP recommendation: Response requested

Comment:

The sponsors provided a reasonable rationale for initiating a white sturgeon conservation hatchery Step Review. The ISRP response request is for justification that anticipated production cannot be met with existing capacity at Sherman Creek or other neighboring facilities.

Sufficient justification of the lack of recruitment is provided in support of a request to initiate the Three Step process. However, there is no justification for the planning of a hatchery based on the need for extra capacity. With a documented history of hatchery production at Sherman Creek and enhancement in the transboundary reach, recruitment limitation does not *by itself* seem adequate justification for planning another hatchery. Although detailed justification for the hatchery in terms of numbers of fish to be released, target goals, expected mortality rates to maturation, etc. are finalized in the Step process, it would seem appropriate if some of the

basic numbers were developed in this proposal to confirm that there is a shortage of sturgeon rearing capacity at Sherman Creek and elsewhere for supplying the transboundary reach. It seems that more than 3,000 sturgeon were produced and released last year.

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

This is a proposal to fund a planning process potentially leading to another sturgeon hatchery in the upper Columbia Basin.

Significance to regional programs: The linkages to the NPPC Fish and Wildlife Program, Lake Roosevelt Fisheries Guiding Document, the Upper Columbia River White Sturgeon Recovery Plan, the Spokane Subbasin Plan, and other management plans are reasonably presented and summarized. Conservation aquaculture is identified as a recommended strategy in the Upper Columbia White Sturgeon Recovery Initiative, and many state and tribal agencies are participants along with US and Canadian national level agencies. There is no mention of whether this recovery initiative has been peer reviewed, and whether it has been formally approved by the participating entities. Until the recovery plan is fully vetted, its status as a forum for guiding and justifying an artificial production strategy seems premature. The sponsors' response should describe the status of the recovery initiative.

Technical background: The summary of studies of white sturgeon status in the Columbia River above Grand Coulee and the hypothesis that recruitment limitation is due to an altered hydrograph owing to dams and reservoirs in Canada is adequately presented. The hypothesis of the primary limiting factor is consistent with white sturgeon investigations elsewhere, for example, the Snake River in Idaho. The background would be improved with additional information on the status of sturgeon conservation successes and failures using artificial production. Step 1 of a Master Plan should include this information.

The technical background (Problem Statement) is extensive and covers the status and recruitment failure of white sturgeon populations in this area well.

The overarching objective to provide a more normative age structure for white sturgeon along with conserving extant genetic diversity is reasonable and well stated. There is a need, however, to quantify these objectives. What are the goals for abundance and age structure? What is the goal for preserving genetic diversity? Many details would be expected in Step 1 or earlier; however, no information is provided here.

The potential for using wild-caught juveniles is an important opportunity and needs to be developed more fully.

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

The problem statement provides a summary of past investigations. The development of a sturgeon Master Plan is waiting for the completion of investigations of genetic diversity. It would be useful in the Master Plan Step 1 document to identify all the data that would ideally be available for development of the plan, and then identify the status and confidence in the data that is available in each category.

Available evidence indicates that the sponsors have coordinated closely with the CCT and WDFW to reach agreement on goals for a conservation hatchery. The organization appears to be in place for initiating a Step Review process. However, the relation to other specific hatchery efforts by other tribal and non-tribal entities in the basin is not well explained in the proposal.

The problems with recruitment in the Lake Roosevelt population are well outlined in the proposal. Also, the ability to sample wild, young-of-the-year fish provide an unusual, and perhaps unique at present, capability to evaluate sturgeon artificial propagation from a different perspective than broodstock collection. This point should perhaps have been raised more prominently in the proposal.

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

Overall, responses to questions were adequate. The sponsors proposed effort appears to be coordinated with other similar BPA projects.

There was no discussion of potential future emerging limiting factors such as from adverse interactions with non-native species or effects of climate change. This should be added.

It would have been useful to clearly state and provide some evidence that that rearing capacity for sturgeon was limited, and that no space is available at Sherman Creek and other facilities. Data are presented on the releases from other hatcheries in the reach, but insufficient discussion ensues of the inadequacies of those facilities to meet production goals.

4. Deliverables, Work Elements, Metrics, and Methods

The draft Master Plan and subsequent step elements generally appear consistent with the three step process. The proposal states in a number of places that a Hatchery Genetic Management Plan (HGMP) will be developed for issues not already covered in the recovery plan. This is inconsistent with the format of HGMPs that the ISRP has seen for salmon and steelhead. The HGMP is a stand-alone product that appropriately covers all elements of production.

The discussion of the Master Plan appears focused on evaluating artificial production alternatives. The Master Plan needs to begin with a foundation on the stock status of the populations, the quantitative objectives for recovery including abundance and genetic diversity, and then evaluate options for achieving the recovery including artificial production options. Once artificial production is established as a reasonable strategy, facilities to accomplish the strategy can be evaluated.

The Deliverables identified were all related to Step Review process.

Although the vast majority of the funding requested is for sub-contractors, there is no indication of who these contractors are or if they have been contacted or involved in project coordination.

[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?

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 requested

Comment:

CDA Trout Pond Synthesis

Response Requested

1. Provide assurances on QA/QC for triploidy in rainbows.
 - What percent of the fish are sterile, and how is this percentage verified?
 - Are the batches certified?
 - What is the process for ensuring triploidy?
2. The response should justify the need for any additional ponds.

Overall, the project appears reasonable and justifiable, even if there is not yet fully adequate information on total usage and angler satisfaction. We would like to see testing data for the triploid fish to ensure that 100% are sterile, since many non-native species invasions have occurred from ponds like these when they are flooded. Other problems include pond banks breaking and humans moving fish illegally.

There is not sufficient information provided to justify additional ponds, and there is no design presented in this current proposal to address this issue, though a survey is mentioned as one method to obtain information on existing and potential demand for additional stocking. If so, a qualified independent contractor needs to be identified and asked to provide a survey design to answer the supply/demand question under a funding request for this current proposal.

The current stocking protocol of so many fish of large size could create demand that would never be met with wild fish, even if they were restored. It might be better to provide smaller fish and make clear to anglers that a similar catch rate is unlikely to occur in natural streams except under pristine conditions.

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

The proposal is reasonably justified as a recognized substitution strategy to compensate for lost anadromous fish. The rationale for providing meaningful harvest opportunities that take pressure off of native stocks is a reasonable approach and is widely used in various lakes throughout northern Idaho.

Significance to Regional Programs: The stated goal is to reduce angling pressure on native resident fish populations, which are bull trout and westslope cutthroat trout. However, the goal of providing anglers the opportunity to harvest 5 fish per trip, of which one is over 16" could create expectations that cannot be met in the future by wild fish, even when their populations are restored. Given this expectation, put-and-take fishing from ponds would be a required commitment of funds for the foreseeable future.

This concern with angler expectation could be addressed several different ways. One way would be to plant smaller fish that more closely resemble the size of wild fish in the adjacent geographic area. This would perhaps also result in cost savings due to a shortened rearing duration for hatchery-produced fish. If this approach is not deemed socially acceptable, then anglers visiting the ponds can be educated using appropriate signage that wild fish will be smaller than the fish stocked in the put-and-take pond. Either way, the put-and-take fishing from these ponds would be a required commitment of funds for the foreseeable future.

Problem Statement: The problem statement is adequate.

Objectives: The same concern about the long-term effects of the objective applies, as described above.

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

The general activities and accomplishments since the project's inception are well described. The main shortcoming is of course the lack of an effective creel census to scientifically and quantitatively verify the benefits of the program to date.

Accomplishments: Past accomplishments are adequately described.

ISRP Retrospective Evaluation of Results

The proposal's Major Accomplishments section describes many improvements to the CDA trout ponds that maximize their ability to sustain fish and provide quality rearing habitat. Ponds were augmented with wells to supplement existing spring flows in 2009 and 2010 and were fitted with wind-driven aeration devices with electric backup to increase dissolved oxygen levels at critical times.

Public access has been improved at each site sufficient to allow handicap access, and portable bathroom facilities are rented and placed at each site during the main fishing season. The ponds are also routinely groomed and mowed to provide safe access for anglers. Ponds are also regularly monitored and policed for garbage and trash, which is collected for disposal.

The ponds have been regularly stocked with hatchery-reared rainbow trout dating back to 1996. Beginning in 2009, all planted fish have been triploid stock to further minimize the potential for unintended interactions with native trout.

Stocked triploid trout have ranged from 1.5 – 2 pounds with some larger fish being planted in advance of fishing derbies, which are held regularly. These stocking levels have supported no less than 6,563 angler visits since 2004, ranging from 396 – 1,148 visits annually (Table 1). Total project expenditures during the period FY2007-2011 were \$224,114. During this time 40,140 lbs of fish were purchased and stocked at a total cost of \$144,504 (\$3.60/lb) and the costs for administering the project and completing improvements at the sites totaled \$79,610.

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

Response concerning project relationships adequately explains that related projects are focused on habitat restoration and native fish restoration. The CDA Trout Ponds are used for substitution mitigation and provide angling opportunities while many streams where native fish are recovering are not presently available for fishing.

4. Deliverables, Work Elements, Metrics, and Methods

The deliverables call for stocking 1.5-3 lb fish, and some 3-5 lb fish. If future wild fish resources are unlikely to reach the 3-5 lb range, then it would seem wise to limit the number of these fish stocked so as not to create future expectations that are unreasonable. Public dissatisfaction, based on erroneous assumptions of potential wild fish size, could erode public support for present restoration activities. Likewise, more 1-2 lb fish could be raised for the same cost of feed, and provide more angling opportunity for less cost.

The sponsors propose to "evaluate the need for additional put-and-take ponds within the Project area to facilitate a more even distribution of stocked fish across the system, making harvest opportunities more widely available and allowing for greater flexibility in applying stocking strategies to meet the stated objectives for this project. The evaluation may include an angler satisfaction survey determined through direct mailings to the Tribal membership and fishing permit holders to better gauge fishing pressure/demand and a consideration of economics." This description is very vague. Angler surveys will need to be developed with care, since anglers can be predicted to ask for more and larger fish under most circumstances.

Although there may well be considerable additional demand for additional fishing waters that exceeds current supply, it is especially important that this determination be made using an objective, scientifically rigorous design. That is not provided in this proposal. High usage during a fishing derby, as clearly documented, does not get at the issue of overall demand. Ideally, since most fisheries biologists are not accustomed to designing such studies, it is typically best if

such a study is designed and implemented by an independent contractor experienced in such supply/demand surveys. This might involve a survey of the populace at large and a creel census. It would be highly beneficial if a qualified independent contractor were contacted and asked to provide a survey design to answer the supply/demand question under a funding request for this current proposal.

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

The sponsors state, "A better indication of harvest was obtained prior to 2006 when ponds were periodically sampled with a beach seine using mark-recapture methods (Burnham et al. 1987) to estimate the number of fish remaining 30-45 days following stocking events with a known number of fish. During six of these sample efforts, estimated harvest averaged 90.4% of stocked fish (Peters and Vitale 1998; Lillengreen et al 1996, 1998)."

This approach may be better than their other methods, but it has some real shortcomings. For example, it is not reasonable to assume that because the number of stocked fish has decreased by 90% over the time period, that 90% were harvested by anglers. Fish reared in hatchery ponds typically drop in numbers from predation and other mortality factors, often unseen by those managing the pond. This example underscores the need for a reliable creel census.

Another concern relates to whether all triploids stocked are actually triploids, and hence sterile. Has this been tested? If even a few are not sterile, then they pose a risk of invasion into the system.

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.

Pend Oreille Subbasin

199404700 - Lake Pend Oreille Kokanee Mitigation

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation: Response requested

Comment:

The Lake Pend Oreille fishery has received a lot of attention because it focuses on the historically large non-native kokanee population, which is in decline although apparently recovering slowly, as well as a trophy rainbow and bull trout fishery, which is also depressed. Many restoration actions are occurring simultaneously, and it will be difficult to determine the efficacy of individual program elements on both the harvest and conservation objectives. Nevertheless, this project has contributed valuable information on the ecosystem processes supporting the lake's salmonid populations over the last decade, and it is likely to provide useful data in the future.

The ISRP requests clarification on several points before providing a final recommendation.

1. What is the likely role of lake whitefish in reducing abundance of *Mysis*?
2. Additional justification is requested for adding spawning gravel to select shorelines to increase kokanee spawning.
3. A summary of what has been learned over the past 15 years of management actions in the context of the overall objective of increasing harvest is needed.
4. What has been learned from Lake Pend Oreille research that has helped IDFG balance conservation and harvest objectives?
5. What are likely reasons why rainbow trout have increased in abundance by 50% from 2009 to 2010?
6. Other questions and concern are embedded in the comments provided below. The ISRP suggests the sponsors examine these items as a response is prepared.

Apart from specific questions, the ISRP feels the restoration of native resident bull trout and westslope cutthroat trout in Lake Pend Oreille deserves additional attention. This proposal devotes little attention to these species, even though other proposals in the region do. For example, there may be adfluvial populations of cutthroat trout that could or do provide important sport fisheries, and management could consider restoration actions in Lake Pend Oreille's tributary habitats. Ongoing lake trout suppression would also benefit these other native species, but increased kokanee production would not likely benefit whitefish or most cutthroat trout.

See the ISRP's programmatic comments on fish stocking.

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

This project has been in place for a long time, and the plan of work was reviewed by the ISRP in 2006, when it was given a favorable assessment. It is important to note that Lake Pend Oreille represents a large natural lake with a highly altered fish community. Of the three primary focal species, two are not native (kokanee and Gerrard stock rainbow trout) and the third (bull trout) is primarily of interest from a conservation standpoint, not a harvest standpoint. Additionally, the food web in Lake Pend Oreille has been strongly affected by the invasion of a non-native zooplankton (*Mysis diluviana*), which has acted as a competitor with kokanee and also helped to fuel the expansion of the non-native lake trout population, a significant predator on mysids as well as kokanee and juveniles of other salmonid species. As with many large lakes with increasing human development in the watershed, management challenges in Lake Pend Oreille are complex.

The project sponsors have done a good job of describing the relationship of this project to other regional resident fish management efforts, and their description of the technical background was also well done.

The proposal makes clear that recovery of the Pend Oreille fishery is the project's primary goal. Conservation of the two native salmonid species, bull trout and westslope cutthroat trout, is acknowledged in the work, but the primary emphasis is either research that addresses factors limiting kokanee and trophy trout recovery or habitat improvements that benefit kokanee reproductive success, such as addition of spawning gravel. Reduction of the lake's population of lake trout, generally viewed as a negative influence in the Pend Oreille ecosystem, also figures prominently in the work.

As mentioned above, management challenges are complex and restoring a desired balance of species, that is a balance that favors angler harvest of kokanee and trophy trout, will require that a number of potential limiting factors be addressed simultaneously. This will essentially mean a trial and error approach, and that is what IDFW have been doing for the last 15 years. A strong monitoring program will be essential for detecting the signal of programs such as lake trout reduction, winter lake level manipulation, kokanee stocking adjustments, and possible nutrient additions.

The role of lake whitefish in reducing abundance of *Mysis* is mentioned once but is not addressed again. Could this be important?

The objective to increase kokanee spawning success by adding spawning gravel to select shorelines needs additional scientific justification. When gravel is added in streams or lakes without addressing the hydrogeomorphic factors that create clean spawning gravel, for example upwelling and wave action, the usual result is that the gravel simply becomes unsuitable, requiring either more gravel or manual cleaning, all at great expense. Additionally,

we wonder whether studies of kokanee egg survival in the laboratory and in boxes buried in lake substrate will answer the question of interest: what conditions are necessary for high survival, and how does survival vary with sediment deposition? It is clear that survival should be low when sediment is high, but at moderate levels of sediment, it is not clear whether human-placed egg boxes or eggs monitored in the laboratory will mimic those from egg pockets placed by female fish sufficiently to generate useful data.

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

The proposal does a good job of summarizing the administrative accomplishments of the project. More details could have been given on results to date. A single graph was presented showing lake trout abundance from 1999 to 2008 but with only 5 years sampling data, while it would have been helpful to have seen similar summaries as graphs or tabular data for the other salmonid species. Over the last 15 years a variety of management actions have been implemented such as lake trout netting, experimental winter drawdowns, hatchery operations, and angler programs. A summary of what has been learned from these actions in the context of the overall objective of increasing harvest is needed. It does appear that predator control has had some success, but what about other efforts? Also, there was little mention of warm-water fishes. Have these introduced fishes had negligible impact on focal species in other areas of the lake?

More information is also needed on how the results of the Lake Pend Oreille research have been incorporated into management changes. In particular, the potential for conflict between *conservation* and *harvest* objectives needs additional clarification. What has been learned from the research that has helped IDFG balance these two important objectives?

Other questions on accomplishments include:

Why have rainbow trout increased in abundance by 50% from 2009 to 2010? Is this difference significant, or are the confidence intervals around these estimates wide? If the difference is real, and not owing to high variability, then what is the explanation – high recruitment rates of small fish?

Lake trout marking – lake trout are reported as being marked in 2011 to estimate abundance by mark-recapture, but in the rest of the proposal all the lake trout were removed. When and where were these lake trout marked, how many, and of what sizes?

Management changes have focused on better targeting lake trout removal efforts in response to new data, and thereby reducing bull trout bycatch. The project sponsors acknowledge pressure from kokanee and rainbow trout anglers to increase abundance of these fishes and expand the fisheries, but how has this pressure driven management decisions as opposed to a focus on conservation and restoration of resident native fishes?

ISRP Retrospective Evaluation of Results

It is clear that the food web dynamics in the lake are changing, but it also seems clear that the primary focal species have not returned to a level of abundance that support harvest objectives. There is no question that the studies proposed here will help address some of the most important problems; however, the proposal itself did not supply very many details about the results of previous management experiments, with the possible exception of the lake trout netting program. Sorting out the benefits of the various initiatives including predator control, habitat improvements, hatchery releases, and nutrient manipulations will be very difficult when they are all happening at the same time and will require very creative field experiments and analyses.

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

Because this project has a long history and Lake Pend Oreille has been intensively studied, the suite of potentially limiting factors has been adequately characterized. The project also seems to be well integrated into other work taking place in the Pend Oreille watershed.

