Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

July 6, 2010

In reply refer to: KEW-4

Mr. Mark Fritsch
Manager, Project Implementation
Northwest Power and Conservation Council
851 SW 6th Ave, Suite 1100
Portland OR 97204-1348

Mr. Erik Merrill
ISRP/ISAB Coordinator
Northwest Power and Conservation Council
851 SW 6th Ave, Suite 1100
Portland OR 97204-1348

Re: Upper Columbia Programmatic Habitat Project 2010-001-00
Response to Comments of the Independent Science Review Panel (ISRP) on Narrative Proposal (ISRP 2010-12)

Dear Messrs. Fritsch and Merrill:

Would you please forward this response to the ISRP for its further consideration of the proposed project referenced above? This response has three parts:

- Cover letter from the Bonneville Power Administration (Bonneville), including responses to some ISRP comments about the 14 existing projects that are ending.
- Submittal letter from the project proponents, the Upper Columbia Salmon Recovery Board (UCSRB), which includes detailed point-by-point responses to the ISRP's comments.
- Revised narrative proposal from the UCSRB.

All three documents are available in Pisces for public viewing under this project. I hope the ISRP and Council agree with us that the UCSRB has produced a very comprehensive and professional response.

You may wish to read the UCSRB's point-by-point responses before proceeding with this letter. The remainder of this letter complements the UCSRB's response by addressing four ISRP comments about the 14 existing habitat projects in the Columbia Cascade Province and about the current review process (ISRP 2010-12):

- "At this point, the narrative does not…provide a summary of what has been learned from the 14 existing habitat projects…." (p. 2)

- "[The ISRP] would like to see: 1. a concise and brief description of how existing habitat projects have been implemented and how well they are working in the subbasins of interest" (p. 2)
- "Since this programmatic proposal involves incorporating 14 projects that have had a history of funding, the technical justification and project history sections are insufficiently developed….The project history section needs to describe the status of the work completed…and what has been learned about the efficacy of recent actions." (p. 4)
- "[The project proponents] should provide concrete examples of problems with the current review process and why the proposed process represents the best alternative." (p. 5) [Note: I interpret "current review process" to refer to the regional categorical review and funding process for the Columbia Basin Fish and Wildlife Program.]

We will consider the first three comments – those related to status and effectiveness of the current 14 projects – as a package, then apply the lessons learned to the current review process.

The 14 Existing Projects

Bonneville is in a better position than the UCSRB to speak to the history and performance of these projects. All of them were proposed and have been administered by entities other than the UCSRB, so the UCSRB bears no responsibility for them. Nevertheless, these projects compose a significant investment, and it is reasonable to wonder what they have accomplished and learned. Also, the projects are ending and will not participate in a future categorical review. In part for these reasons, Bonneville asked (and helped) the UCSRB to provide contextual summary information for these other projects in the Project History section of its original narrative proposal. Unfortunately, Bonneville's guidance may have inadvertently created the impression that the UCSRB is somehow responsible for the 14 existing projects.

No report cards exist for individual projects, let alone for a portfolio of projects like these. Certainly, annual progress reports are generally and publically available, while metrics, status reports, and a wealth of other details are provided in Pisces and Taurus. However, this information cannot be easily compiled and meaningfully measured against the work originally proposed or against other benchmarks. The ISRP may be asking for a meaningful overview.

Table 1 (at the end of this letter) provides summary information that may partially satisfy the ISRP's interests about implementation, accomplishments (i.e., work completed), and post-implementation monitoring. The following text elaborates on Table 1 at some length. A couple of the 14 projects from the FY07-09 review process were not implemented, while others were rather productive:

2 projects were not contracted, either because the proponent did not reach agreement with the respective stakeholders (2007-055-00) or because of a lawsuit regarding quantity of water to be diverted (2007-172-00, both shaded grey in Table 1).

1 project was contracted, but only got as far as Environmental Compliance before being delayed by another agency's land acquisition process. Partial funding for actual construction was provided by another source (2007-214-00, also shaded grey).