The questions being asked specific to kokanee restoration seem appropriate, for example, where do lake trout spawn and at what locations in their daily or seasonal movements will they be particularly vulnerable to capture? Additional work is needed on understanding the role of winter drawdown in regulating kokanee reproductive success, whether physical addition of gravel along shoreline spawning areas can be cost-effective, and whether deliberate nutrient supplementation can achieve desired food web benefits. Fortunately, the proposal contains elements that address these matters.

The proposal did not supply much detail regarding how salmonid releases from hatcheries would be carried out to maximize learning opportunities nor did it give many details about existing or planned monitoring efforts except for the acoustic tracking work on lake trout, which was adequately covered. It was also unclear how project staffs are exchanging information with other RME practitioners in the region, although the explicit call for an annual science review meeting to discuss results is an excellent idea.

4. Deliverables, Work Elements, Metrics, and Methods

The ISRP had several questions relative to project deliverables:

The proposal did not specify metrics and indicators in very much detail for some of the deliverables. Often the metrics were described in general terms, but not in a way that particular measurement protocols could be identified or assumed. Many of the protocols and methods in

MonitoringMethods.org were in draft form and did not contain sufficient detail for scientific review.

The proposal also lacked information on what would be considered reference conditions for some of the deliverables. For example, if gravel is added to a kokanee spawning area, what would the reference condition be, pre-gravel enhancement egg survival or egg survival in an adjacent spawning area without gravel addition?

Can annual exploitation rates be accurately determined if only 30 lake trout are tagged with acoustic tags per year?

We were unsure why a gear efficiency study is necessary. Would it be more cost effective to buy a bigger boat and trawl and simply increase efficiency this way?

[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 Pond 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 requested

Comment:

There are two separate components to this proposal. One component is directed at recovery of native westslope cutthroat trout in Goose Creek, which flows through a land parcel purchased by the Kalispel Tribe. It involves eradication of brook trout, habitat restoration, and installation of a weir to prevent return of brook trout into Goose Creek following their eradication. The other component is a resident fish substitution project to enhance a largemouth bass fishery in a slough in Box Canyon Reservoir slough on the Pend Oreille River.

The ISRP has a number of questions regarding elements within each of these components and requests a response regarding the issues described below.

Goose Creek Habitat Restoration

The first objective is to restore habitat for westslope cutthroat trout in of 3.65 km of Goose Creek, which flows through a land parcel purchased by the Kalispell Tribe. Non-native brook trout will be eradicated in this steam and prevented from recolonizing by construction of a barrier at the downstream end of the parcel. Native westslope cutthroat trout will then be

translocated to the restored part of Goose Creek to re-establish a population. This Objective is technically justified, but the ISRP requests a response to the following in order to complete our evaluation of the proposal.

1. Clarify differences between Deliverables 2 and 4, and between Deliverables 1, 3, and 7.
2. Discuss the plans for reintroduction of westslope cutthroat trout to Goose Creek and indicate when the reintroduction will occur relative to habitat recovery.
3. Explain the RM&E plan for Goose Creek.

Largemouth Bass Production and Fishery

Objective 2 is intended to establish a subsistence fishery for largemouth bass in a slough of Box Canyon Reservoir located on the Kalispell Reservation. Largemouth bass will be reared in a hatchery and stocked as fingerlings in the slough. The sponsors intend to place a screen at the mouth of the slough to prevent emigration of bass out of the slough and immigration of northern pike into it. The ISRP has a number of questions below regarding the development of a subsistence fishery for largemouth bass in the slough. Addressing these questions will help the ISRP complete their evaluation of the proposal.

1. What will be the estimated abundance and size structure of bass in the slough?
2. What is the estimated carrying capacity?
3. Will abundance of forage fish in the slough, other than added brook trout, be sufficient to support a viable bass population?
4. Will northern pike and other undesirable fish be removed or suppressed in the slough and how will this be done?
5. More information on the screening operation is needed. What types of screens will be installed and will they be sufficient to prevent movement of fish into and out of the slough under seasonal and annual changes in reservoir elevation.
6. Can the issue of mercury contamination of bass tissue be resolved, especially if mercury is bio-accumulating through consumption of forage fish. Is there a plan for monitoring mercury levels in bass and other fishes in the slough?
7. Explain the RM&E plan for the largemouth bass fishery.

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

This project addresses multiple objectives of the Fish and Wildlife Program, strategies and objectives of the Pend Oreille Subbasin Plan, and the Bull Trout Draft Recovery Plan 2002. The technical background is very well done, although the two unrelated objectives make a case for two separate proposals. The Objectives are adequate when linked with Deliverables which have specific target habitat features and target production numbers for largemouth bass.

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

The native fish component lists a series of bulleted accomplishments ranging from installing habitat structures, fencing, brook trout removal, and population/habitat surveys. It would be helpful to include some response levels and indicators of progress for habitat and westslope cutthroat trout recovery.

The largemouth bass component has a number of changes since the last ISRP review of this project including increased production of bass fry and improved post-release survival. Some indication of the level of demand, total catch, and efficiency is warranted.

Adaptive Management: The project has undergone a number of changes based in part on ISRP recommendations, past results in attempting to establish a reservoir-wide bass fishery, and impacts of the invasion of northern pike. The goal of the project is now to establish a subsistence bass fishery in a small slough of Box Canyon reservoir through outplanting fry reared in the tribal hatchery. This is a good management strategy as long as the screen placed at the mouth of the slough is effective in preventing movement of bass out of the slough and pike into it. This is a good example of adaptive management.

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

The proposal cites relationships with several other projects including: the Albeni Falls Wetlands Wildlife Mitigation Project #199206102, the Intermountain Province/Pend Oreille Subbasin Data Management Project #201102000, and the Non-Native Fish Suppression Project #200714900. All Resident Fish Project data was used for the WDFW 2009 Westslope Cutthroat Trout Status Update in 2009. In 2010, all project data was used for NetMap coverage and analysis in conjunction with the SRFB WRIA 62 Strategy update.

An important limiting factor for the largemouth bass is the increase in northern pike in Box Canyon Reservoir over the past few years. This has led to some modifications of the project such as slough screening and targeted removal of pike. Climate change and increased temperatures are also recognized as emerging limiting factors, and the plan to improve riparian shading along Goose Creek is a good response to these factors.

The sponsors state that there are no RM&E plans for this project. This is a perplexing statement. They need to monitor and evaluate the progress of their work. RM&E plans for both the Goose Creek and the largemouth bass hatchery project need to be developed. The response should discuss these plans.

4. Deliverables, Work Elements, Metrics, and Methods

For the most part the Deliverables are straightforward and present a logical approach to accomplishing the objectives of the project. A few Deliverables need clarification. Deliverables 2 and 4 appear very similar. The sponsors need to explain how they are different. The same can be said for Deliverables 1, 3, and 7. Deliverables 10-14 pertain to fingerling bass production in the hatchery. Justification for these Deliverables is contingent on a satisfactory response to the previously posed questions.

During the site visit, reed canary grass appeared to be widespread on the Goose Creek floodplain. Will there be an attempt to control this plant and how will it be done?

The sponsors should discuss their plans for reintroducing westslope cutthroat trout to Goose Creek. Will the reintroduction occur after the habitat has sufficiently recovered?

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

Protocols and methods specific to the project were not found in [MonitoringMethods.org](#).

Kootenai Subbasin

[199404900](#) - Kootenai River Ecosystem Restoration

Sponsor: Kootenai Tribe

ISRP recommendation: Response requested

Comment:

Responses are requested on the following items:

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.
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?
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?
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?
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?
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.
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.

8. If changes in the monitoring protocols are anticipated in the future the ISRP would like a description of them.
9. More details are required on the particular relationships, at the working scientific level, between this project and the other three Kootenai River proposals.

The following two references need full citations and links if available: Holderman and Hardy 2004 and Hoyle et al. 2011.

ISRP References:

Newbold, J.D., R.V. O'Neill, J.W. Elwood and W. Van Winkle. 1982. Nutrient spiraling in streams: implications for nutrient limitations and invertebrate activity. *The American Naturalist* 120: 628-652.

Slaney, P. A., B. O. Rublee, C. J. Perrin, and H. Goldberg. 1994. Debris structure placements and whole-river fertilization for salmonids in a large regulated stream in British Columbia. *Bulletin of Marine Science* 55:1160–1180.

Slaney, P. A., B. R. Ward, and J. C. Wightman. 2003. Experimental nutrient addition to the Keogh River and application to the Salmon River in coastal British Columbia. Pages 111–126 in J. G. Stockner, editor. *Nutrients in salmonid ecosystems: sustaining productivity and biodiversity*. American Fisheries Society, Bethesda, Maryland.

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

Significance: The proposal does not describe clearly enough the relationships among this project and the other major projects on the Kootenai for which proposals were submitted for this review cycle. It is connected with three other Kootenai proposals (198804900, Kootenai River Fishery Investigations; 200200200, Restore Natural Recruitment of Kootenai River White Sturgeon; 200200800, Reconnect Kootenai River with Historic Floodplain). These 3 projects should be highly integrated but there is no evidence of this level of collaboration in the proposal.

Technical background: Previous research has established the fact that nutrient availability is limiting productivity in the Kootenai River below Libby Dam. The premise of the current proposal as well as 200200800 (Reconnect Kootenai River with Historic Floodplain) is that increasing the basal productivity will increase tertiary level productivity for resident fish including rainbow trout, white sturgeon, and kokanee, for a long term ecosystem recovery of

the river's mainstem. The foundation for this project appears to be the energy budget developed by Synder and Minshall (2005) which showed that fish pooled data over several species may be limited by food. A major oversight, however, is the need for an ongoing model to guide the research and restoration. For example, it is not clear how spatially extensive the nutrient additions need to be before fish populations are reasonably restored or whether the costs will be prohibitive. Although this is an interesting experiment and the results are potentially useful, the ISRP concludes that the nutrient addition may not be feasible to maintain over the long term. In other words, nutrient addition is likely not a sustainable method of ecosystem recovery.

The ISRP noted there are no references to the success or failure of other attempts to increase fish production with long term fertilization in large rivers (Slaney et al. 1994) and small rivers (Keough, Salmon; see below) and numerous other references in the ISAB Food Web Report (ISAB 2011-1).

- OBJ-1: System-wide Biomonitoring and Evaluation of the Mainstem Kootenai River

The objectives are clearly stated and directly relevant to restoration.

- OBJ-2: Restore Ecosystem Productivity

The sponsors state, "Bottom-up productivity in the regulated mainstem of the Kootenai River was identified as a strong limiting factor to food web development in the river, ultimately resulting in reduced fisheries." Holderman and Hardy (2004) is one of the papers quoted but there is no citation given. It is noteworthy however that the foundation paper for the work recognized the confounding effect of habitat when discussing fish in the context of the energy budget (Synder and Minshall 2005, page 482).

The nutrient addition work in the Canyon Reach is not accompanied by physical habitat restoration but there appears to be an expectation that the positive effects of nutrients will extend into the braided reach where very substantial bioengineering is occurring. This reach is at the downstream end of the nutrient effect footprint. It would be helpful to have this clarified.

- OBJ-3: Provide Provisions to Restore Ecosystem Productivity to Kootenay Lake, B.C.

The lake component of the project seems to be successful. However the spawning channel is a confounding factor. The sponsors state, "While ...Figure 44. represents kokanee production that is mainly due to the North Arm (Meadow Creek spawning channel), South Arm nutrient addition has assisted with improving foraging conditions (zooplankton availability) for kokanee in the lake as a whole." Although this is an interesting experiment and the results are potentially useful, the ISRP is concerned that the nutrient addition may not be feasible over the

long term. In other words, nutrient addition is likely not a sustainable method of ecosystem recovery.

- OBJ-4: Restoration and Monitoring of Key Kootenai River Tributary Segments

This objective focuses on tributaries downstream of Bonners Ferry. The ISRP learned there are a few tributaries above the Canyon reach, in Montana, that are used by rainbow trout (RBT). Are any of these used by the RBT populations targeted for nutrient enrichment? If so have habitat conditions in the tributaries been factored in as possibly limiting?

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

Accomplishments and Results: This project has a long history and much detail on the results of studies on nutrient dynamics and trophic productivity that have been completed was presented in the proposal. However, results are not provided in a meaningful way. While the sponsors provide abundant detail on results they fail to articulate key advances in understanding the ecological system or how the data have been used to improve management. Clearly, substantial effort should be spent to synthesize the advances to date and show how they have been used to improve management.

Further, as a general comment, while this proposal is labeled as "Ecosystem Restoration" and many of the system-scale components are under investigation, there is no attempt to examine the data at the ecosystem scale. That is, no model linking it all together or to guide and prioritize the research and restoration activities is presented. A working model is sorely needed.

The project started in 1994 but achievement of results is not clear. A synthesis of results or reference to peer reviewed publications is needed for ISRP review. Most of the results that have been published are in the grey literature, and those that are in journals do not deal with the key results documenting how the fish community has responded and on what scale has the response been observed.

The sponsors state that a report is currently in progress that will update and combine previous reports from 2009 and 2010 with recent data. It would be useful for the ISRP to see this draft

It would be helpful to have more information on the migratory traits of rainbow trout, the apparent target species, as this has a bearing on how far afield nutrient addition effects are projected. Results to date show growth of RBT, as reflected by condition factor, is only being influenced in the nutrient addition reach shown in Figure 22. However the significant increase in whitefish populations and growth of their younger ages is noteworthy. It might be worthwhile to investigate the role of whitefish in the food web of the Kootenai River in some detail. This might involve more collaboration between this project and 199806500 Kootenai River Fishery Investigations. Are whitefish a forage fish for white sturgeon?

Further documentation on lessons learned relative to this aspect from other systems would be instructive. For example, a case history on a fertilization project on the much smaller Keogh and Salmon Rivers in BC showed that the effective distance of fish growth resulting from nutrient additions was on average 15 km (Slaney et al 2003). The furthest downstream monitoring station on the Kootenai seems to be 40 km. Do the sponsors anticipate fish enhancement over these 40 km? What is the role of nutrient spiraling in this regard? The concept is not mentioned in the proposal.

Responses to Past ISRP Comments: The reports being prepared for publication were not provided. At a minimum, there should be a Table with the publication title, key authors, target journal, and submission date.

Adaptive Management: The process is adequate, for the most part, but lacks a guiding model and criteria for change. How are decision-makers incorporated so as to make large scale changes happen?

The ISRP's Retrospective Report 2011 includes a recommendation on time frame for evaluating restoration projects (p. 68) which is very relevant:

"The ISRP therefore suggests that additional dialogue is needed between habitat managers, scientists, and policy-makers so that realistic timeframes can be established, and appropriate schedules agreed upon, to monitor and evaluate different types of restoration actions."

Given that this project has been underway for 11 years, it is likely the additional dialogue is required soon.

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

See above for comments on project relationships.

RME has been underway for several years, and according to the proposal an adaptive management approach reduced the number of treated sites by 50% without losing significant statistical power or representation. This assertion should be documented.

Emerging Limiting Factors: Climate and land use changes are superficially treated. There are numerous changes taking place and emerging at the local scale. The ISRP urges the sponsors to take these seriously by incorporating them into some of their planning and activities.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables and work elements generally appear to be appropriate for the project objectives. It appears that the nutrient application process, monitoring methods, and experimental design that have been used in the past will continue with this new project. However, this is not explicitly indicated in the proposal and very few details are provided about the monitoring effort going forward. This point should be clarified.

Restoring the Kootenai River and the Lower Kootenai Watershed to Pre-Impoundment

Productivity Levels: The sponsors need to be specific about whether a food web analysis will be performed, how detailed it will be, and articulate how the results will be used to improve productivity. Although positive results have been obtained locally in terms of increasing trout biomass, although not to a statistically significant level, nutrients will need to be applied broadly to significantly improve total trout abundance and growth.

Work Elements: Considering all the work completed to date, is there an overriding model being developed that guides the research and restoration activities? If not, there should be as well as a peer-reviewed synthesis of the progress to date. Further, while the goals are well-articulated, when will they be achieved? A time line is needed for each objective.

Key Personnel: The sponsors have a good level of competence. Two items of concern are the heavy reliance on private consulting firms to do the work and the lack of publications in the peer-reviewed literature. The benefits from this project would increase if central personnel made peer-reviewed publications a priority. While reports are necessary, they are not sufficient for a program of this scope and importance.

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

Monitoring has been a major component of this study and needs to continue to be the focus with the implementation of this new phase of this effort. As noted for the Deliverables and Work Elements, the proposal implies that the methods to be used will be those that have been employed in the past. But the proposal does not indicate that this will be the case. If there are any changes in sampling or project design, these changes should have been fully described in the proposal.

Some of the protocols related to environmental and physiochemical sampling are not complete on the website, thereby making it difficult to evaluate. These need to be completed in the very near future.

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

Sponsor: Kootenai Tribe

ISRP recommendation: Response requested

Comment:

Responses requested:

1. Further detail is required on the staging of the various components of restoration.
2. Specify the RM&E and adaptive management plans in sufficient detail for ISRP review.
3. Provide a synthesis and model of the existing data as justification and guidance for prioritizing project activities

This project is addressing an important habitat deficiency in the project area. However, the proposal was poorly organized, making it difficult to understand how activities were to be sequenced and the extent to which proposed actions were founded on previously collected data. There was no indication that data previously collected has been synthesized to any appreciable extent or used in a formal manner, statistical or otherwise, to guide development of project activities. Further detail is required on the staging of the various components of restoration. A flow chart or Gantt diagram would be very useful in this regard. The field visit in October provided insights into the complexities being faced by the sponsors, but these were not adequately reflected in the proposal.

RME and adaptive management components of the plan are incompletely described. The sponsors indicate that these topics are to be addressed in two documents that are currently being developed. RME and adaptive management are critical components of any restoration effort and a complete technical review of this project would require that these two plans be included with the proposal. At a minimum, the subbasin adaptive management plan should be included with the response to this ISRP review.

The ISRP requests a revised proposal that emphasizes synthesis and modeling of the existing data as justification and guidance for ecosystem scale restoration activities and that focuses on the priority activities needed to make the floodplain functional once again. This project has tremendous potential, not only locally in terms of restoring fish and wildlife, but also as a demonstration to the broader restoration community as to what is possible. Unfortunately, the present proposal will not achieve that potential.

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

Restoration of riparian wetlands along this reach of the Kootenai River would be significant to regional ecological restoration. Almost all listed species will potentially benefit from floodplain

reconnection. As an example the Meander Reach of the Kootenai River, where this project will occur, is listed as critical bull trout habitat in the 2006 BiOp.

The proposal clearly defines the historic extent and biological productivity of wetlands along the Kootenai River in Idaho and the extent to which floodplain habitat in this region has been reduced. The authors seem quite familiar with the literature on the subject matter and adequately describe the impacts of the operation of Libby Dam and altered land use on ecological processes of the study reach. The technical background provides a fairly good description of the problem and relies heavily on the Operational Loss Assessment results. It would have been helpful to provide a link to the Operational Loss Assessment as this document did provide useful information, especially for showing the changes in trophic structure along the various reaches. For example, the ISRP also found a useful presentation of the Loss Assessment at www.powershow.com/view/14ff6e-YjI1Y/Floodplain_Operational_Loss_Assessment_on_the_Kootenai_River_Watershed_Downstream_from_Libby_Dam_flash_ppt_presentation. One issue that was not adequately discussed in the proposal was the extent to which flows from Libby Dam could be manipulated to encourage more channel-floodplain interaction.

There appears to be some discrepancy between the objectives of this project and the assumptions on which other proposed projects on the Kootenai River are based. The sponsors state, "The project was originally designed to improve conditions for larval and juvenile rearing of Kootenai sturgeon and positively affect sturgeon recovery by restoring natural ecosystem functions. The project was funded to locate a site and evaluate its suitability for reconnecting the river and floodplain (Scott and Clayton 2004). The objective of this initial phase was to find a site that would provide low-velocity, off-channel refugia for juvenile sturgeon and stimulate ecological function by expanding floodplain habitats and associated trophic productivity." The Kootenai proposal that is focused on ecosystem restoration for sturgeon is based on the assumption that recruitment at the larval stage is a bottleneck, not survival of the juvenile stage, which would likely use off channel habitat provided by this project. Riparian wetland restoration is still a worthwhile objective. But the benefits for sturgeon presumed from this project should be consistent with the assumptions in the other proposals.

A significant problem with the objectives is that there is no guiding model(s) based on previous data to prioritize the research and restoration efforts. A substantial amount of work has already been done, but it is not informing the next restoration phase in a logical and quantifiable manner. The supporting text for each objective is often inadequate. For example, OBJ-3 seeks to implement invasive species control management techniques in floodplain habitats (a general objective) by 2015, but only Reed canarygrass is targeted (very specific). This objective also suggests the assumption that natural communities will outcompete Reed canary grass if native vegetation is introduced on a site. Generally this is not the case until habitat conditions that discourage reed canarygrass such as flooding frequency are sufficiently restored. In some cases,

even the restoration of habitat conditions appropriate for native species may not be sufficient to enable suppress canarygrass, and ongoing site maintenance may be required. OBJ-2 seeks to implement floodplain reconnection activities in conjunction with BPA mitigation projects 199206105 and mitigation phase of 200201100 by 2021 but the text only addresses strengthening the Tribal Fish and Wildlife Program's ability to share resources, information, and reduce duplication and costs in floodplain ecosystem restoration. Other objectives share these problems.

The reality is that the river is fundamentally different now than prior to European settlement and construction of Libby Dam. A new system has emerged, one that is not well connected to the historic floodplain ecosystem, and restoration of previous functionality requires thinking in new ways and on new scales. The proposal does not fully communicate an understanding of how this project will be linked to ecosystem responses at broader scales. While there are lots of activities taking place there is a notable lack of synthesis both in working models and in peer review publications.

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

The history of this project is thoroughly described in the proposal. The project sponsors have conducted baseline research and monitoring to understand the nutrient dynamics within lotic and lentic systems on the Kootenai river floodplain and using this information formulate the hypothesis that wetland restoration may increase nutrient delivery to the river and stimulate primary and secondary productivity. The ISRP identified several issues related to the interpretation of the baseline information:

1. The trophic analyses are quite limited as there is no mention of decomposition, organic matter dynamics, or microbial food webs.
2. The low chlorophyll a levels in water samples from lotic systems was interpreted as an indication of low primary productivity in these systems relative to lentic habitats. However, most primary production in small, flowing systems is supported by periphyton, algae attached to the streambed substrate, rather than from phytoplankton in the water column. Phytoplankton is more prevalent in lotic habitats. Therefore, the contrast in chlorophyll a levels between these habitat types may be an artifact of the sampling methods rather than an actual disparity in primary production.
3. The sponsors state (p.13) "In addition to nutrient sampling, we collected samples that represented primary producing organisms (chlorophyll a and phytoplankton taxonomy) as well as primary producing organisms (zooplankton)." Please note, zooplankton are secondary producers.

4. The proposal also states “The graphs shown in Figure 20 suggest that the increased primary production (chlorophyll a) in the lentic areas might reflect the increased nitrogen (DIN) available,” but earlier they state that data were not sufficient for statistical analyses (note lack of error bars on Fig 20).

Despite these issues with data interpretation and analysis, the conclusion that increasing the presence of riparian wetlands would be of benefit to the ecological health of the ecosystem is still valid. But it will be important to ensure that deficiencies in sampling and data analysis are addressed in RME efforts designed to evaluate the effectiveness of the Ball Creek wetland restoration project and other floodplain reconnection projects in the meander reach.

The adaptive management effort associated with this project was not adequately described in the proposal. The project appears to have some form of an adaptive learning process but the proposal does not clearly describe the structure of this process. Is there an effective mechanism for transferring RME information to decision makers? Is there a formal process for using this information to make project management decisions? How are decisions made and who makes them? The proposal does indicate that a subbasin-scale adaptive management plan is under development, and this plan will guide adaptive management efforts for all habitat restoration efforts in the project area. Presumably, these questions will be addressed in the plan. However, the adequacy of the adaptive management process for this project cannot be assessed unless this plan is a component of the proposal.

ISRP Retrospective Evaluation of Results

The results of research conducted to date in support of this project are described in the proposal, as noted above. However, it is not clear that this information has been used to full advantage. At least three key activities are missing that are essential for success: hypothesis testing, model development, and serious periodic information syntheses. Substantial information is being acquired about the system, but it is not being effectively translated into knowledge or actions that will do more than provide incremental benefits to fish and wildlife.

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

The relationship of this project to other efforts ongoing in the same area was not fully described. In particular, there seems to be considerable overlap in project objectives between this project and the large habitat restoration program proposed for this reach of the Kootenai River (200200200 - Restore Natural Recruitment of Kootenai River White Sturgeon). The project reviewed here provides details for a specific project, the restoration of Ball Creek and associated wetlands, while the other proposal for "Restore Natural Recruitment of Kootenai River White Sturgeon" describes a large habitat restoration program that will identify and implement a variety of projects over time, including the restoration or riparian wetlands. Both

this proposal and the one for the restoration program should have clearly indicated why these proposals are separate and how efforts between these two projects are being coordinated. The relationship between these proposals was only very briefly discussed. This proposal also indicates that there has been an ongoing study of nutrient dynamics in the project reach, yet no results from this effort are presented in the proposal. It would seem, given that one of the key objectives of the Ball Creek wetland restoration is to increase nutrient delivery to the Kootenai River, that these efforts would be closely coordinated. But the relationship between these projects is only briefly discussed.

The project does indicate that they will utilize hydrologic models to predict possible impacts of climate change on project effectiveness. Potential changes in winter ice conditions due to climate change or alterations in winter flow conditions were not discussed. Icing is a major driver of ecological processes in streams and shallow water areas, and winter icing conditions are influenced by alterations to temperature, cloudiness, vegetation, and water flows. There is no mention of possible impacts for increasing human population or alteration of land use over time. Also, the potential impact of invasive species, other than Reed canarygrass, was not addressed. Given that *Didymo* does occur in the system and that there are a number of other aquatic species whose introduction could affect project success, this factor should be considered.

4. Deliverables, Work Elements, Metrics, and Methods

While it is refreshing to see the project taking an ecosystem approach to floodplain restoration, it is important to proceed in a logical and thoughtful manner. Unfortunately, it appears from the long list of deliverables that the sponsors are trying to do everything at once. Further, there are deliverables that overlap as well as deliverables that should have been completed as part of previous projects or as part of the proposal preparation process. For example, CR1-4 (*Literature review and study design analysis of critical uncertainties research*) and CR3-4 (*Sampling and laboratory analysis protocol development*) should have been completed and used in the development of this proposal. Similarly, P&C2-5 (*2D floodplain inundation hydrologic modeling and USGS ground/surface water review*), a review and analysis of the 2D floodplain hydrologic modeling efforts for project 200201100, should have been completed, and the results used to develop this proposal. Most importantly, there are no priorities for the deliverables. The Deliverables aspect of the proposal needs to be revised and consolidated to show deliverables as part of an integrated research/ restoration effort. One or more deliverables should focus on a major synthesis (to be peer-reviewed) and the development of a quantitative ecosystem model(s).

The work elements proposed for this project are quite detailed but poorly organized. As a result, it was difficult to relate work elements with their associated deliverables and objectives. The manner in which the work elements were presented also made it difficult to envision how

the project is intended to be sequenced. Three work elements: IV1-3: Literature review for invasive species control management techniques; IV2-3: Experimental design for invasive species control management techniques; IV3-3: Implement invasive species control management techniques, could benefit from review of the invasive species control work described in the ISAB Invasive Species Report and ISRP Wildlife Reviews.

There is a lack of detail on the RME effort that will evaluate project effectiveness. The proposal indicates that a subbasin scale adaptive management plan is under development and that RME will be comprehensively described in this document. Only a very general description of the monitoring goals, design, and protocols is provided in the proposal. This adaptive management plan should be included with the response to the ISRP comments. Technical evaluation of the RME and adaptive management components of this proposal are not possible without this plan.

There was inadequate discussion of data management in the proposal. Data management and retention protocols are critical for an RME effort, especially for large projects like those planned for the Kootenai River and its floodplain. There also is a concern about the data management being off-site, but perhaps that will be appropriate over the longer term as data management becomes increasingly complex. The ISRP hopes this issue will be thoroughly addressed in the subbasin adaptive management plan. As noted above, this plan needs to be included as a component of a revised proposal to enable ISRP review of RME and adaptive management associated with the suite of Kootenai River projects.

As a general comment, substantial data has been collected for this project already, but little predictive understanding seems to be emerging. Basically the group is drowning in unassessed data without fully using it to generate knowledge. More emphasis should be placed on generating syntheses from these data. Application of predictive models and rigorous use of testable hypotheses/relationships in developing syntheses will help generate information useful for informing managers and guiding future RME efforts.

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

The general outline of the RME process to be used in assessing the Ball Creek wetland restoration project is very brief. A link was provided to website that was supposed to provide additional detail on the sampling methods to be employed. The descriptions of many of the methods at this site were not complete and, therefore, could not be adequately evaluated.

Some of the methods that were briefly described in the proposal did raise questions. The sponsors state, "From its inception, the Reconnect Project built in a Research, Monitoring and Evaluation (RM&E) component that estimates trophic level responses to proposed restoration of floodplain and ecosystem function. Subbasin-wide monitoring will provide a long-term baseline, plus feed back into the overall Index of Ecological Integrity (IEI), developed by the Kootenai River Floodplain Ecosystem Operational Loss Assessment Project (BPA 200201100), to

capture the contributions of each project and the cumulative effects of multiple projects to the IEI.” However, the IEI appears to be a very simplistic and preliminary method of aggregating effects. The sponsors want to develop a trophic model which will apparently supersede the IEI. More information is required on the proposed model. The proposal also mentions a fish index, but methods for sampling fish or specifics about the index are not given. Are fish assessment protocols aligned with those to be used in project 199806500, Kootenai River Fishery Investigations?

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

Sponsor: Kootenai Tribe

ISRP recommendation: Response requested

Comment:

Responses requested:

1. More detail on the feasibility assessments and design activities for phase 2 and 3 projects should be presented.
2. A draft of the KRHRP monitoring and adaptive management plan should be provided.
3. Ten recruitment failure hypotheses are listed in the proposal. Identify which of these hypotheses have been tested and what conclusions have been reached.
4. 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.
5. There are three other projects on the Kootenai River that are closely related to this proposal. Describe how this project connects with these projects.

This proposal describes a large project that is almost a program in itself. This is a worthwhile effort and has already made some progress towards meeting program objectives. However, some of the very ambitious projects included in this proposal are not described in sufficient detail to determine if they would make a significant contribution to meeting program objectives. The understanding of the factors limiting recruitment of white sturgeon is incomplete. However, the sponsors are relying extensively on the theory that the limiting factors for white sturgeon is at the eggs/larvae stage. It would be useful to provide evidence that focusing on improved survival of this life stage has contributed to recovery of other sturgeon populations around the world.

More detail on the feasibility assessments and design activities for phase 2 and 3 projects should be included. This project is very large and complicated. Essentially, the proposal is for

a habitat restoration program in which projects are funded prior to the completion of planning and design. The fact that the program proposes to proceed without a clear identification of limiting factors or specific desired population objectives for the focal species suggests that a more conservative approach might be advisable. Support for projects already initiated and O&M for existing projects could be supported through this proposal with Phase 2 and 3 projects included in subsequent funding requests, once understanding of limiting factors is improved and a full project feasibility assessment and design has been completed.

The KRHRP monitoring and adaptive management plan appears to be viewed as the coordinating structure for the RME program at the subbasin scale. This plan is scheduled for completion in 2012. Review of the RME component of this proposal is not possible without the inclusion of this plan. The revised proposal should have the plan, or at least a draft, appended to the proposal.

There are three other projects on the Kootenai River that are closely related to this proposal. The connections among the four projects are never fully described in any of the four proposals.

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

This is a large project of major significance to a variety of agencies and stakeholders in a large reach of the Kootenai River. The project represents a substantial effort to restore aquatic habitat conditions in a large river that supports a number of ESA listed fish species. Most of the background information is provided in the Major Accomplishments section and is generally adequate. However, the sponsors claim that only the Kootenai River supports a naturally landlocked population of white sturgeon is incorrect. The Nechako River in BC has a non-anadromous population and several relevant papers on this stock were not cited (e.g., McAdam et al. 2005; McAdam et al. 2011). It might be instructive for the sponsors to review literature from the Nechako.

OBJ-1: “Restore and maintain Kootenai River habitat conditions that support all life stages of Endangered Species Act listed Kootenai River white sturgeon” and OBJ-2: “Restore and maintain Kootenai River habitat conditions that support all life stages of native Kootenai subbasin focal fish species” are really stated as general rather than quantitative objectives. The objectives should be specific and measurable. Linking the objectives with the deliverables partially addresses this concern. Nonetheless, it would be helpful if the objectives were more quantitative and included measures of incremental success. Given that the required habitat conditions needed to recover and support white sturgeon are not completely known, these objectives should include both habitat and demographic targets and be closely linked to the RME effort associated with this project so objectives can be amended as knowledge improves.

In addition, the objectives appear to concentrate heavily on the focal species to the exclusion of others. This approach is not ecosystem restoration. It would be helpful to discuss how the

restoration actions proposed also will benefit burbot, salmonids and other species such as cottids, which are not ESA listed or harvested but are important for trophodynamics and predation (see below; McAdam 2011). A possible approach would be the application of trophic models to assess the extent to which the bioenergetics needs of focal species will be met by the various measures being taken to improve food supply (e.g., Bevelhimer 2002; van Poorten and McAdam 2010). This comment also applies to the Ball Creek and Floodplain reconnection projects.

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

This project has a relatively long history, and the proposal includes a very good review of the ecological and legal issues around Kootenai white sturgeon. The sponsors have provided a good description of the rather tortuous path they have followed in order to develop the Master Plan (1997-2010). The ISRP appreciated the on-line access to the extensive library of project documents although some (e.g., Kynard et al. 2010) could not be downloaded completely. The vast majority of the literature is grey, however.

Several habitat restoration projects have already been implemented on the Kootenai, but there was little evidence in the proposal that the response of the focal species to these projects has been assessed. The sponsors did state, "Since 2005 the Tribe, in response to Recovery Team guidance, has released either fertilized eggs or free-embryos into reaches of the Kootenai River that have more suitable rocky substrates. The releases have ranged from 400,000 to over one million fertilized eggs or free-embryos annually. To date these experimental releases have not produced a detected increase in captured unmarked juvenile Kootenai sturgeon (Rust 2010)." It would be helpful to put these findings in the context of the recent laboratory experiments reported by Kynard et al (2010) (cited in the document) and McAdam (2011). The propensity of larvae to drift, as well as predation by cottids, was clearly related to substrate size; when gravel and cobble was provided the larvae hid and had lower mortality. Although subject to the usual caveats of lab work, these results have important implications for sturgeon habitat restoration in the Kootenai River. First, the proposal to create spawning substrate in the meander and other reaches should carefully consider bed load movement of mud and sand and the possibility that desirable substrate will be rapidly covered. Second, ecosystem restoration by nutrient addition and other methods could result in increased cottid populations which could increase predation pressure.

In their response to the ISRP's review of their (STEP) sturgeon and burbot hatchery proposal the sponsors state, "Biological responses to the collective measures associated with the Tribe's different habitat restoration and nutrient projects is a key component of the program-wide adaptive management approach currently under development. The extent to which sturgeon may benefit from these actions is unknown, but it is likely that improved ecosystem function, habitat complexity, and productivity could be beneficial" (see [ISRP 2010-27](#)). Because sturgeon

live a very long time, the monitoring work will have to go on at the decade scale in order to assess fish response.

The adaptive management process for the Kootenai River projects is to be described in a plan to be completed in 2012. Because this plan was not included with the proposal, it is difficult to judge the adequacy of the adaptive management process. In addition, the description of the organizational structure intended to implement adaptive management was unclear. According to the proposal there are five teams involved in adaptive management (Peer Reviewer Advisory Team [PRAT]; Modeling Review Team; Core Adaptive Management Team [CAMT]: Co-manager and Agency Review Team [CMART]; Kootenai Habitat Policy Team). It would be helpful to include a description of how these groups interact and decide priorities as they relate to RME.

ISRP Retrospective Evaluation of Results

Information on the results of previous projects and studies was provided in the proposal and links to other documents providing this information was provided. However, additional focus should be placed on developing syntheses from information that has been collected to date. These syntheses would be valuable for the formulation of testable hypotheses/relationships that will guide the generation information useful for informing managers and guiding future RME efforts. More extensive application of predictive models also may help in this regard.