1 project has been contracted and is still working on assessments that were conditions from the FY07-09 ISRP review and Council funding recommendation (2007-034-00).

4 projects are completed or will be completed by the end of their FY09 contracts (2007-237-00, 2007-251-00, 2007-318-00, and 2007-400-00; all shaded green in Table 1).

6 remaining projects have work ongoing through FY10 within the approved scope of their FY07-09 proposals. Bonneville could sustain these projects with FY10 start-of-year budgets because they are programmatic in nature; they cover a type of habitat work within a geographic area.

We have learned that projects may not reach full implementation for many reasons, and it helps to remember the ontogeny of these 14 projects. They were developed and proposed in 2005 and 2006 at Bonneville's request to satisfy a nascent obligation under the Endangered Species Act/Biological Opinion (BiOp), referred to as the Updated Proposed Action (UPA). Bonneville's request represented a significant expansion of funding to improve habitat in the Upper Columbia, and project proponents – most of whom were new to the Fish and Wildlife Program – stepped forward into foreign and challenging proposal and contracting processes with little time to plan and prepare. Proponents were asked to forecast and to describe specific actions up to four years in advance of implementation…no small feat for habitat restoration and protection efforts. Landowners and stakeholders change their minds, obstacles arise during environmental compliance and land acquisition processes, key staff become unavailable, priorities and opportunities change, proposal processes are delayed, legal challenges arise, etc. So, the issue is not simply whether a project was successfully implemented or not, but how we – the ISRP, the Council, and Bonneville – can best adapt and sustain an essential effort when things inevitably go awry with project implementation.

The accomplishments of implemented projects can be described in several ways. For example, Pisces provides reports of project/contract metrics. However, the Pisces metrics for these FY07-09 projects represent only a couple of years of on-the-ground work, because much of FY07 was occupied by contracting and ramp-up (e.g., design, permitting), and because some FY09 work is not yet completed and/or fully reported (in part because of how variable contract cycles relate to FYs). So, Pisces metrics capture some quantitative accomplishments, allowing for lag times in implementation and reporting.

Accomplishments beyond quantitative metrics – like lessons learned, post-implementation effectiveness, and adaptive management – are generally available in each project's annual progress reports. For example, some of the information presented in Table 1 for post-implementation monitoring was gleaned from those reports, from contract work statements, and from the FY07-09 project proposals. So, there is abundant and accessible information – both

quantitative and qualitative – about these 14 projects, but the challenge is to assemble it and to distill meaning from it.

The ISRP's desire for summary information suggests a need for a function – a role – that does not presently exist in the Upper Columbia. In this retrospective case, the need is for someone to gather relevant information from across 14 relatively disjointed projects, 5 project proponents, 3 years, and several data sources, then to summarize that information into a clear synthesis of progress and effectiveness; in essence, they are looking for an entity to be responsible for a sizable habitat program in the Upper Columbia/Columbia Cascade Province. The UCSRB proposes to accept that responsibility beginning in 2011. For now, this letter is the best we can do.

In addition to project implementation and accomplishments, covered above, we might benefit from a few additional notes regarding accomplishments and lessons learned:

- Riparian enhancement projects (2007-035-00, 2007-086-00, and 2007-231-00) are achieving plant survivals of roughly 90% through the 1st year and 80% through the 2nd year, attributable to effective irrigation. Drip irrigation is superior to sprinklers, which encourage weed growth. Weed mats, browse protection, and follow-up weed control are essential; mulching is useful.
- Economies of scale may be achieved when funding/contracting flexibility enables multiple related actions to be implemented in concert. For example, 17 culverts on Chumstick Creek (Wenatchee) were replaced with standard-sized pre-fab bridges in the 2009 construction season under a single contract for project 2007-400-00. This is impressively efficient implementation. Most high-priority anadromous fish passage barriers in the Wenatchee subbasin have now been corrected.
- Many project proponents/contractors feel somewhat constrained by Bonneville's contracting requirements. The high levels of resolution required for work statements, environmental compliance documentation, and line-item budgets limit the flexibility that more grant-like programs provide and to which many proponents/contractors have been accustomed.
- Projects involving Bonneville-funded acquisition of real property rights (e.g., conservation easements, fee title) have been obstructed by rigorous and time-consuming processes at Bonneville (e.g., 2007-264-00).
- It is too early to say much about the biological effectiveness of many of the completed passage and complexity actions, with the exception of the 2007 Nason Creek oxbow reconnection (2007-400-00).
- Post-implementation monitoring is spotty, although most of the implemented projects have covered some basics (Table 1). The meatiest monitoring and evaluation (M&E) exists for projects/actions (2007-318-00, 2007-325-00, and 2007-400-00) that intersect with the Integrated Status and Effectiveness Monitoring Program (ISEMP, 2003-017-00).