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

There are three other projects on the Kootenai River that are closely related to this proposal. The connections among the four projects are never fully described in any of the four proposals. There does not appear to be an overarching theme that knits these projects together in a unified strategic approach to restoration of this section of the Kootenai River. The only described process that would encourage coordination are meetings of the whole group working on these projects, that is biologists, engineers, and technical staff of all four projects. The proposals for these four projects seem to suggest disparate objectives for these meetings. For example, the nutrient addition project (199404900) proposal states "Project results will be summarized and presented at an annual meeting of the International Kootenai/y River Ecosystem Restoration Team (IKERT). This multidisciplinary group is comprised of project managers, scientists, and academicians who provide expertise, insight, guidance and adaptive management direction for the project." whereas the present proposal indicates that IKERT is an outreach team, implying less direct involvement with technical direction of the project. The extent to which these meetings achieve inter-project coordination was not discussed, and it appears that a more formal process to achieve coordination would be beneficial. A much more complete discussion of the relationship, interactions, etc. among these projects should have been included in all of the proposals dealing with the section of the Kootenai River in Idaho.

A list of presumed limiting factors for white sturgeon is provided in the proposal. Identification of these limiting factors appears to be partially founded on research that has been conducted in the project area on this species and on best professional judgment. The proposal indicates that the critical limiting factor for sturgeon habitat is lack of appropriate spawning habitat, specifically, hard substrate on which fertilized eggs can attach. It is not clear that the information provided in the proposal supports this contention. Some of the research on sturgeon survival seems to suggest that lack of recruitment may be more influenced by mortality occurring after hatching rather than failure of the eggs to hatch. Very few fish are produced by the release of large numbers of fertilized eggs and free embryos into the river. In contrast, yearling sturgeon released to the river survive at a very high rate. This observation suggests a problem with habitat for very young fish may have a greater influence on recruitment than the lack of substrate for egg attachment. If the assumption is that good habitat for spawning also represents good habitat for young sturgeon, this point was not addressed or supported in the proposal. The proposal does acknowledge that there appears to be a survival bottleneck during the early rearing period and suggests that it may be due to reduced biological productivity in the river owing to sequestration of nutrients upstream, behind Libby Dam. No information is provided to verify that low productivity is the cause of this survival bottleneck. In fact, the high survival of juvenile sturgeon after age 1 suggests that sufficient food is available to support these fish; why not larvae and fry?

The RME program for this project does not appear to be monitoring nutrient levels, primary production, or invertebrate production in the river. The program that is monitoring these factors (199404900) is located in the Canyon Reach where sturgeon spawning and post larvae habitat is not being monitored. This type of information, in conjunction with data on the dietary habits of the young sturgeon, would be required to establish that the assumption that lack of food is causing high mortality of young sturgeon is correct. Some of this information is being collected as part of the Kootenai nutrient addition project, but the linkages between these projects is not described. Additional work on the factors limiting sturgeon recruitment is clearly needed and should be a focus of the RME effort associated with this project.

Many of the proposed habitat actions are focused more broadly on restoring the ecological health of the project reach rather than specifically addressing factors thought to impact sturgeon. Actions to restore bank stability, riparian vegetation, wetland habitats, etc. are all likely to make contributions to improved aquatic habitat. But it is difficult to determine whether or not these planned projects are in the most advantageous location to affect responses by the focal species. Some additional information on the factors limiting the productivity of burbot and the various salmonid species that are intended to benefit from this project could have helped to verify that the proposed actions are located in an appropriate location to benefit these fishes.

The effects of non-natives species, especially brown trout and *Didymo*, deserve additional consideration.

4. Deliverables, Work Elements, Metrics, and Methods

This proposal covers a large number of very ambitious, and expensive, work elements and deliverables. Elements related to the completion and maintenance of project elements that have already been initiated or completed are described in sufficient detail. But the activities associated with the projects slated for phases 2 and 3 would have benefited from a more thorough discussion of what will be required to move these projects to execution. A considerable amount of general engineering detail is provided in the proposal, especially regarding the location of specific project elements. However, description of these phase 2 and 3 projects indicates that feasibility assessment and design have yet to be completed. It is not clear what the feasibility assessment entails. Is this primarily obtaining landowner cooperation and environmental permits? Or is there still some uncertainty that the projects can be executed as designed? Technical review of these proposed projects is difficult without understanding what must be accomplished prior to beginning construction. It is also difficult to understand how accurate estimates of project costs could be generated prior to the completion of the feasibility assessment and project design. Submitting each project as an individual proposal, once the planning, design, and feasibility steps have been completed might be more efficient for moving projects in this program through the review process.

Several other statements in the proposal require clarification.

- The sponsors state that they will “complete a feasibility study, 35% design, and final design to place suitable substrate at select locations in the Shorty’s Island/Meander Reach area of the Kootenai River where white sturgeon are currently spawning.” It would be helpful to obtain information on how impacts to the existing spawning substrate will be avoided during the execution of construction for this project.
- The proposal further states, “Specifically, the height, location and composition of the substrate beds is designed to avoid inundation by sand dunes on the river bottom, sedimentation during the spawning season, or infilling of interstitial spaces by sediments.” It would be useful to obtain further information on how reliable the models are that were used in developing this design.
- The sponsors state, “This deliverable includes implementation of approximately 12 habitat restoration projects in the braided and straight reaches which are designed to provide specific ecological benefits to Kootenai sturgeon.” It is not clear why so much emphasis is placed on riparian habitat when the benefits of riparian conditions to sturgeon rearing has been questioned (McAdam et al 2005). If the riparian components

of this project are intended to primarily benefit species other than sturgeon, this fact should have been discussed in the proposal.

- The proposal indicates that in work element P3-2: “Implement Phase 3 projects in the meander reaches.” However, planning for this project element is incomplete, so implementation appears to be premature.
- The proposal indicates that the development and calibration model being used to support the engineering designs for the substrate placement at Shorty’s Reach is only 23% complete. Is it premature to rely on this tool for the design of a major engineering project?

The sponsors should be complimented for their successful outreach and educational efforts. However, if projects start to unravel because of unexpected changes that may affect ecosystem recovery, for example outlier low or high flows, working relationships between parties may be strained and an adaptive management plan that allows for contingency planning is crucial.

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

The details on the overall RME program for the suite of projects planned for the Kootenai River will apparently be provided in an adaptive management plan currently under development. The information provided in the proposal was not sufficiently detailed to enable review. Assessment of the RME effort for this project, therefore, should occur once the adaptive management plan is complete.

Several monitoring efforts related to this project were included in the proposal. Post-project implementation of habitat conditions is planned and links are provided to some of the monitoring methods proposed for use in this effort. However, the descriptions of the methods at this site were often incomplete.

There was no indication in the proposal that assessments of water quality and biological productivity of the river were to be monitored. As noted above, the assumption that sequestration of nutrients above Libby Dam is limiting productivity of white sturgeon has not been well documented, at least based on the information provided in the proposal. As noted earlier, some monitoring and research relevant to this project may be occurring as a part of the nutrient enhancement effort being conducted by the tribe, but insufficient information about RME associated with the nutrient project was provided in this proposal (nor were project linkages adequately described). In addition, the monitoring and evaluation design does not seem to have a sound statistical framework.

There was no discussion about toxic compounds in the river and what influence they may be having on the health of this ecosystem. However, the proposal did indicate that there were

industrial sites adjacent to the river that may be contaminated and that the Bonner's Ferry waste water treatment plant discharges to the river within the study reach. These factors suggest that toxic chemicals in the river could be an issue and this should be investigated as a part of the monitoring program. The proposal indicated that procedures for monitoring at scales larger than the individual project will be included in the subbasin-scale adaptive management plan. As noted above, this plan should be reviewed as part of this proposal.

The discussion of critical uncertainties research in the proposal states: "This deliverable is to conduct limited critical uncertainties research that is necessary to identify and/or refine design criteria for the KRHRP Phase 2 or 3 projects or otherwise specifically support design or implementation of the projects." and is conducted to "support Obj 2 i.e. Restore and maintain Kootenai River habitat conditions that support all life stages of native Kootenai subbasin focal fish species (i.e., all life stages of burbot, kokanee, redband trout, westslope cutthroat trout, and bull trout." This is perhaps the most important deliverable for adaptive management, but emphasis on it seems to be limited. Surprisingly, the contention that survival of eggs and early fry is a key limiting factor for sturgeon recruitment did not seem to be reflected in the priorities of the RME program. Will additional early life history research be included as part of the monitoring effort? Using fin ray geochemistry to assess historical white sturgeon life history movements in the Kootenai River is indicated as a pilot study under critical uncertainties. The ISRP/ISAB expressed concern about the reliability of this technique in their recent tagging report. The project sponsors should consider these concerns prior to initiating this pilot study.

References

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- McAdam, S.O., Walters, C.J., and Nistor, C. 2005. Linkages between white sturgeon recruitment and altered bed substrates in the Nechako River, Canada. Trans. Am. Fish. Soc. 134(6): 1448-1456.
- Bevelheimer, M.S. 2002. A bioenergetics model for white sturgeon *Acipenser transmontanus*: assessing differences in growth and reproduction among Snake River reaches. J Appl Ichthyol. 18:550-6.
- van Poorten BT, McAdam SO. 2010. Estimating differences in growth and metabolism in two spatially segregated groups of Columbia River white sturgeon using a field-based bioenergetics model. Open Fish Sci J 3:132-141.

[198806500](#) - Kootenai River Fishery Investigations

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation: Response requested

Comment:

On balance, this project has a long and successful research record of tracking the general population trends of the target species. The three accompanying projects dealing with habitat restoration in the Idaho-Montana portion of the Kootenai River require data from this project to evaluate their efforts. However, there is substantial overlap in almost all the elements of this proposal with the other projects and the degree of collaboration is unclear.

Information has been obtained on many key aspects of sturgeon life history and habitat needs. Research has progressed to the point that specific hypotheses can be tested, such as the issue of whether spawning substrate is adequate. The main significant limitation has been that the research has thus far failed to actually understand the fine points or effectively address the recruitment problems for the Kootenai sturgeon. Not much of the research has seemed to be applied to effectively managing the population.

The inability thus far to restore any natural recruitment does not bode well for more recent efforts with burbot, which are essentially extirpated. Biologists do not have the luxury of as long of a burbot lifespan as that of sturgeon, and understanding will need to be arrived at more rapidly for this species.

Rainbow trout are responding to some degree to nutrient addition, but other species especially whitefish are benefiting more. The localized effects and long term sustainability/cost of the nutrient addition is of concern.

Questions to be responded to arrayed by objective

- OBJ-1: Restore natural recruitment of Kootenai River white sturgeon

1. Clarification is required on how this proposal meshes with the ACOE 1135 project, which is directly related to Proposal 200200200 (Restore Natural Recruitment of Kootenai River White Sturgeon), and whether adequate monitoring and sampling to meet general objectives of this proposal occurs under the latter project.

2. Data are required on gillnet mesh sizes or details of setlines including length and hook size. No details are given concerning sample sizes. The method for sampling juveniles calls for gillnets. Have trammel nets been tried?

3. VEMCO tags are to be used for “fine scale movement.” It would be useful to have more information on what is meant by the term to identify if the plan is to assess sturgeon microhabitat or something different?

4. The proposal would be improved by details on environmental cues to be measured in conjunction with the egg mat surveys. What were they, how were they chosen, and what were the hypotheses regarding their effects?

5. 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. Were the stations chosen with a systematic grid of sites? If not, what sampling method was used? The same issue relates to juveniles released by the hatchery.

- OBJ-2: Restore natural recruitment of Kootenai River burbot

1. What visual methods will be used for documentation of presence/absence/abundance of burbot?

2. How will the results of the stocking density experiments in the ponds be used in relation to natural habitat?

3. Operations at Libby Dam are the issue. What are the prospects that dam operations will change for the better in terms of burbot needs?

4. There is a graduate student at the University of Idaho investigating gears for sampling burbot in the river. How does this work mesh with this project?

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

1. The proposal does not discuss the long term success of nutrient addition to increase fish production in large rivers. Has this been attempted in other rivers and was it successful?

2. A concern about this objective relates to river fertilization for salmonids. While it seems to be working within a limited section, are the cost and logistics of expanding this treatment elsewhere in the river feasible?

3. The appearance of brown trout in the system is a concern. Is there a plan in place to deal with this species, should it appear?

4. Use of specific tributaries will be investigated using microchemistry, but there are limitations with this approach as stated in the ISAB-ISRP tagging report (ISAB-ISRP 2009-1). Contingency plans for dealing with possible problems should be described.

5. Please provide any updates on the issue of property ownership for the nutrient facility. If the property for the nutrient experiments is sold, how would this affect the experimental design, especially the 3-km treatment reach?

6. A fixed, 3-km portion of the shoreline is being used as a plot for mark-recapture studies to estimate population size of rainbow trout. The type of fin mark used is not given in MonitoringMethods.org. With only one replicate reach it will be impossible to calculate site variability. The carrying capacity of individual stream reaches for salmonids and other fish will change over time. Please explain why replicate reaches are not being used.

7. How was the N:P ratio determined as the correct one to use? Does it change seasonally?

- Data Management

The ISRP had concerns about data management for RM&E results as well as implementation data. Is there a data manager for the non-fish data? What percentage of the overall budget goes toward data management? Overall, the discussion of data and data management needs to be strengthened, especially as related synthesis and analyses.

References

Holderman C., G. Hoyle, R. Hardy, P. Anders, P. Ward and H. Yassien. 2009. Libby Dam hydro-electric project mitigation: Efforts for Downstream Ecosystem Restoration. Pages 6214-6222 *In: 33rd IAHR Congress: Water Engineering for a Sustainable Environment*. Copyright 2009 by International Association of Hydraulic Engineering & Research (IAHR) ISBN: 978-94-90365-01-1.

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

This project is a bellwether for large scale habitat restoration projects in the upper Columbia basins as it is measuring responses in fish populations. As such it is very significant as results will shape any future projects of this nature elsewhere, as well as deciding the long-term future of this particular project. The technical background is well described with most references timely and accurate.

Progress in uncovering the factors affecting recruitment success of the resident fish has been slow, but new hypotheses are being proposed and tested. The cost of this work has been stable, and the productivity of the project in terms of reporting and refereed science papers has been excellent. Among the three Kootenai River projects that involve sturgeon, this project has the strongest scientific approach. Results have been useful throughout the basin and beyond. The real issue that the ISRP identified is the relationship of this project, of fundamental ecological significance, with the other large KTOI proposals on the Kootenai.

Objectives

- OBJ-1: Restore natural recruitment of Kootenai River white sturgeon

The criteria for determining if natural recruitment is occurring were established in 1999. It would be worthwhile to revisit those criteria after a decade of work. Natural recruitment has not yet occurred in the study area to meet the criteria, and it appears a bottleneck is at the egg to larvae stage.

All the signs point to this population being propped up by supplementation/hatchery releases, with its attendant genetic issues, well known in the salmon world but not yet seriously discussed with sturgeon. Although there are encouraging signs that nutrient addition is increasing productivity, and possibly generating more secondary production of forage fish for sturgeon, this management approach raises the specter of long term nutrient addition which is another artificial methodology.

As for the first objective, it is a concern that after more than two decades of work there is no major plan for addressing what has been known for years to be a recruitment problem, except for stocking hatchery fish. The proposed work introducing gravel/cobble deserves careful consideration. The RPAs seem to clearly outline the need to focus on these questions.

- OBJ-2: Restore natural recruitment of Kootenai River burbot

See comments above for sturgeon for similar concerns about the recruitment problem.

An additional concern relates to Libby Dam operations as they relate to this objective. The ISRP is concerned that burbot populations do not have much chance of recovering considering the state of the river/habitats and future projections of environmental conditions. Operations at Libby Dam are the issue, and it is not likely that basic operations will change for the better in terms of burbot needs anytime in the near future.

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

A concern about this objective relates to river fertilization for salmonids. While it seems to be working within a limited section, the cost and logistics of expanding this treatment elsewhere in the river do not seem feasible.

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

The sponsors have an overall good reporting record for the project but mostly in non-reviewed report series. Accomplishments in terms of information gained are very well documented.

A contingency plan needs to be developed in case the property where the nutrient tanks are located is sold.

Native salmonids

Results of the nutrient addition work for five years to date are not encouraging in terms of rainbow trout increases although it is difficult to evaluate whether the 0.11 fish m⁻² target is actually being met. Variation in the trout densities is not given and Figure 2 does not separate out species. Mountain whitefish (*Prosopium williamsonii*) accounted for nearly all the response, suggesting that insects in their diet also benefited from nutrient additions (Holderman et al. 2009).

The adaptive management process being employed is strong in that it involves large scale experiments to test the system, and it allows researchers to respond and adjust to surprises. However, it does not appear to involve the public or decision-makers in any consistent way.

A more strategic approach is required. Limiting factors such as high winter flows are also suspected problems. An experimental design to try and separate density-dependent and density-independent factors is needed. The work proposed is more of an opportunistic approach.

Sturgeon

The finding that sturgeon released in Idaho move upstream into Montana and apparently grow better there than at their release location is quite significant. The sponsors attribute this to density-dependent effects, but this appears to be speculation. More cooperative work with MFWP could be beneficial.

Burbot

Results of investigations on limiting factors for wild fish seem inconclusive. As with sturgeon artificial propagation is being attempted as a last resort.

ISRP Retrospective Evaluation of Results

The ISRP 2011 Retrospective Report's recommendation on time frame for evaluating restoration projects (p. 68) is very relevant:

“The ISRP therefore suggests that additional dialogue is needed between habitat managers, scientists, and policy-makers so that realistic timeframes can be established, and appropriate schedules agreed upon, to monitor and evaluate different types of restoration actions.”

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

Project Relationships

There is much overlap between this proposal and the other three Kootenai River restoration projects, especially 200200200 (Restore Natural Recruitment of Kootenai River White Sturgeon). Good working relationships seem to exist between the various parties, but it is difficult to see how they all fit together. In Proposal 200200200, Table PS-2 lists the inter-related projects. The sponsors claim coordination is well orchestrated, but there are notable exceptions. For example the floodplain reconnection project (200200200) is not mentioned as a linked project with the present one.