Important note: Projects devoted to M&E, with independent funding and administration, provide a more certain way to sustain post-implementation monitoring if/when the habitat projects themselves are completed, terminated, or otherwise no longer funded for internal M&E.

- Projects that have been proposed, reviewed, and approved – but cannot be implemented – represent stranded investments (2007-055-00, 2007-172-00, and 2007-214-00). It would help to have a process that:
    - Does not require sponsors to propose detailed projects several years in advance.
    - Provides higher certainty of success at the time funding decisions are being made.
    - Is more nimble in redirecting budgets that have been earmarked, but cannot be used.
- Projects that are completed before the next funding cycle are cul-de-sacs with respect to Bonneville sustaining an ongoing effort (e.g., for BiOp compliance). These tend to be discrete-action projects rather than programmatic in nature (2007-237-00, 2007-251-00, 2007-318-00).
- The understanding, acceptance, and support of Upper Columbia stakeholders for Bonneville-funded habitat work is slowly growing, thanks mostly to the diligent efforts of local sponsors. Much consideration must still be given to local values and how Bonneville does business in these subbasins.

Current Review Process

The accomplishments and lessons learned from these 14 projects lead naturally into a response to the ISRP's request (fourth bullet, above) for "…concrete examples of problems with the current review process and why the proposed process represents the best alternative." Again, I construe this to mean potential problems with the current regional categorical review process relative to a new programmatic habitat project in the Upper Columbia, as represented by the UCSRB's proposal. However, rather than focus on perceived "problems," it may be more useful to consider opportunities within the context of Bonneville's needs and interests:

- Assured out-year funding allows local sponsors to prepare better actions. This funding assurance exists in the Upper Columbia because of Bonneville's commitments through 2017 to the Accords and to the non-Accord BiOp effort represented by the UCSRB's programmatic project. A <u>rolling</u> 3-year financial commitment – if updated annually – probably would provide sufficient assurance. Abrupt terminations (e.g., end of the FY07-09 funding recommendations) and uncertainty about new recommendations (e.g., we're in year-to-year mode until the next habitat categorical review) hamstring our ability to sustain an effective effort. Bonneville began developing the programmatic concept for the Upper Columbia when it was apparent that the BiOp habitat effort in that area could not be sustained with just the remnants of the 14 FY07-09 projects. By FY10, only one-third of our original FY07-09 funding effort could be contracted for work that was consistent with FY07-09 project proposals.

- Bonneville funding can be applied more effectively to meet habitat obligations in the Upper Columbia. Proponents propose actions that can address the highest, most current priorities when the actions are fully developed. Under this programmatic project, proponents can propose preliminary work for funding in its time, then request support for actual construction. A process that provides for annual decisions is more nimble and therefore better able to incorporate new knowledge from recent assessments, to align funding with new opportunities, and to adjust to unexpected schedule changes.
- Better projects would result from complementary technical review and input by both local experts (i.e., the Upper Columbia Regional Technical Team) and regional experts (i.e., the ISRP). Local technical experts can stay abreast of current local conditions, can define specific priorities, and can assess in detail the merits and limitations of actions proposed to address those local priorities. They might be in the best position to make detailed and year-to-year evaluations. On a higher plane, regional technical experts could provide some continual oversight/participation, but – more importantly – could periodically assess performance of the local program, guide process (e.g., criteria for evaluating proposed actions), advise on latest scientific knowledge regarding techniques, and provide a nexus for information-sharing across the Columbia Basin. The Fish and Wildlife Program has become so large and complex that it might be useful to consider some refinements in roles and responsibilities.
- More effectively support a complementary habitat M&E effort. This support could be in the form of:
    - Ensuring that implementation and compliance monitoring is accomplished, perhaps within the habitat program itself.
    - Coordinating implementation of habitat actions with an independent effectiveness monitoring program (e.g., Entiat Intensively Monitored Watershed).

  Current proponents of habitat projects bear – in addition to significant implementation challenges – an unduly cumbersome M&E responsibility. They are asked to understand M&E standards, terminology, and methods and to ensure that their habitat work is well monitored and evaluated. However, they have a prime directive to accomplish on-the-ground mitigation and are constrained by budgets. Regionally, responsibilities for habitat implementation and its associated M&E could be more precisely defined and divided into separate programs that are independently funded and administered, yet highly complementary and coordinated at multiple levels. This appears to be developing, particularly in the Upper Columbia.

In conclusion, we hope that the information in this letter satisfies the ISRP's and Council's interests in the 14 existing habitat projects that are being terminated. Please consider the UCSRB's proposed Upper Columbia Programmatic Habitat Project both on its intrinsic merits and on its value as a potential model. The Upper Columbia already has the essential elements of a successful habitat program, as is evident in the UCSRB's proposal. This is one of several independent programmatic habitat projects being proposed in 2010; all of them are intended to

support Bonneville BiOp commitments, yet all are unique. Bonneville recognizes the need to engage further with the Council and the ISRP in defining criteria for "programmatic" habitat projects and ground rules for managing them. Kathy Fisher (503.230.4375) will be Bonneville's lead for this coordination effort.

We appreciate the ISRP's review and the Council's consideration of this revised proposal for the Upper Columbia Programmatic Habitat Project. Both the UCSRB and Bonneville would be glad to answer any questions and to provide supporting information. Please contact me (503.230.5213) if additional information is desired from Bonneville.

Sincerely,

Roy Beaty
Fish Biologist/Project Manager

Enclosures:
Cover letter and point-by-point response from the UCSRB
Revised narrative proposal for project 2010-001-00

cc: (without Enclosures)
Ms. Julie Morgan, Mr. Derek Van Marter, and Mr. James White, UCSRB
Mr. Casey Baldwin, WDFW

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Table 1. Summary of 14 Current BiOp, non-Accord habitat projects in the Columbia Cascade Province being replaced by the Upper Columbia Programmatic Project, 2010-001-00.