It is not clear exactly how this proposal meshes with the ACOE 1135 project, and whether adequate monitoring and sampling to meet general objectives of this proposal occurs under the latter project. If sampling is proposed under the ACOE 1135 project, which is directly related to Proposal 200200200 (Restore Natural Recruitment of Kootenai River White Sturgeon), it would be helpful to outline the rationale for this general sampling proposed under the current proposal.

Emerging limiting factors

Will the projected loss of late summer snowpack and associated cool temperatures be issues for the Kootenai? Climate change is not addressed, but it is likely already an issue.

The appearance of brown trout in the system is of concern. No real contingency plan to deal with this species is described. It is likely the ecosystem will adapt to its appearance through development of hybrid food webs.

Tailored questions

Hatchery – The KTOI sturgeon and burbot hatcheries are producing fish that are tracked under this project and these facilities are in Step Review.

RME – Monitoring is being conducted on a host of variables. In most instances the statistical background given for their choice, power, temporal aspects are not given and the RME aspect is rather open-ended. It would be helpful to have a concise description of RME.

The ISRP had concerns about data management for RM&E results as well as implementation data. Is there a data manager for the non-fish data? What percentage of the overall budget goes toward data management? Overall, the discussion of data and data management needs to be strengthened, especially as related synthesis and analyses.

The sponsors have given considerable thought to the tagging issue and the tags being used including PIT, radio, fin clips, and freeze branding are appropriate for the tasks at hand. The sponsors note that increased sample sizes using hatchery burbot will help documentation of “effects of release locations, timings, and other metrics on burbot survival” but of course results may not be applicable to wild fish, which presumably in the long term are the desired taxa.

4. Deliverables, Work Elements, Metrics, and Methods

- DELV-1: Estimate spawning success and natural recruitment of white sturgeon in the Kootenai River

The proposal would be improved by provision of details on what environmental cues were to be measured in conjunction with the egg mat surveys and how were they chosen.

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. How were the stations chosen? The same issue relates to juveniles although because they are larger, more sedentary, and abundant, and at least for the hatchery fish have known abundance, the difficulties are diminished.

- DELV-2: Monitor and evaluate white sturgeon vital statistics in response to recovery strategies

Since this is a trans-boundary investigation, the sponsors are to have an annual contract for stock assessment work to be performed in Canada with BC Ministry of Forests, Lands and Natural Resource Operations. It is important that this linkage be more than just a formality. There are significant consequences for the stock. For a project that has been in place for more than 20 years, it is surprising to the ISRP that it was not until recently that it was understood that the sturgeon population size was larger than previously thought, evidently because of inadequate sampling downriver and into Canada. Perhaps the focus of some of this work has been a bit too localized, not adequately considering the entire habitat use of Kootenai sturgeon.

The method for sampling juveniles calls for gillnets. Have trammel nets been tried? They are the preferred gear for sampling small sturgeon such as shovelnose sturgeon in the Upper Mississippi River. It would be helpful to have details on methods of set lining.

VEMCO tags are to be used for “fine scale movement.” It would be useful to have more information on what is meant by the term and whether the plan is to assess sturgeon microhabitat or some other purpose.

- DELV-3: Monitor and evaluate juvenile and adult burbot population dynamics

It is not clear what visual methods will be used, and they are not described in MonitoringMethods.org.

- DELV-4: Monitor and evaluate burbot early life survival strategies

It is not clear how the results of the stocking density experiments in the ponds will be used in relation to natural habitat. The genetic work looks good.

- DELV-5: Monitor and evaluate salmonid vital statistics in response to recovery strategies

See above for comments relative to boat electrofishing. Also use of specific tributaries will be investigated using microchemistry, but there are limitations with this approach (see ISAB-ISRP tagging report 2009-1).

- DELV-6: Co-manage and evaluate nutrient restoration program

See comments above relative to housing for the facility. The nutrient experiments could benefit from additional leadership.

- DELV-7: Information Dissemination

This project has a respectable track record for reporting with limitations as discussed above.

Metrics/Methods: Most appear to be standard. However, there are a few specific concerns. It would be prudent to use more than one reference reach to look at population trends because the carrying capacity of individual stream reaches for salmonids and other fish will change over time. How was the N:P ratio determined as the correct one to use? Does it change seasonally? Where are the reference sites? What do the data suggest so far? For the sturgeon, how will the spawning mats be arrayed in the larger river system? What has been learned so far from doing this? While the nutrient restoration program is an interesting experiment, how practical is it to fertilize the entire river network, if that is what is needed? More information is needed on the nutrient addition method in order to evaluate it properly; it is not well described in the protocol.

Personnel: Most seem well versed in their respective areas of expertise. The nutrient experiments could benefit from additional leadership.

Data Management: Is there a data manager for the non-fish data? What percentage of the overall budget goes toward data management? Overall, the discussion of data and data management needs to be strengthened, especially as related synthesis and analyses.

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

1. Burbot

A general description of sampling methods used for burbot is given in MonitoringMethods.org, but detailed descriptions of the primary hoop net and Herzog trawl methodology including sampling efficiency are lacking.

2. Sturgeon

Gillnets and setlines are used for larger juveniles and adults, and the spatial aspects of the sampling is quite well described. However, no data are given on gillnet mesh sizes or details of setlines. Larvae are sampled with D rings which presumably are the same as “plankton nets” described in MonitoringMethods.org. No details are given on sample sizes.

3. Rainbow trout, whitefish, other resident fish

A fixed, 3 km portion of the shoreline is being used as a plot for mark-recapture studies to estimate population size of rainbow trout. The type of fin mark used is not given in MonitoringMethod.org. With only one replicate reach it will be impossible to calculate site variability.

Details of boat electrofishing techniques were not provided in MonitoringMethods.org as far as could be found. This is the method used in the general fish density measurements.

4. Nutrients

The protocol for the nutrient addition experiment needs to be finalized. As is, there is not enough information on the website to provide a proper evaluation.

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

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 benefitting 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 requested

Comment:

This project will evaluate the changes in drawdown limits and ramping rates at Libby and Hungry Horse dams, the two dams in Montana where flows can be altered to potentially benefit resident native fishes including those with fluvial and adfluvial life histories. There is a long history of dam operation changes, with current changes at Libby Dam coming online in 2008.

The proposal makes clear that dam operations affect the entire river ecosystem, with effects cascading downstream and upstream, partly through the altered movements and migrations of fishes. For the Kootenai River, the proposal describes that large amount of data collected both before and after the 2008 operation changes on hydrology, geomorphology of tributary deltas, benthic algae, and fish populations. For the Flathead River, where flow regime changes and research of them have been ongoing longer, the proposal describes evaluation of regime effects on habitat for juvenile bull trout, PIT tagging of bull trout in North Fork tributaries, and recent work on movement of mountain whitefish.

Overall, there were several deficiencies with the proposal itself, and several objectives and deliverables that were not well justified. First, we list deficiencies with the proposal which should be corrected in further proposals, followed by identification of responses requested to address problems with objectives and deliverables.

A. Deficiencies with the proposal:

1. Objectives were not well organized into key components to be measured. For the Kootenai River, Objective 1 was too broad, and aimed at monitoring many physical and biotic components from river flows to fish survival, whereas 2 through 5 were much more specific. In the future, objectives could be divided into more logical key components, such as 1) physical changes to reservoirs and flow regimes, 2) changes in nutrients, periphyton, and invertebrates, 3) demographics and viability of listed fish species, 4) population analysis of other native and non-native species, and 5) potential for invasions by non-native fishes.

2. Within objectives, deliverables should focus on key questions phrased as hypotheses. Examples might include: 1) Is survival rate and population growth rate (λ) of listed bull trout increasing, stable, or decreasing? And 2) are brook and brown trout invading above Kootenai Falls? Focused questions to be addressed were a key component missing in the proposal for the Kootenai River work.

3. Sections on accomplishments need much greater synthesis for the work on the Kootenai River. This section was long and lacked the critical analysis and synthesis needed. No questions were presented, and no statistical analysis was completed or presented. Although the ISRP understands that these data are recent, and often too few data have been collected since the flow regime change in 2008 to analyze appropriately, the work needs to provide useful summaries rather than so much relatively detailed data. Some parts, such as the figures of aggradation at delta mouths, were unreadable, and so unusable. Not all reviewers will be able to delve into the annual reports.

B. Deficiencies with objectives and deliverables that require response in this cycle:

1. Appropriate study designs were lacking for much of the work on the Kootenai River, although baseline data collected provide useful information to develop such designs. Given this background, future work needs to focus on specific questions, rather than attempting to address all aspects of the changes caused by the flow regimes. Specific points raised by the ISRP that need to be addressed in this cycle include:

a. Bull trout survival and population growth – in both river systems, much effort is being expended to capture and mark bull trout with PIT tags, but no information was given about how these data would be analyzed to yield robust estimates of survival or rates of population change (λ). These are two key vital rates that must be evaluated to make management decisions. Program MARK (see website of Dr. Gary White at Colorado State University) provides a flexible method for analyzing these data to estimate these rates. It offers much better power at detecting differences between time periods or locations than, for example, the analysis described in the annual report for the Kootenai River (Sylvester and Stephens 2010, FY10 Annual Report). Examples of such integrated MARK analyses for mark-recapture data on fishes in major river systems are available in Bestgen et al. (2007) and Zelasko et al. (2010), both in Transactions of the American Fisheries Society. Expertise to conduct such analyses can be gained by consulting with experts such as Drs. Paul Lukacs (U of MT), Gary White or Kevin Bestgen (Colorado State U), and Paul Conn or Brett McClintock (NOAA Fisheries, Seattle), and/or attending one of the periodic workshops on MARK (after some self-study, the intermediate-level workshop might be best). Given the large effort and excellent datasets being collected, appropriate design and analysis are a key component missing from the proposed work. Without them, much effort and funding could be wasted. With them, the work could provide landmark information to help fuel sound management decisions.

Response requested: Provide information about how data will be analyzed to yield robust estimates of survival or rates of population change for bull trout.

b. Similar data will be collected for white sturgeon in the Kootenai River, and can profit from a similar design, although the ISRP recognizes that recaptures may be too few for robust analysis. Nevertheless, without a suitable design, it may be difficult to prove that survival is indeed low, or to place confidence intervals around this, or test the evidence for it.

Response requested: Provide information about how data will be analyzed to yield robust estimates of survival or rates of population change for white sturgeon.

c. Problems were reported about estimating survival of rainbow trout, based on concerns about inaccurate ageing using scales. The method proposed for estimating survival in the FY 2010 Annual Report is akin to using catch curves, which is based on many assumptions. It seems like it would be much more efficient to simply PIT tag rainbow trout, avoiding the ageing issues altogether, and estimate survival directly using MARK. This could be done within size classes of interest. Given this, some deliverables need to be modified or dropped.

Response requested: Provide an evaluation of using PIT tagged rainbow trout to estimate survival within size classes. How would using this approach affect currently proposed deliverables?

d. Population estimation for salmonids can also be improved markedly with new methods in MARK (see Saunders et al. 2011 TAFS for an example), which can integrate analysis across all size classes and even among different locations or sites. This improves power greatly by estimating capture probabilities for a much larger sample of fishes, with a continuous covariate for fish length (Huggins model) and other covariates for sites or times. In contrast, the method proposed and commonly used of estimating abundance for several size classes of fish at each site separately produces estimates with wide confidence intervals because they are each based on small sample sizes.

Response requested: Provide an evaluation of using the new methods in MARK for population estimation.

e. Questions about factors affecting Didymo invasions should be developed as alternative plausible models or hypotheses, which can be tested using model selection (see Burnham and Anderson 2002). This method allows evaluating the weight of evidence for alternative models, and estimating parameters using multi-model inference to more fully use the information gained. Expertise in these methods can also be gained from the people listed above. Moreover, there are several proposals from this region addressing the same topic, and all have substantial budgets, so the ISRP is interested for clarification on how the workload will be shared.

Response requested: Provide alternative models or hypotheses about factors affecting Didymo invasions and outline how current and future data could be used to evaluate the alternatives.

f. The information on delta aggradation and potential blockage of bull trout migrations is very interesting and important, but no questions were developed, and no methods or statistical analyses discussed for evaluating these changes.

Response requested: Develop questions and identify methods of analysis to evaluate changes due to delta aggregation and potential blockage of bull trout migrations.

g. Adaptive Management: Most material in the text is a small component of adaptive management. It is suggested that the sponsors develop an adaptive management process that is responsive to the resources as well as to the public and to management needs.

Response requested: Provide an Adaptive Management plan to describe a process that is responsive to the resource, public, and management needs.

h. Emerging Limiting Factors: The sponsors seem to have a good understanding of most emerging factors. However, changes in winter icing conditions were not mentioned, and could become increasingly important with time.

Response requested: Identify how winter icing conditions would affect the proposed project objectives.

i. Data Management: What percentage of the total budget is dedicated to data management? How is data QA/QC addressed for specific projects activities? Please describe anticipated improvements in the data management system expected to occur over the next few years (e.g., cloud computing, new software, equipment upgrades).

Response requested: Provide a response addressing issues raised in item i.

j. The sponsors need to improve their collective productivity by publishing peer-reviewed articles in professional journals.

Response requested: Describe plans to publish in peer-reviewed journals.

2. On the Flathead River system, where work is apparently more advanced, several main points require response:

a. Analysis of bull trout survival and rates of population growth require a more robust approach using current capture-recapture analysis methods like those included in Program MARK. Please see point 1.A. above.

Response requested: Provide information about how data will be analyzed to yield robust estimates of survival or rates of population change for bull trout on the Flathead River system.

b. The accomplishments presented about whitefish tracking in the Flathead River were useful information, but no study plan of focused questions was presented for the future, and there was no indication about how these data will be analyzed to answer specific questions.

Response requested: Develop questions and identify methods of analysis to evaluate whitefish tracking data.

c. Points 1.G., and 1.I. from above also need to be addressed for the Flathead River system.

Response requested: Provide an adaptive management plan to describe a process that is responsive to the resource, public, and management needs for the Flathead River system. Respond to the questions posed in item i above with respect to the Flathead River system.

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 farther 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. Nevertheless, better designs are needed for analysis of these before-after comparisons to capitalize on the substantial data being collected in the Kootenai River.

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 requested

Comment:

The ISRP requests that sponsor provide:

1. A copy of, or a link to, the specific plan used by the cooperators to monitor and evaluate the program's progress. See comments below for specific information requested in the plan. In the event such a plan is not presently available, the ISRP will recommend to the Council that such a plan be jointly developed among cooperators within 12-18 months.
2. A copy of, or link to, the summary report of the program's results to date for the metrics identified in the plan such as production characteristics including size, numbers, and health assays, as well as an historical accounting of lakes that received stocking, post-stocking performance such as growth and survival, and angler-use and harvest characteristics, for example angler effort, total catch, CPUE, percent return to creel, or others as appropriate.
3. Evidence to evaluate the hypothesis that by directing fishing and harvest opportunities at fishing lakes, pressure on sensitive stream populations is reduced. Evidence might be data-driven analyses or a literature review of empirical data that demonstrates the extent of this redirection.

Generally, the proposal does not provide the kinds of information necessary to adequately judge whether or not it meets scientific criteria required for the Council's Fish and Wildlife Program. The sponsors propose an ongoing operational project aimed at producing a target of 100,000 rainbow trout (RBT) juveniles and 100,000 westslope cutthroat trout (WCT) juveniles for release into fishing lakes managed by Montana Fish Wildlife and Parks (MFWP) and the Confederated Salish and Kootenai Tribes (CSKT) to meet mitigation requirements of construction and operation of Hungry Horse Dam. Nominally, the stocking of fish into the agency-managed lakes is identified in the "loss statement." The ISRP identifies two basic kinds of information lacking within the proposal.

First, the project sponsors indicate that the two cooperating agencies (MFWP and CSKT) will receive and distribute the trout propagated at the Creston NFH. They also indicate that the cooperating agencies will conduct monitoring and evaluation of the stocking operations. The ISRP appreciates that MFWP and the CSKT are responsible for the decision on which lakes will receive the stocked fish and will conduct the evaluations of post-stocking survival and fishery yield. Nonetheless, the decision pathway for determining stocking locations, stocking numbers,

and consistencies with agency stocking policies needs a fuller explanation and presentation. MFWP and CSKT have each submitted proposals for RM&E activities associated with Hungry Horse Dam mitigation activities (e.g., 199101903 for MFWP), but these do not specify any Objectives, Deliverables, or Protocols associated with stocking of the Creston NFH fish. Moreover, the sponsors do not summarize or present analyses of results from this project's past activities beyond numbers produced for 2006-10. In these years, there has been considerable annual variation in production ranging from ~70-122% of target. It is unclear whether the variation is on fishing demand, agency objectives, or simply based on production survival. Therefore, the ISRP cannot objectively evaluate the scientific basis for the program's success at meeting its (offsite) mitigation objectives for losses associated with operation of Hungry Horse Dam.

The ISRP requests that the sponsors provide a copy or a link to the specific plan used by the cooperators to monitor and evaluate the program's progress. In the event such a plan is not presently available, the ISRP recommends to the Council that such a jointly developed plan (among cooperators) be produced within 12-18 months. The plan should minimally include who is responsible for individual M&E pieces, the measurable objectives of the project (such as the targets for catch rates and stocking densities required to meet those targets), a proposed list of recipient waters and stocking densities by year with a description of the lake, including its connectivity to open waters in the subbasin, the metrics used to evaluate effectiveness of stocking toward the objectives, and any specific analytical approaches that will be applied to M&E data.

The ISRP also requests a copy of or link to the summary report of the program's results to date for the metrics identified in the plan (if any), such as production characteristics such as size, numbers, and health assays, as well as an historical accounting of lakes that received stocking, post-stocking performance such as growth and survival, and angler-use and harvest characteristics for example angler effort, total catch, CPUE, percent return to creel, or other as appropriate. The ISRP recommends to the Council that such a report should be delivered or reviewed prior to the next annual round of production.

Second, the project sponsors suggest that by directing fishing and harvest opportunities at fishing lakes, pressure on sensitive stream populations is reduced. The sponsors suggest this is a logical outcome, although no supporting data are provided. The ISRP suggests that this is a testable hypothesis and requests such supporting documentation preferably within the data report requested above, especially data-driven analysis or a literature review of empirical data that demonstrate the extent of this redirection of angler effort rather than the possibility of simply creating a different population of harvest angler that has little bearing on the local sensitive waters. An important question that needs to be addressed is: are the anglers using fishing lakes the same as those that would target the sensitive "no kill" waters, or do the lakes and the streams recruit different a kind or population of anglers?