Number	Title	Status (June 2010)	Major Accomplishments	Post-implementation monitoring?
2007-034-00	Columbia Cascade Pump Screen Correction	Ongoing, and contract will renew 9/16/10 for the final, FY2010 contract period. Focus has been on completing assessments prescribed by ISRP and a condition for funding recommendation. Project will terminate 9/15/11.	1. Okanogan Watershed Assessment attached in Pisces (final inventory of locations of pump diversions, with priorities) 2. Lists of screening priorities for Methow, Entiat, and Wenatchee subbasins are in progress.	n/a No post-implementation monitoring was proposed or contracted.
2007-035-00	Methow Basin Riparian Enhancement Program	Ongoing, and contract will renew 8/20/10 for final, 2010 contract period. Project will terminate 9/19/11.	See metrics and monitoring summary in proposal Appendix C, also 2 annual progress reports.	Yes, minimal. Photopoints and visual observations of plant survival and weed encroachment, with results in annual progress reports.
2007-055-00	Lower Entiat River Off-Channel Restoration	Project was not contracted; could not obtain landowner agreement.	n/a	n/a
2007-086-00	Wenatchee River Riparian Enhancement	Ongoing, and contract will renew 9/27/10 for final, FY2010 contract period. Project will terminate 9/26/11.	See metrics and monitoring summary in proposal Appendix C, also 2 annual progress reports.	Yes. Photo points and results of plant (survival) assessments in annual progress reports.
2007-145-00	Okanogan Livestock and Water for Habitat Improvement	Ongoing, but will terminate at the end of the current FY2010 contract period (1/31/11).	4.9 mi. fence installed (along 0.20 mi. of stream) 0.35 mi. of stream riparian planted with native species	n/a No post-implementation monitoring was proposed or contracted.
2007-172-00	Methow Valley Irrigation District (MVID) West Irrigation Diversion	BPA-funded project was not implemented because of litigation.	n/a	n/a
2007-214-00	Fender Mill Floodplain Restoration	Last contract expired 6/26/09. Environmental Compliance was completed. Construction was delayed by lengthy land acquisition process (not part of this project), then partially funded by another source.	n/a	n/a
2007-231-00	Entiat River Riparian Restoration	Ongoing, and contract will renew 9/16/10 for its final, 2010 contract period. Project will terminate 11/30/11.	See metrics summary in proposal Appendix C, also 2 annual progress reports (which appear to have duplicate content).	No. Minimal implementation and level 1 effectiveness monitoring was proposed, but not contracted or reported.
2007-237-00	Elbow Coulee River Restoration	Project was completed, and last contract expired 5/31/10.	See metrics and monitoring summary in proposal Appendix C, also 2 annual post-project assessment reports.	Yes. A 2010 post-project assessment report is attached in Pisces (emphasis on physical parameters).
2007-251-00	Methow Valley Irrigation District (MVID) East Irrigation Diversion	Project is being completed now; last contract (and the project) will terminate 12/31/10 after reveg work this fall.	Too early to report actual metrics.	No. Minimal post-construction effectiveness monitoring was proposed, but not included in contracts.

Table 1. Summary of 14 Current BiOp, non-Accord habitat projects in the Columbia Cascade Province being replaced by the Upper Columbia Programmatic Project, 2010-001-00.

2007-264-00	Methow River Complexity Fisheries Enhancement	Ongoing, and contract will renew 7/1/10 for final, FY2010 contract period. BPA decisions pending on potential additional actions for unallocated portion of FY2010 project budget. Project will terminate 8/30/11.	0.57 mi. improved complexity 12 new instream/streambank structures + 2 repaired (no annual progress reports submitted to-date)	n/a No post-implementation monitoring was proposed or contracted.
2007-318-00	Knapp-Wham and Hanan Detwiler Irrigation Consolidation and Well Drilling	Project was completed, and last contract expired 4/30/10.	See metrics and monitoring summary in proposal Appendix C. Final status and annual progress reports not yet submitted.	Yes. Groundwater and channel morphology by sponsor; biological and other M&E by ISEMP (Entiat IMW).
2007-325-00	Wenatchee River Complexity Fisheries Enhancement	Ongoing with construction of CMZ 6 and CMZ 20. Project and current contract will terminate 2/28/11, at which time all work will have been completed.	See metrics and monitoring summary in proposal Appendix C, also 2 annual progress reports.	Yes. CMZ 11 and CMZ N4 M&E reports are attached in Pisces. CMZ 11 results include physical parameters and fish presence, with plans for snorkel counts of fish in 2010. Too early for CMZ N4 biological results (completed 2009).
2007-400-00	Wenatchee River Subbasin Fish Passage Enhancement	Project was completed, and last contract expired 3/14/10. This project was formed for BPA capitalization purposes from 3 projects proposed during the FY07-09 review: 2007-042-00, 2007-085-00, and 2007-283-00.	See metrics and monitoring summary in proposal Appendix C, also several annual progress reports.	Yes, most biological M&E by ISEMP (YN and USFS). Several reports attached in Pisces for Nason Cr. oxbow reconnection (completed 2007; YN snorkel counts by species/season) and Chumstick Cr. culvert replacements (completed 2009; USFS steelhead redd surveys).