Ultimately, the present review reiterates previous recommendations for a more science-based approach to the proposed work. In earlier reviews, the ISRP “qualified” its recommendation in two primary ways. First, the ongoing production and distribution/stocking of rainbow trout remains at odds with goals of eradicating introgressed hybrids in the basin. The sponsors indicate that only “closed” basins receive trout so that risks are minimal. This reinforces the need for clearly articulated linkage with agency M&E actions on the stocked fish and descriptions of these recipient waters. Second, as described above, the sponsors premise the purpose of production and distribution as diverting fishing pressure on native and sensitive populations elsewhere in the basin. The ISRP seeks some evidence to substantiate this premise.

[200200300](#) - Secure and Restore Fish and Wildlife Habitat in Montana

Sponsor: Salish and Kootenai Confederated Tribes

ISRP recommendation: Response requested

Comment:

This joint ongoing project between MFWP and CSKT requests \$24 million to continue acquiring lands by fee title or conservation easement to protect forever habitat for adfluvial and resident bull trout and westslope cutthroat trout in the Flathead River basin, Montana. This work is mitigation for habitat lost owing to Hungry Horse Dam.

First, the ISRP applauds the two sponsors on their efforts to collaborate actively on this project. This level of cooperation and collaboration is rare in the Columbia Basin. The project has so far protected 35 km of streams since 2002, 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. The presentation to the ISRP showed several properties acquired, and presented a brief list of the criteria used to select lands for acquisition. However, these criteria, both for the 1) ecological/mitigation value and 2) the cost/benefit value, were not presented in the proposal. Moreover, this same request has apparently been made repeatedly by ISRP, yet no information has been forthcoming. In the “Response to past ISRP and Council comments and recommendations” the sponsors indicate that they have developed the criteria and a scoring system.

The ISRP is excited about the opportunity for the program to continue to purchase lands, or conservation easements, as one of the most effective ways to protect habitat to help recover the threatened salmonids in this basin. The ISRP also understands that much of work depends

on opportunity to purchase parcels, and that this is sensitive to both the release of information and timing. However, the ISRP requires a response on four key points:

1. What are the specific qualitative and quantitative criteria that provide the template against which different properties are compared, both for ecological/mitigation and cost/benefit purposes?
2. How are these criteria scored? The ISRP needs to see the explicit criteria and scoring metrics used.
3. How are two key emerging limiting factors, increased climate change and variability, and exotic species, considered in this scoring system?
For example, future climate change and variability, or invasions by a non-native plant or fish, may make a property that is currently valuable no longer a high priority for acquisition. Much trout habitat will be lost as water warms, and fish assemblages will likely shift to species like smallmouth bass in the next 70 years (Wenger et al. 2011, Proc. Natl. Acad. Sci). Although the ISRP agrees that much can be done to decrease these effects with riparian habitat protection and watershed restoration, it will be important to develop basic predictions of what habitats will remain suitable into the future. How does the scoring system account for these factors?
4. It was unclear how the budget was planned and the total cost determined. The ISRP understands that many acquisitions are opportunistic, but more information is needed here.

ISRP Retrospective Evaluation of Results

As described above, 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 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.

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.

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 requested

Comment:

The Duck Valley Indian Reservation trout stocking program needs a comprehensive summary of the fish stocking, creel census, fish growth, and environmental limnological data for the ISRP to make a judgment on whether the project meets scientific review criteria. The ISRP understands that the comprehensive summary is nearing completion and will be provided for review during the response period. If the summary does not clearly respond to the responses requested below, the sponsors should provide appropriate responses.

1. Describe the significance of the project to regional programs.
2. Provide a quantitative description of the desired fish harvest, whether that harvest has been achieved, and the current status of environmental challenges and problems.
3. An explanation of the approach that will be used to evaluate the scale of the threat to the put-and-take fishery by emerging limiting factors should be provided.
4. Information on factors limiting the growth, survival, and catchability of stocked fish is requested.
5. Provide a response containing additional details on Deliverables as specified below.

Additionally, the actions proposed in this project (199501500) should be part of an overall Master Fisheries Management Plan for the Duck Valley Indian Reservation (DVIR) that describes an overall fisheries and habitat management program for the DVIR. The DVIR Fisheries Master Plan does not presently exist, but if developed, could provide considerable overall guidance and coordination among the potentially conflicting fisheries management goals for native redband trout in DVIR streams and watersheds with management of the three large reservoirs where non-native rainbow trout are stocked to provide angling opportunities. The ISRP recommends that such a plan be developed to guide fisheries actions on the DVIR prior to the next project solicitation.

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

Significance to Regional Programs: No response is provided. Clearly the project is related to the Council's Fish and Wildlife Program and the Owyhee subbasin plan, and perhaps a tribal fisheries plan or environmental document. The program may also have relationships with Idaho

or Nevada trout stocking plans and/or policies. This section needs to be completed; the NA given in the proposal is not accurate.

Technical Background/Problem Statement: The general goal and objective to replace lost anadromous salmon fisheries with a put-and-take trout fishery is sufficiently presented. The problem statement provides a clear summary of the history of stocking and creating fisheries in three reservoirs on the Duck Valley Indian Reservation. However, the problem statement does not provide an adequate quantitative description of the desired fish harvest, whether that harvest has been achieved, and the current status of environmental challenges and problems. For example, grass carp have been stocked to graze and reduce aquatic macrophytes and trapping programs are proposed for Lake Billy Shaw and Mountain View Reservoir to remove yellow perch and tui chubs. While some detail on these issues and solutions are summarized in the 2008/2009 annual report, a more complete presentation is needed in the proposal.

Objectives: A single objective is identified – Remediate loss of anadromous salmonids to the DVIR. The purpose is to provide and enhance subsistence fishing for Tribal members. Objectives are needed quantitative standards that can be evaluated by metrics. None are provided in the proposal. Monitoring needs to provide data to evaluate whether the objectives are being achieved.

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

Accomplishments: The accomplishments/results section is too brief. The proposal text identifies the trout stocking that has taken place, along with native vegetation work, and grass carp introduction. The concluding paragraph states that a comprehensive report will be completed in January 2012. The ISRP needs to have that report for a final evaluation of the proposal/program. The 2008/2009 annual report provides some information, but it needs to be addressed in the context of achieving the fishery goals. In the annual report stocking information is provided, but the table is not legible. Summary statistics and observations from the creel census are provided, but not interpreted. There is no identification of whether Tribal members have used fish from the program for subsistence harvest, and how this goal is reconciled with potential mercury contamination. In the annual report it appears that fish growth has only been modest. There was no presentation of limnological findings.

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

Project Relationships: No project relationships are identified. The sponsor should confirm that this project is or is not integrated and complementary to other Fish and Wildlife Program projects, BIA activities, or other programs.

Emerging limiting factors: Climate change, non-native species, and predation increases were identified as emerging limiting factors. The problem statement, accomplishments, and adaptive management identify these problems, but a structured approach to evaluating the scale of the threat to the put-and-take fishery is not developed.

Factors limiting the growth, survival, and "catchability" (water turbidity, dissolved oxygen, temperature, etc.) of the stocked trout in each reservoir are not discussed in specific terms. This information is needed.

4. Deliverables, Work Elements, Metrics, and Methods

Sixteen deliverables are itemized under the single objective. A few are self-evident and require no additional justification, but most require additional information regarding need and alternate approaches considered:

Delv-7 is to collect field and lab data, but details are not specified. Delv-7 and Delv-8 need more development. The reservoirs are stocked with trout, and creel census, fall gill-netting, and limnological data are collected at various times. A description of how the data are analyzed is needed as is evidence that the precision and accuracy are adequate for making stocking decisions. A plan for evaluating post-stocking survival, growth, and lake-ecosystem function needs to be developed. Are the reservoirs too hot, oxygen depleted, too turbid, or what?

Delv-12 Highline Canal headcut stabilization – The proposed action is outlined to stabilize what is apparently a large headcut. While this might be a necessary action if turbidity is rendering Sheep Creek Reservoir unfishable, the problem and solution are not adequately described and the headcut was not seen on the field tour. Map, photos, and details need to be provided.

Delv-13 Quagga mussel – This is needed if it is clear that boats entering the reservation from contaminated waters have not already been inspected.

Delv-14 Mapping – This might be useful, but a \$75K activity needs justification beyond saying that data are lacking.

Delv-15 Habitat enhancement – Several possible techniques are mentioned in a vague sense. More detail and explanation are needed.

Delv-16 Tissue sampling (mercury) – Why are Hg levels high and how high? If this was a problem why was sampling discontinued?

[199701100](#) - Duck Valley Reservation Habitat Enhancement

Sponsor: Shoshone-Paiute Tribes

ISRP recommendation: Response requested

Comment:

The sponsors need to provide the following:

1. The procedure used for selecting and prioritizing potential habitat enhancement sites.
2. The design of the RM&E program including sample site selection, methods, and metrics. Reviewers are aware that an RME plan was developed several years ago by BioAnalysts Inc., but specific references to appropriate components of that plan are needed.
3. An analysis of the M&E data on habitat and fish that have been collected to date. Presumably this would be the evaluation of the 2006-2010 results being produced by a consultant, as mentioned in the proposal.
4. Detail regarding Deliverable 17, a fish screen. Apparently there is the intent to install or replace one but no details are presented.

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

The goal of this project is to protect and enhance stream and riparian habitat on the Duck Valley Indian Reservation. Cattle grazing is a major land use problem on the reservation. Most of the work conducted to date has focused on excluding cattle from springs and riparian areas to protect and restore stream habitat. The sponsors plan not only to continue this kind of work but also to begin instream habitat enhancement projects

The project is consistent with the Owyhee Subbasin Plan. The Technical Background could be more detailed. The problem statement is minimal and consists of one paragraph. It is simply a broad overview of the activities the Tribe is taking to protect and enhance habitat. The proposal would be improved with more discussion of the background and history of the project. This would include the progress that has been made over the years since project inception in 1997, the problems that have been encountered, how they have been addressed, and any changes in direction the project has taken. A map showing the location of some of the more important streams and springs would have been helpful. Details about the M&E program should be provided.

The four objectives provide a relatively clear picture of what the proposed work is trying to accomplish.

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

The program has undertaken an impressive number of habitat enhancement and protection projects, as many as 130, but no quantitative results were presented on trends in habitat and fish from these projects. Rather the sponsors address implementation accomplishments in a lengthy list that identifies the location where work was done and the type of actions undertaken including off-channel water troughs and riparian and spring fencing, but present no results of this work. It is unclear how successful the habitat enhancement projects have been or how fish have benefited from the projects. There is no information given on status of fish populations.

The ISRP identified this problem in the 2007-09 review of this project. The comment is still apropos, "a summary of biological results is not provided. Past accomplishments refer to extensive monitoring and data collections, so one would hope that some habitat trend responses could have been reported on. The proposal, however, indicates the data and statistical analysis to support effectiveness monitoring is forthcoming as the M&E Plan is executed." Analysis of data collected over the past 14 years by this project has not occurred.

To their credit, the sponsors freely acknowledge this problem in their proposal: "Data analysis, data sharing and reporting remain the shortcomings of the program." The sponsors also have made a commitment to undertake comprehensive data analysis: "The monitoring and evaluation data will be provided in a stand-alone report covering data from 2006 through 2010 scheduled for completion by spring 2012. Outstanding reports for FY2009 and FY2010 will be completed by February 28, 2012."

More important for the current review is the statement: "The Tribes are currently in the process of contracting with an environmental consulting firm to tabulate and display the monitoring data collected by the Tribes from 2006-2010 which will allow the project manager, in conjunction with the department director and fisheries biologist, to analyze, interpret and report on the data that has been collected to-date. The project manager has projected completion date of January 31, 2012 for receipt of this work product." We are encouraged that the sponsors finally will be undertaking this analysis. That information should be made available to the ISRP in the response loop.

ISRP Retrospective Evaluation of Results

The ISRP's evaluation is pending a response from the sponsor.

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

The sponsors state that their program accounts for potential effects of: 1) climate change; 2) non-native species; and 3) predation increases. How their work helps ameliorate climate change effects on water temperature is discussed briefly. It is not clear from the proposal how serious a problem non-native species and predation are, and how the proposed habitat work will help alleviate these problems.

The sponsors speak of a status and trends monitoring program and an effectiveness monitoring program, but little detail concerning these programs is provided. The sponsors state that they will employ a GRTS sampling design for the program by referring to a protocol in MonitoringMethods.org, but few details about the design are provided. For example, have the actual field sites have been selected? Will the GRTS design include sites that have undergone habitat enhancement or just sites that have not been treated? It is unclear whether an M&E program has been in place or if this is a new effort.

4. Deliverables, Work Elements, Metrics, and Methods

Many of the deliverables listed are really components of the process such as report submission. Several of the deliverables seem to involve the M&E plan developed by BioAnalysts several years ago, but, as mentioned above, that reference is unclear enough to make understanding difficult. Deliverable 17 is to install or replace a fish screen and seems to lack further detail anywhere. More detail is needed.

The sponsors should have described their rationale for selecting and prioritizing potential project sites.

Upper Snake Province

[199201000](#) - Fort Hall Habitat Restoration

Sponsor: Shoshone-Bannock Tribes

ISRP recommendation: Response requested

Comment:

The sponsors appear to have done quite a bit of habitat enhancement work, and it seems that it has improved habitat conditions in Fort Hall Bottoms streams. The project appears to be at an important juncture as it is poised for larger-scale efforts, but without strong underpinnings of consistent and predictable successful results. The proposed assessment of limiting factors comes at a good time and might be expanded. This project, however, needs to complete a comprehensive summary of the past work, current resource status, and establish focused priorities for achieving improvements to aquatic resources and fisheries. Toward this end, the sponsors need to provide an overall plan for restoration including:

1. Discussion, but preferably numerical documentation, that the habitat protection and restoration goals are obtainable and that achieving the habitat goals would lead to the desired improvement in fish abundance.
2. A comprehensive summary of the status of the resources including habitat and focal species, assessments of limiting factors, work completed prior to 2007, work completed post-2007, and what the priorities are for 2012 – 2017. The summary should include an up to date report of results through 2010 or 2011, if the data have been analyzed.
3. Clearly stated recovery objectives. If quantifiable objectives and strategies have been established, they should be stated. Streams where the enhancement work will take place need to be identified. A map of current and proposed future projects would be helpful.
4. A rationale for selection and prioritization of potential sites for habitat restoration, the sites where proposed work will take place, and why these sites were selected.
5. A more thorough description of the M&E program including sampling design, methods, and metrics.
6. More information on Bannock Creek.

7. A justification for stocking hatchery fish (Deliverable 11) including how this activity is consistent with the overall goal of recovering native fish populations. Is this activity intended for harvest augmentation or supplementation?

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

The proposal continues instream and riparian habitat restoration in Fort Hall Bottoms streams, largely lower gradient spring streams that are highly productive but provide challenges in their rehabilitation. It states, "The goal of this project is to provide conditions to recover weak populations of focal species (native Yellowstone cutthroat) to self-sustaining levels on the Fort Hall Reservation by improving/providing suitable habitat."

A new aspect of the proposed actions is to address some of the larger, more complex and expensive areas of habitat damage. More elaborate design and engineering would be included, appropriately. The larger scale work would also be accompanied by an assessment of the spring creeks to better evaluate limiting factors and presumably aid in prioritizing efforts. This overall approach appears to reviewers to be necessary and appropriate as the project evolves.

Such an assessment should include a determination of the portions of the creeks that are most important to (a) protect and (b) restore for cutthroat trout with resident and adfluvial types addressed separately and with a parallel evaluation for non-native trout species. An assessment that does these things and begins to quantify fish habitat and fish abundance is vitally needed at this point to assemble a plan for restoration that so far has been lacking.

This is largely a stand-alone effort because it is probably the only spring stream restoration project in the Columbia Basin and involves somewhat different geomorphological principles than "freestone" streams. The photos included in the proposal do a very good job in helping describe the situation.

The proposal could be improved with a stronger technical justification and problem statement. The problem statement is taken from the narrative developed in 2007 and should be updated. The proposal would be improved if the sponsors had discussed in more detail the current status of habitat and focal species, how this current status reflects the work done during earlier funding or work cycles, the major limiting factors and how widespread and significant these factors are in limiting trout populations, and how the current status informs the priorities for the next few years. A discussion of work completed prior to 2007, work completed post-2007, and what the priorities are for 2012 – 2017 would have been helpful.

The proposal could be enhanced if a more definitive recovery goal for fish populations was stated. At one point in the proposal the sponsors state that the goal is to "recover weak populations of focal species... to self-sustaining levels." It is unclear what the sponsors mean by "weak" and how they determined that populations were "weak." It is equally unclear how they

will determine when the populations reach “self-sustaining levels.” At another point in the proposal the sponsors state that the goal of the work is to restore trout populations to “historical levels.” It is unclear what “historical levels” means numerically and whether it is conceivable today to restore populations to the abundances they maintained in the past.

There are four objectives in the proposal: improve habitat; increase focal species density; monitoring and evaluate work; and increase angler and tribal member catch. No time frame for achieving these objectives was given. The background and problem statement did not establish that meeting the habitat protection and restoration goals was obtainable and that achieving the habitat goals would lead to the desired improvement in fish abundance. Additionally, there is no quantitative documentation that improving cutthroat abundance would provide sufficient fish for achieving the harvest objectives. Some treatment of the links between these goals is needed.

The sponsors state, “Quantifiable or measurable objectives were never developed for project 199201000 or submitted to BPA in Statement of Work documents or previous proposals. An attempt was made during the Subbasin Planning Process by Resident Fisheries Program in 2004. Because this is an on-going project proposal, it was decided to not include the newly drafted objectives and strategies in the appropriate section(s).” A statement of quantitative, measurable objectives would have improved the proposal considerably.

Objective 2 is to increase focal species densities. This is an important goal, but apart from the cessation of stocking non-native species (already accomplished) how would it be done? No mention is made of how much the sponsors want to increase densities and in what streams.

The sponsors point out that their work is consistent with the Council’s Fish and Wildlife Program and the Upper Snake Subbasin Plan. Is there a relationship to a tribal fisheries plan or environmental document? The program may also have relationships with Idaho or Nevada trout stocking plans and/or policies.