The mission of the Upper Columbia Salmon Recovery Board is to restore viable and sustainable populations of salmon, steelhead, and other at-risk species through collaborative, economically sensitive efforts, combined resources, and wise resource management of the Upper Columbia region.

11 Spokane Street, Suite 101, Wenatchee, WA 98801 phone: (509) 662-4707 fax: (509) 665-6475 www.ucsrb.com

June 25, 2010

Dr. Eric Loudenslager, Chair
Independent Scientific Review Panel
Northwest Power & Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204

Re: Review of the Upper Columbia Programmatic Habitat Project (#2010-001-00)

Dear Dr. Loudenslager:

Thank you for the thorough review of the Upper Columbia Programmatic Habitat Project Proposal. The intent of the programmatic habitat project is to help provide a stable and effective process for implementing priority habitat actions that will ultimately lead to salmon recovery in the Upper Columbia Region. The Upper Columbia Salmon Recovery Board is confident that this programmatic approach will also achieve the goals of the Council, Action Agencies, and other partners with mitigation mandates. We realize the inherent challenge for the Independent Scientific Review Panel (ISRP) to review an intricate project identification and selection process proposal as an alternative to the current process of reviewing the technical merits of individual actions. The ISRP has spent significant time and effort assimilating and providing comments and we hope that we have responded sufficiently.

Please find enclosed the revised Upper Columbia Programmatic Habitat Project Proposal (#2010-001-00). This revised Proposal addresses the ISRP's comments regarding the original Proposal. The ISRP's comments were provided in Memorandum ISRP (2010-12) dated May 4, 2010 from ISRP Chair Eric Loudenslager to Tony Grover, Fish and Wildlife Division Director, Northwest Power and Conservation Council.

For your convenience, this letter includes a point-by-point summary of the additional detail that was incorporated into the revised Proposal in response to your comments of May 4, 2010.

Sincerely,

Julie DE Morg

Julie Morgan, Executive Director
Upper Columbia Salmon Recovery Board

Enclosed: Point-by-Point Summary Response to ISRP Response Request
Revised Upper Columbia Programmatic Habitat Project Proposal

Point-by-Point Summary Response to ISRP Response Request

The ISRP requested a response to the following:

ISRP Comment #1: Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)

1. bringing a large number of separate habitat projects under one umbrella project may not fundamentally alter the processes leading to site selection, project design, funding, and evaluation.

2. criteria that would be applied in determining which reaches or areas are most appropriate for large, restoration programs and which projects would be most appropriate to achieve restoration objectives at targeted sites.

3. reviewer qualifications, independence, and ability to avoid potential conflicts of interest.

4. the future proposals based on the Council's Multi-year Action Plans.

5. the lack of technical information in the proposal.

6. a description of work completed and what has been learned about the efficacy of recent actions.

7. the potential unwieldiness of process.

8. the involvement of local technical experts.

9. further description of the models including the intrinsic biological potential.

10. the need for long-term monitoring of Nason Creek.

11. a further description of IMW work in the subbasins.

12. information on the effects of watershed conditions from the Canadian portion of the Okanogan Basin.

ISRP Comment #2: Objectives, Work Elements, and Methods (section F)

13. concrete examples of problems with the current review process; explain why the proposed process represents the best alternative.

14. the concern on the lack of information given about where actions will occur.

15. an explanation and justification of the open track.

16. the importance of the Watershed Category approach.

ISRP Comment #3: M&E (sections G and F)

17. a completed BiOp RM&E plan.

18. how existing monitoring efforts will be coordinated with other activities to be supported in this proposal.

19. reach-scale habitat monitoring in the Okanogan and intensification of M&E in the Methow and Okanogan.

20. M&E plans for implementation and effectiveness monitoring.

21. Additional narrative on the statistical methodology to be used in measuring or comparing project effectiveness.

ISRP Comment #4: Benefit to F&W

22. a clear scientific approach to achieving integration across subbasins.