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

The sponsors appear to have done quite a bit of habitat enhancement work and it seems that it has improved habitat conditions. Discussion of accomplishment and results were presented too briefly and may not fully reflect the progress of the project to date. The discussion could have been better organized with transparent links between the tasks completed since 1993 and the current status and assessment of the habitat and fishery resources. Most of the Accomplishments section was taken from the 2007 proposal.

It was not clear how trout abundance data were obtained, although the use of electrofishing was mentioned. It appears cutthroat trout are now beginning to expand to occupy habitat that was previously occupied by hatchery-produced rainbow trout prior to discontinuation of

stocking. Unfortunately there are few, if any, comparable situations elsewhere with which to compare as most western U.S. spring streams are populated with non-native trout. Emphasis to date has been on "soft" techniques for restoration, using a minimum of heavy equipment unless there is no alternative. This approach appears sound.

A major concern is how effective the project has been in increasing abundance of native fishes in both Clear Creek and Spring Creek. Trout densities in Clear Creek increased through the 1990's but then declined precipitously in the 2000's. The sponsors believe that the decline was due to the impact of the Tribal bison herd on stream habitat. Future plans are to fence the stream to exclude bison. Only results through the mid-2000's are presented for Clear Creek. The sponsors should have presented up to date results if they are available.

The trend in trout abundance in Spring Creek is also of concern. Trout densities in Spring Creek decreased considerably from 1993 to 2008 despite habitat improvement efforts. Trout biomass was variable since 1993, but it increased in 2008. Since data after 2008 was not reported it is unclear whether the increasing trend in biomass will continue. Again, up to date results should have been presented. Apparently the sponsors will continue habitat improvement work in Spring Creek, but this effort may be futile unless they clearly understand why trout densities have remained depressed since the early 1990's despite extensive, ongoing habitat enhancement work. Perhaps the positive results from enhancement are so localized that they had little stream-wide impact. If so, what can be done? Is it possible that overharvest is a problem and stricter harvest regulations are needed?

The sponsors discuss management changes that are not really adaptive in the sense that the project has been improved or a new phase of the project has been initiated based on results of past work.

ISRP Retrospective Evaluation of Results

The ISRP will complete this after reviewing the sponsors' response.

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

Monitoring results for physical habitat and biological (fish and invertebrates) changes will be completed in 2012 for the most recent bank stabilization project. Some results of the project's nearly 20-year history are summarized but need to be brought up to date. Before and after photos of the most recent effort are helpful and illustrate visually habitat improvement. Accounts of physical habitat and fish abundance changes over time were fragmented and difficult to interpret, leaving reviewers with the feeling that much is needed to define the best metrics to monitor and to determine the methods needed to gather them. More needs to be

known about the factors limiting cutthroat trout in project streams, as the proposal acknowledges and proposes to focus upon.

For emerging limiting factors, the proposal states that non-native fish are collected annually and fish have been sampled for contaminants. Results of this work were not presented in the proposal. There was little discussion of how abundant and widespread non-native fish are in the streams. No mention is made of climate change impacts.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables include the use of a variety of techniques such as riparian fencing, to achieve restoration. The proposed work on newly acquired property on Bannock Creek is not described in any detail and may need some ISRP review as planning is completed.

Deliverable 1, “Increase Instream Habitat Complexity and Stability” is rather general. The streams, rationale for selection of sites within the streams, and the kinds of enhancement actions that will be implemented are unspecified.

For Deliverable 4, a more thorough discussion of non-native fish problems would have been insightful.

Deliverable 6 pertains to collection and analysis of habitat data. The sponsors propose to use the CHaMP protocol for collection of data. This protocol generates a large amount of habitat data. The sponsors do not provide much detail on how this data will be analyzed, what kinds of fish data will be collected, where it will be collected, and how it will be collected?

Deliverable 7 pertains to assessment of habitat conditions in the major streams in the Fort Hall Bottoms. On what streams will this assessment take place, how will the assessment be designed, and what data will be collected.

Deliverables 8 and 9 pertain to habitat work in Bannock Creek. This is the first time in the proposal that Bannock Creek was mentioned. There has been insufficient discussion of habitat problems in the stream, the status of the fish population, sites selected for restoration and how they were selected.

Deliverable 11 is to “Stock native focal species on Reservation.” More information on the stocking program is needed. How many fish will be stocked and how often? What is the size of the fish that will be stocked? Is the purpose of stocking hatchery trout harvest augmentation or supplementation? Possible genetic and ecological impacts of hatchery-reared trout on naturally spawning fish should be considered.

[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.

Clearwater Subbasin - Dworshak Dam and Trout Ponds

[200700300](#) - Dworshak Dam Resident Fish Mitigation

Sponsor: Idaho Department of Fish and Game (IDFG)

ISRP recommendation: Response requested

Comment:

A lawsuit stopped lake fertilization in 2011, the fourth year of a five-year test, which although a setback for the project was beneficial in terms of monitoring and evaluation. With a cessation of fertilizer input, the sponsors saw a rapid response with blue green algae returning to pre-nutrient enhancement levels. In a nitrogen-limited system, blue green algae can fix nitrogen, and thus outcompete other species that need nitrogen. However, with adequate nitrogen levels, other algal species and their zooplankters predominate over blue green algae, and support a plankton-based kokanee fishery.

The proposed food web monitoring is critical to evaluating success or failure of the proposed project and addressing both scientific and political concerns. Nevertheless, the ISRP wonders if the monitoring could be reduced in scale and budget and still meet the political and scientific needs for the project? For example, the enclosure experiment could be deleted, as it seems unnecessary and expensive.

The sponsors did food web work, which should be encouraged, but do not identify the criteria they are going to use for evaluating success nor do they commit to much detail on their fishery goals, in spite of some recent positive results. For example, what kokanee population response is needed to indicate success? The sponsors need a more rigorous presentation of their analysis methods and of existing data to date, including how annual variation in kokanee abundance can be sorted out from treatment response.

The proposal needs to be more sharply focused on a testable hypothesis. The sponsors argue that fertilization must be repeated, for an additional five years, because four years of data are apparently inconclusive (yet almost no detail regarding results is given to review). A critical question is whether four years of study shows significant enhancement of kokanee. When the population biomass "doubled" at the end of four seasons, were the IDFG management goals for kokanee met? Is it not possible that four years of fertilization were indeed adequate to evaluate a fishery response?

Alternatively, would simply monitoring the kokanee population in summer 2012 answer the question? Further, what really is the question – what kokanee population response is needed to

indicate success? The sponsors need to discuss their results (especially kokanee) in light of what has been found in other water bodies. Is the Dworshak work really pioneering?

A response is requested on the following issues:

1. Provide justification that the duration of the second phase of the study (five years) is long enough to yield conclusive results, given the inevitability of natural variation in kokanee abundance, catch, and spawner counts, and the likelihood that a response of kokanee to the treatment will only be observed in the last one or two years of the study. In their response the sponsors should consider providing a more comprehensive analysis of variability in kokanee abundance and spawner counts prior to the first treatment. In addition it would be helpful if the sponsors provided information on the response of lake biota following cessation of the first set of treatments in 2010.
2. Provide data indicating that pre-treatment kokanee population abundance, angler catch, and fish size did not meet IDFG's management objectives for the reservoir, and how the objectives were derived.
3. Provide better justification for how the enclosure experiments will directly contribute to understanding kokanee response to nutrient additions in the reservoir. Granted these experiments will shed light on limnological responses over a range of nitrogen concentrations and perhaps assuage public concerns, but what else will they do? For example, will these experiments provide information on trends in lake chemistry, phytoplankton, and zooplankton that cannot be reliably obtained from reservoir samples? Will the experiments provide greater understanding of mechanisms underlying biotic responses to nutrient addition? Will the experiments provide information on kokanee response that is not already known from the fisheries literature? Finally, could the enclosure experiment be reduced in scope or eliminated without compromising the project's biological goals?

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

The proposal identifies three stated objectives: to enhance reservoir productivity, to enhance the kokanee population and to improve nutrient cycling in the river upstream from the reservoir.

The proposed work is to determine if the addition of nitrogen fertilizer to Dworshak Reservoir will enhance the kokanee population and improve the reservoir and upstream fishery. The U.S. Fish and Wildlife Service established a goal of stocking 100,000 lbs of trout annually in Dworshak as mitigation for the loss of resident fisheries (Ecovista et al. 2003, pg 327). However, this goal has only been met three times in the history of the project (IDWR 2000) and recently stocking has been approximately 20,000 pounds annually. Fisheries for non-native kokanee and

smallmouth bass have since supplanted trout as the primary fisheries in the reservoir. However, these fisheries continue to be severely limited by reservoir operations. There are no present efforts to mitigate for the loss of historically abundant anadromous fish and marine derived nutrients to the fish and wildlife populations of the North Fork Clearwater ecosystem.

The sponsors present some evidence that the productivity of Dworshak Reservoir has declined, possibly due to operation of the dam, natural aging of the lake, and loss of marine-derived nutrients due to extinction of the salmon run in the North Fork Clearwater River. A five-year pilot nutrient enrichment project was funded in 2007 by BPA. After four years of nutrient addition and data collection the project was suspended in 2010 due to a permitting issue. A positive response in kokanee abundance was seen only in the fourth or last year of the study prior to its cessation. The sponsors are proposing another five year study to more conclusively determine whether nutrient additions to the reservoir will improve kokanee abundance, angler catch, and number of spawners.

The work is consistent with the Fish and Wildlife Program and the North Fork Clearwater Subbasin Plan where one goal is “assessing where nutrient additions or reductions would be beneficial to focal species.”

The proposed work would be better justified if the sponsors provided data indicating that pre-treatment kokanee population abundance, angler catch, and fish size did not meet IDFG’s management objectives for the reservoir, and how the objectives were derived. The project introduction states that it "seeks to improve resident fisheries in Dworshak Reservoir through the careful addition of a nitrogen-based fertilizer to the reservoir. In particular, the kokanee population should benefit from improved reservoir productivity and provide a better fishery for anglers. Further, fish and wildlife species in the North Fork Clearwater Subbasin will benefit from nutrients that kokanee transport to spawning tributaries where marine derived nutrients were historically abundant." However, it appears to reviewers that a more accurate description of the current goal is, or should be, to assess if fertilization is sufficiently cost-effective to adopt as regular, annual management.

Objective 3, “Improve nutrient cycling to the North Fork Clearwater River and its tributaries,” is based on the supposition that decomposition of the carcasses of larger runs of kokanee will increase nutrient levels in spawning streams and so benefit stream biota such as bull trout. They also surmise that kokanee fry will provide a food source for bull trout. While possible, this assumption seems at this point to be largely conjecture because no direct evidence was presented that the spawning streams were nutrient limited or that bull trout growth and survival were food limited. Furthermore, the sponsors do not propose to measure nutrient concentrations in the tributaries or determine if any changes in stream biota, including bull trout growth and abundance, have occurred following nutrient addition to the reservoir. Without this information Objective 3 cannot be accomplished. Consequently, either the

sponsors should provide an adequate plan to accomplish this objective or the objective should be deleted from the proposed work at this time.

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

In the spring of 2007, the U.S. Army Corps of Engineers (USACE) began applying liquid fertilizer weekly to the reservoir while IDFG monitored the response of the reservoir and kokanee population. Results from the first four years of nutrient supplementation indicated an immediate increase in densities of picoplankton, followed by a reduction in N₂ fixing cyanobacteria concurrent with an increase in the proportion of edible phytoplankton taxa, and an increase in the density and biomass of *Daphnia*, the preferred forage of kokanee (Scofield et al. 2011). By the fourth year of the project, kokanee were larger than they were in a pre-supplementation year with similar fish densities, and kokanee biomass was twice as high as it had been in recent years for which the sponsors were able to estimate biomass (Wilson et al. *in prep*). In addition, spawner counts in index streams were the highest on record (Wilson et al. *in prep*). How much confidence can be placed on the "biomass being twice as high" statistic? Is that likely to be a real, meaningful increase when considering the extent of normal interannual variability?

A positive response by kokanee was seen only in the last, or fourth, year of the first set of treatments. The sponsors expect the lake to return to pre-treatment conditions following cessation of the first round of nutrient supplementation in 2010. If this occurs and a kokanee response is observed only in the fourth or fifth year of the second set of treatments, as it was in the first set, it could be difficult to determine, with only one or two years of data, whether the response was due to the treatment or to natural variability in lake chemistry, phytoplankton, zooplankton abundance, and kokanee abundance. Given this variability, there is no certainty that a clear, scientifically valid, kokanee response will be evident in a five-year time frame. It seems that a study of much longer duration would be needed to account for natural variability and to provide conclusive results.

ISRP Retrospective Evaluation of Results

The lack of detail given in the proposal on results to date, especially regarding kokanee, made the proposal more difficult to review adequately. The sponsors need to provide more results and discussion than a table and two figures. Data and discussion about creel results including fish size, and catch rates, would have been informative.

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

The sponsors will work in collaboration with the USACE's Dworshak Resident Fish Mitigation Project. The proposed work also is relevant to two BPA funded projects: the Lake Pend Oreille

Fishery Recovery Project (199404700) and IDFG's nutrient restoration project on the Kootenai River that is part of the Kootenai River Resident Fish Mitigation Project (198806500). Relationships with USACE are described, with the USACE covering the cost of the fertilizer and its application, \$181K annually, as before.

4. Deliverables, Work Elements, Metrics, and Methods

Most Deliverables are accomplishable and relate directly to the stated Objectives. Standard limnological methods will be used to collect data on lake chemistry, phytoplankton, and zooplankton. Data on the kokanee population will be collected using protocols developed by IDFG. These methods appear sound.

There are six deliverables, including badly-needed public outreach.

Deliverable 1: Monitor limnological conditions of the reservoir – Some monitoring is clearly appropriate but needs to be described in more detail and better justified. Monitoring accounts for nearly half of the annual budget for the proposal.

The ISRP has commented in its retrospective reports and other reports on the importance of monitoring to evaluate responses to actions; however, the ISRP has also noted that monitoring needs to be targeted so it can answer the needed questions but not consume a disproportionate portion of the project's budget. We wonder if a scaled down monitoring plan for the food web could adequately provide the project's M&E needs and increase cost-effectiveness for the project.

Deliverable 2 is the experimental enclosure experiments. Although interesting, the need for enclosure experiments (Deliverable 2) is uncertain. The central question this proposal addresses is whether the kokanee population will respond positively to nutrient additions and the enclosure experiments will shed little light on this question. Reviewers are not convinced of the need for this task, suggesting it is redundant with work done elsewhere.

[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.

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 requested

Comment:

The ISRP requests a response to these issues:

1. Relationships to and coordination with other projects was not described. Please provide.
2. Methods for each of the objectives have not been described with adequate detail in either the proposal or in MonitoringMethods.org. Please provide.
3. More effort needs to go into not just performing the monitoring tasks, but framing the tasks, in more meaningful scientific, management, and adaptive management contexts. What management actions will this inform? The sponsors need to take the next step and describe how the data could be applied and further explored. Hypothesis testing is in order. Some improvement in this area would help in this proposal, and especially in the reporting documents.
4. Describe the management actions that will be addressed given the several years of monitoring that have been well reported. How is habitat work expected to have an effect on bull trout? How might these proposed management actions be tested?

Address comments from the ISRP's previous review.

In a follow up to the 2007-09 ISRP review requesting a response, the sponsors provided mostly adequate responses to the ISRP questions. The proposal has dropped genetic evaluation of hybrids and PIT and radio-telemetry investigation of fish movement. The annual enumeration of bull trout adults and juveniles remains in the proposal, as well as testing the census model. In future proposal cycles, justification for annual census needs to be based on a statistical design and analysis, not just the bull trout recovery plan. The ISRP poses the question of how often must bull trout be sampled to obtain data for determining the trend in population abundance. No answer to this question has been received.

Completion of the census model or permutation analysis is overdue, and testing of the model should have been completed by now. What is the status? The ISRP also asked if the model has been peer reviewed, but no response was provided.

While this project is listed as new in 2007, it has actually been ongoing since 1998 and by now status and trends of bull trout in this system should be understood. Application of project results for recovery actions should already be underway. It would therefore be essential for those proposing this work to frame the project in a broader context of bull trout ecology and management actions.

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

This proposed project is involved with the collection of diverse life history and ecological data on bull trout from the Warm Springs River and Shitike Creek. The proposal provides information responsive to a number of regional plans including MERR Plan, the Deschutes River Subbasin Plan, the NPPC Research Plan (2006), the Accords, and the USFWS Bull Trout Recovery Plan. The role of this proposal in supporting information needs under those plans is clearly described. The technical background provided in the proposal gives adequate detail regarding the basic histories of bull trout on reservation lands and the region.

Each of the objectives, if achieved, will produce measurable results. The work proposed to be conducted is all relevant. All 11 objectives are important activities. However, the overall perspective on the goals, objectives, and hypotheses to be tested is lacking. All of these "objectives" other than No. 10 might more accurately be described as sampling "tasks" to be performed. With adequately designed protocols, many of them are typical, fairly routine fisheries work. The described results and indicated use of the data seldom go beyond basic monitoring, with the broader significance not discussed. Perhaps this site-specific data collection is the primary intent of the 20-year effort. However, the objectives of this study can be expanded to include acquisition of much more general knowledge and hypotheses testing for bull trout. Many opportunities exist in this work to test various hypotheses related to bull trout relevant to this site and other sites. As one example, the importance of groundwater to bull trout, mentioned in the text, may be framed into a hypothesis. Sampling could be designed to test hypotheses of interest to other bull trout investigators such as migratory patterns in relation to resource availability. It is intriguing that one population is adfluvial and another resident. The significance and reasons for the difference could be investigated and modeled, with the results leading to a useful publication on bull trout life histories. Similarly, the use of half-duplex tags and an additional screw trap are proposed without well-defined hypotheses identified. The proposal is therefore too focused on simply monitoring the situation as it changes, perhaps over concerns of deterioration, rather than conducting a scientific investigation. The monitoring work should be done, but it is also important to ask why the observed ecological situation for bull trout exists. The region could thereby gain basinwide applicable knowledge, including the potential for habitat improvements, effects of climate change, and reasons for observed life history patterns. The proposal appears to be written more as a handbook for technicians to implement, more than as a scientific proposal for

scientists to conduct and learn from. By identifying higher-level objectives and hypotheses and collecting the data under the 11 current objectives, a more valuable outcome will result.

Some of the listed objectives could be combined under scientific objectives and hypotheses to be evaluated.

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

After more than ten years of work, the sponsors do not provide accomplishments or results directly in the proposal but indicate that accomplishments and results may be found in two reports which are listed in documents. One report is called a retrospective and covers the period of 1998-2009. The other is just for one year (2009-2010). These are straightforward monitoring results with little or no interpretation or discussion. This lack of interpretation is consistent with the lack of higher level perspective and broader objectives noted above.

What have we learned of general and specific scientific value during this time that allows for more effective management of the fish or their habitat? How is it changing our approach from what it would have been in 1998? It would be good to describe results to date in this context. This part of the proposal is not developed in adequate detail.

Regarding adaptive management, little indication of its use is indicated other than a statement that no management actions have occurred regarding bull trout except that no fishing for bull trout can go on during steelhead and salmon fishing seasons. Has the Warm Springs Tribe started any actions regarding management, control, or eradication of brook trout? Brook trout certainly appear to be limiting and competing with bull trout in several places on the reservation, for example Mill Creek. This would be a possible adaptive management action.

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

No relationships with other projects are described.

Climate change is briefly mentioned as an emerging limiting factor that they will track through their sampling. More thought needs to go into how results to date and planned work will address limiting factors. Some hypotheses would be useful to guide the sponsors' thinking.

Responses to tagging questions were adequate.

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables/work elements are detailed in section 1 by objective. Most of the deliverables are data delivery that will need some serious scientific interpretation. It is not clarified if any interpretation and synthesis are part of this proposal.

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

The methods described in MonitoringMehtods.org are incomplete, consisting mostly of general protocols. Some of the methods were not described beyond merely saying what would be done. It is unclear in some cases if the methodologies have been clearly worked out. Methods were listed, but it was indicated that they will be entered once they "receive a qualified rating from the ISRP." The sponsors need to provide methods in reasonable detail in a response before the ISRP can complete a review of the proposal.

Umatilla and John Day Subbasins - Freshwater Mussels

[200203700](#) - Freshwater Mussel Research and Restoration

Sponsor: Umatilla Confederated Tribes (CTUIR)

ISRP recommendation: Response requested

Comment:

A response is requested on the following items:

1. Identify hypothesized limiting factors for low recruitment
2. Explain how exotics could change host relationships
3. Identify hypothesis for the observed death of mussel beds

Mussel declines are a great concern throughout North America and elsewhere because of pervasive changes to river systems. Mussels are excellent taxa for monitoring and for assessing environmental conditions. Developing a solid understanding of mussels in the Columbia Basin will be prudent and useful for better resource management. This project is under the guidance of scientists with considerable experience and a scientific publication record associated with this or similar projects. The development of the project follows a logical pathway to where they are now. The project has contributed greatly to our knowledge of freshwater mussel status and trends in the mid-Columbia, and the proposed work will likely be worthwhile.

In order to provide a more useful scientific review of the project, the ISRP needs additional details on monitoring protocols and methods in a response. This is especially important for: 1) Deliverable 2, mussel reintroduction. Is enough known about mussel glochidia to expose fish caught in the Umatilla River as a pilot project? 2) Deliverable 3, apply and test predictive mussel-habitat models, 3) Deliverable 4, use of growth-increment chronologies, and 4) Deliverable 6, artificial propagation.

The proposal had two main thrusts, namely basic mussel research and restoration of mussels in the Umatilla. The mussel research component looks justified but restoration requires more justification. The project sponsors need to take a close look at the life history of the mussels. If low recruitment is the primary problem, what are the limiting factors? It was unclear if the sponsors had obtained adequate information to move into the next phase of translocation. Does project staff know enough to proceed with restoration? How do exotics change the host relationships? Are the limiting factors understood? If these are not addressed before translocation, can success be expected? For example, what if there is unsuitable habitat or a lack of fish hosts? Evidence was presented on the death of the mussel bed in the John Day. Do project sponsors have a hypothesis for this finding that can help direct the project? This is an important project, one that will become more valuable with time.

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

The project addresses the status and trends of freshwater mussels in the Columbia River Basin and in particular the area of the mid-Columbia occupied by the Umatilla Indian Reservation, an issue of broad regional importance. Because mussels are long-lived they are particularly useful as long-term bio-indicators of watershed conditions and habitat quality, including sentinels for metals and organic contaminants. The sponsors have a good grasp of the published literature. Specifically, this project is now designed with four objectives that are important and clearly articulated. The goal is to restore mussels to Umatilla River and other mid-Columbia basins to rebuild ecosystem diversity function and traditional cultural opportunities. The objectives of the work are clearly stated.

The work has been generally divided into three emphasis areas: (1) determining the current status of three genera of freshwater mussels in the Umatilla and upper John Day Rivers, (2) conducting a genetic analysis of existing populations to determine taxonomic status and evolutionary relationships, and (3) determining the feasibility of re-introducing mussels to streams where they have been extirpated or have greatly diminished in abundance.

The project sponsors have provided an adequate description of the significance of the work to other projects dealing with freshwater mussels, although there are relatively few in the mid- and upper Columbia. They point out that mussels have historically been an important food resource for native cultures in the area, but that mussels have suffered serious declines just as in other areas of North America. Currently, scientific evidence suggests that freshwater mussels are the most imperiled group of animals in the United States, and some species could be ESA listed. The project will provide information to guide freshwater mussel restoration and monitoring efforts.

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

The proposal provides a thorough description of past accomplishments. The project sponsors are to be commended for publishing their research on mussel genetics and evolutionary relationships. Some basic questions concerning genetics and intermediate host fish have been at least partially answered. The current proposal continues the work previously undertaken by exploring the feasibility of reintroducing mussels to areas where different species have been extirpated, by developing and refining models relating mussel abundance to stream habitat features, and by investigating the cause(s) of mass mortality events. It also adds the elements of elucidating mussel effects on the habitats of other species and forecasting potential effects of climate change on the long-term environmental favorability of streams in the Umatilla Reservation for mussel populations.

From an adaptive management standpoint, the emphasis to date has been on knowledge acquisition and not on policy change. The proposal states that the emphasis will be refocused

from research to restoration, but it appears that nearly all funding is to be spent on research at this stage of the project. The positive aspects are that the sponsors are developing predictive models to test assumptions, to improve understanding, and to generate knowledge and, working collaboratively with researchers from outside the region. A limiting aspect is that most of the work is being done locally. The ISRP notes that the researchers are listed to become involved with similar studies associated with Lake Roosevelt. Given the importance of mussels for ecosystem functioning, and the policy importance if they become ESA-listed, as they are elsewhere, it would be prudent to significantly expand the spatial scope of the work, especially the assessment and monitoring. Adaptive management needs to be greatly expanded. It is not clear how information from this project guides natural resource decisions. While it is true that the information has had some impacts, the adaptive management process is not developed to the point that efficient and knowledgeable decisions can be made in both policy as well as science to inform policy.

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

The project appears to be well integrated into the relatively few other projects dealing with freshwater mussels in the Columbia River Basin; in fact, this project has been a major contributor to advances in knowledge of mussel distribution and evolutionary relationships. The project assisted with mussel salvage (5,000) before and during riverine habitat restoration projects including the dewatered channel of the John Day River and shared equipment and data with the lamprey population status project. While there are some relationships, these should be actively expanded to include cooperation with additional projects and agencies in the Basin.

Considerable research is needed before it will be possible to say with confidence why mussels have vanished from many reaches where they would be expected to exist. The proposal will examine habitat characteristics, intermediate hosts which appear to be mostly sculpins or cyprinids, and water quality. The water quality work focuses on water temperature changes, the ISRP understands that there has been 70 years of de-watering in the Umatilla Basin, but we wonder if exposure to toxins from a variety of potential sources might also be a factor for these long-lived organisms. What is being done to look at agricultural chemicals and other substances that could cause lethal, sub-lethal, or reproductive impairment effects? It would also seem that an evaluation of ages or age classes from current populations including recently dead specimens as well as an evaluation of ages from shells in middens might be particularly informative to form some ecological perspective on what may have transpired over time. Has there been consistent reproduction during the post de-watering era, and if not, what were the water conditions during the successful reproduction years?

Translocation of mussels from existing healthy populations such as from the Middle Fork John Day River to streams where habitat is suitable but mussels are absent might benefit from mark-

recovery studies. However, the proposal did not contain many details about how success of the reintroductions would be determined. If the method of choice is determined to be release of glochidia-infested fishes, it may take a long time before results are observed because mussels are slow-growing and juveniles may be difficult to sample. What is the role of non-native fish species in the reintroduction?

4. Deliverables, Work Elements, Metrics, and Methods

Deliverables in general closely follow the objectives; however, there are some concerns:

DELV-6: If the technique has been successful in eastern United States applications, why would one expect the process to be different for similar efforts in the western United States?

DELV-4: It is not clear how can this be accomplished if the environmental data are not available. It seems that the mussels are responding on a daily to annual scale whereas much of the environmental data, especially from historical periods, is available on annual to decadal scales which demonstrates a mismatch in scales.

The proposed work elements, metrics and methods were often inadequately described for scientific review. For some of the deliverables, for example genetic analysis and taxonomic revision, methods can be deduced from the section on past accomplishments. However, for the mussel reintroduction, predictive model development, and artificial propagation deliverables not enough information was given, and details in MonitoringMethods.org were either missing or unavailable to outside viewers. For the most expensive deliverable, that is artificial propagation of mussels, no work elements, metrics, or methods were provided other than a very brief mention of artificial propagation efforts in eastern United States. Thus, the proposal should provide more details on these three deliverables before their scientific adequacy can be assessed.

One work element in particular needs clarification. Why have salmonid fishes not been evaluated as potential intermediate hosts? The survey of native fishes infested by glochidia was very revealing, but it was limited to non-salmonids. The need to protect salmonids from anthropogenic losses, including research activities, is understandable, but if glochidia can settle on salmonids, and if the overall goal of the project is to restore abundant mussel populations, it would be important to know what the host-parasite relationship of rearing salmonids to freshwater mussels is.

Regarding data management, very little information is provided on this subject, and that is a great concern. Data from this project have considerable value, now and in the future. At a minimum, information should be provided on data storage, back-up strategies, availability, anticipated changes in management, for example cloud computing and routine statistical packages. What percentage of the budget is devoted to data management?

Regarding key personnel, what are their responsibilities? A positive aspect is that the personnel listed have a strong record of publications in the peer-reviewed literature.

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

The protocols and methods in MonitoringMethods.org contained brief descriptions of the monitoring objectives, but there was essentially no information on the sampling methods or metrics. For some of the protocols, information was not available for viewing, stating that in order to see any information one needed to be logged in as a colleague of the owner. Sampling methods, frequencies, laboratory analyses, and statistical tests should be specified for the protocols and methods to be useful.

Method: 200850400: Population Genetic Analyses needs to be completed.

Basinwide - Climate Change Impacts

[200900800](#) - Climate Change Impacts

Sponsor: Columbia River Inter-Tribal Fish Commission (CRITFC)

ISRP recommendation: Response requested

Comment:

While there is a need for Tribal agencies to develop expertise in Climate Change and the consequences for First Foods, this proposal does not contain enough detail to judge whether or not this work will make a meaningful contribution to attaining this goal. Overall, the concept of this proposal involves using downscaled climate projections to predict stream/river temperature and flow, and then using these predictions to project biological responses by fish and other organisms. This approach is similar to that being employed by many ongoing projects in the region and such work can generate important information about climate change impacts on natural resources. This proposal is clear on the general goals, but provides little detailed information on how they will be achieved. Detail about the work elements was insufficient to enable a comprehensive review of the technical adequacy of the study approach. A revised proposal with more specific information about the objectives and methods is required to show that the work is based on cutting-edge science and has a high probability of achieving its stated objectives. In addition, a much more complete description of the adaptive management process, clearly indicating how information generated by this project will be communicated to managers, should be included.

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

The ISAB/ISRP have contended for the last decade that subbasin plans, and the projects based on these plans, should explicitly consider climate change, human population growth and invasive species in setting restoration priorities. The lack of spatially-explicit predictions of the relative intensity of these impacts has made evaluation of these factors at an individual project scale, or even at the subbasin scale, problematic. This project proposes to generate predictions of climate change at a scale appropriate to estimate impacts on First Food resources. Changes in climate will be used to predict changes in aquatic habitat, and habitat predictions will be linked with fish population models to provide projections of potential impacts to focal populations under a variety of future climate scenarios. These predictions will then be used to help guide mitigation measures. This is clearly a worthwhile goal and would be of considerable significance to regional restoration programs.

The technical background provided in the proposal fails to include some important elements. There is little, if any, acknowledgment of the work being done by the University of Washington Climate Impacts Group, NOAA and others to better understand the biological consequences of

climate change in the Pacific Northwest. Although the proposal indicates that these groups will be consulted as this project moves forward, the work that has been completed by these research organizations to date could have been used more effectively to describe the critical nature of the problem that this proposal plans to address.

There are three general objectives provided in the proposal: 1) estimate changes in mainstem hydrology and water quality due to climate change; 2) incorporate a climate change decision support system through tributary habitat and fish population modeling; and 3) develop sustainable adaptation strategies and tools to respond to climate change. The objectives are vague. OBJ-1 does not clearly indicate how projected changes in mainstem hydrologic patterns will be used to identify likely changes in water quality. OBJ-2 glosses over the considerable difficulty of using stream habitat conditions to predict productivity and capacity parameters that are required for population dynamics modeling. There is considerable experience with this problem in the Columbia Basin, and the proposal should review some of this information and provide some discussion of the high degree of uncertainty associated with this type of prediction and how this might affect the ability to achieve Objective 3, which proposes to develop a Climate Change Scenario Data Base Tool. While a Climate Change Scenario Data Base Tool sounds useful, there is insufficient description of this tool in the proposal to understand what it will actually provide. Including an example or demonstration in the proposal would be useful. Further, the mechanisms by which CRITFC will conduct and coordinate future database tool development with others in the region are not apparent.

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

A brief history of the project is provided in the proposal, and a link to a progress report for 2010-2011 project accomplishments is included. One of the major accomplishments in the first year of this project was the development of a unique database tool for modeling and predicting the effects of future climate change and tributary irrigation withdrawals on Columbia River mainstem flows. Little detail was provided on this tool; a description of the tool and an example of its application would have been informative. Also, has the tool been tested and appropriately validated? How effective is the tool in providing reliable predictions? It also would have been informative if the key results from the work to model future temperatures for the Satus and Toppenish watersheds were included in the proposal. Including this information would seem to be possible as the proposal noted that a manuscript is under review.

The adaptive management component of this project is not fully described. The project sponsors indicate that results of this work will be made available through usual scientific channels (publications and presentations) and will be available on the CRITFC website. A complete adaptive management process must also include a mechanism for transferring information to those implementing restoration measures in a form that they can apply to the problems with which they are dealing. It is not clear that the CRITFC website is sufficient to

achieve this transfer. The information that could be generated by this project, particularly the effort to extend predictions of the potential impact of climate change to tributary habitats, would be useful to nearly all practitioners of habitat restoration in the Columbia Basin as well as managers. Including an expanded adaptive management discussion in this proposal that outlines a process to convey the information generated by this project to people responsible for setting basin policy and restoration priorities would be of great value.

Retrospective Evaluation of Results

A link to a progress report for 2010-2011 indicates that one of the major accomplishments in the first year of this project was the development of a database tool for predicting the effects of future climate change and water withdrawals on Columbia River mainstem flows. However, little detail was provided on the nature of the tool or the accuracy of its predictions.

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

The emerging limiting factor addressed by this project (climate change) is widely appreciated as having the potential to impact the effectiveness of restoration efforts throughout the Columbia Basin. The first two objectives for this project are commendable in that they propose to develop methods to predict climate change impacts on both the mainstem of the Columbia and Snake rivers and for tributary habitats, where most habitat restoration efforts are focused. The third objective, "Develop Sustainable Adaptation Strategies and Tools to Respond to Climate Change" relates to the dissemination of the project results. As noted in the comments on adaptive management above, this objective is a critical component of the project, but the description of steps required to meet this goal are incomplete. A more comprehensive strategy for communicating project results to people in the Columbia Basin working on fish recovery and habitat restoration is required to take full advantage of this effort. The activities under this objective should be expanded to better address this goal.

The proposal appears to treat climate change as if it were the only major change occurring in the Columbia Basin. In fact, human population increase and consequent land use alterations, and invasive species may have as great or greater impact on productive capacity of some aquatic systems than climate change. Results of the study may not be very meaningful unless these other factors are also considered. Are these other impacts factors being incorporated in the study? If so, how?

Project relationships for this effort were adequately covered in the proposal. This project appears to be well aligned with some of the climate change work ongoing in the Columbia Basin and has established relationships with the major research groups in the region that work in this field.

4. Deliverables, Work Elements, Metrics, and Methods

The deliverables, work elements, and methods that were presented appear to be appropriate for meeting project objectives. However, this section of the proposal is much abbreviated. There is little detail provided as to how the deliverables will be accomplished, and the methods to be used are only very briefly discussed. In fact, the deliverables essentially just repeat the objectives. As noted above, there are ongoing studies being conducted by agencies and universities that are closely related to Deliverable 2. The sponsors could have used this work to better define the work elements to be included under this deliverable. Publications from these projects should be cited in the proposal justification. Also, there is no discussion of the relative availability of data on current habitat condition. It would seem that this type of information would be critical for assessing the potential impact of climate change on tributary fish production (Deliverable 2). Deliverable 3 (Develop Sustainable Adaptation Strategies and Tools to Respond to Climate Change) in particular needs elaboration. This deliverable appears to consist primarily of attending meetings and workshops. No discussion of how possible adaptation strategies will be identified and assessed is provided.

Much more detail on the protocols that will be employed in executing this study should be included in the proposal. Some additional detail on the hydrological and biological models that will be used, some indication of the range of climate scenarios that will be included, and some indication of where difficulties might be encountered also would have been useful. A complete technical review of the project is not possible without a greater level of detail on the deliverables and work elements.

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

Insufficient detail was provided on study protocols to enable a technical review. Therefore, meaningful comments cannot be provided. Methods should be thoroughly described in a revised proposal.

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.

Regional Coordination

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 meetings? 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 outlines 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.

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