ISRP Comment #1: Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)

1. ISRP Comment: *Bringing a large number of separate habitat projects under one umbrella project may not fundamentally alter the processes leading to site selection, project design, funding, and evaluation.*

We agree with the panel that certain aspects of project selection and implementation will be similar under the old and new paradigms; however, there are several key differences. Under this proposed programmatic process the 14 Updated Plan of Action (UPA) projects will be terminated, and the Upper Columbia Salmon Recovery Board (UCSRB) and partners will begin a new coordinated programmatic approach to site selection, project design, funding, and evaluation. Accompanying this UCSRB response is a Bonneville Power Administration (BPA) letter that addresses how this new programmatic project relates to the current 14 ongoing projects and the NPCC Columbia River Basin Fish and Wildlife Program's categorical review process. In our response here, the UCSRB focuses on how this new habitat programmatic project improves processes within the Upper Columbia for site selection, project design, funding, and evaluation of habitat projects. Ultimately, we believe this process improves the quality of projects that BPA will fund.

Under the historical funding framework there has not been a coordinated approach focused on implementing priority actions in priority reaches nor has there been a process for Upper Columbia regional technical review of BPA-funded projects. Project sponsors were encouraged to coordinate within the Upper Columbia implementation infrastructure (i.e. Watershed Action Teams (WATs), the Upper Columbia Implementation Team, and Upper Columbia Regional Technical Team (UCRTT) to implement priority actions; in reality, site selection, project design, and funding coordination have been up to the discretion of the project sponsor. In the historical approach to funding, there was little incentive for sponsors to work in a coordinated regional framework to effectively implement the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (Recovery Plan). In fact, the old paradigm of funding can lead to increased inter sub-basin competition rather than coordination. Project sponsors sometimes pursued low priority projects simply because they had a willing landowner, and the possibility of securing resources for implementation.

Under the new paradigm, there is a focus on the most important biological reaches, consistent with the UCRTT's biological priorities and the Recovery Plan's Implementation Schedule, so project sponsors will be encouraged to seek out and gain the support of willing landowners in areas that have been identified as high priority by the UCRTT. Additionally, the UCRTT will be involved in selecting the best project alternatives and providing input on the project design early in the process.

Funding coordination is another aspect where the old and new systems are vastly different for two primary reasons 1) certainty of funding through 2017 facilitates planning and development of specific actions/projects, in some cases, could take multiple years to complete, and 2) year-to-year flexibility in funding specific (potentially large) priority actions improves our ability to identify funding opportunities and responsibilities collaboratively with other sources of

significant funds (e.g., the Fish Accords and U.S. Bureau of Reclamation mitigation funds). Funding will be coordinated with funding partners using Multi-Year Action Plans (MYAPs) as a planning tool at least three years in advance.

Revisions to the Narrative Proposal: Additions and changes were *incorporated into the proposal in B.5.3 Challenges in Recovery* and D.1 ***Ongoing and Future Implementation of Priority Habitat Actions in the Upper*** Columbia in response to the panel's comments.

2. ISRP Comment: ***Review process criteria: the criteria that would be applied in determining which reaches or areas are most appropriate for large, restoration programs and determining which projects would be most appropriate to achieve the restoration objectives at these targeted sites were not adequately detailed.***

You are correct that not a lot of technical detail was included in the original narrative. We were focused on describing the regional ***process*** of project identification and selection. The majority of the detail on the criteria developed within the Upper Columbia to determine the most appropriate locations and types of projects for the targeted solicitation was included in appendices or by reference. In our revision, we brought the most relevant technical information regarding the history, development, and foundation of the restoration principles and priorities in the Upper Columbia forward, from the appendices, into the document.

To summarize, we added sections on:

a. How we determined priority reaches and actions (B.4, page 13)
b. Spreadsheet that outlines the restoration and protection priority reaches and actions that will have the greatest biological benefit for Viable Salmon Populations (VSP) parameters.(B.4.2, Table B.6, page 16)
c. Summary of the UCRTT Biological Strategy (2008) (B.4.3, pg 26)
d. Example of one of the Assessment Unit Summaries from the UCRTT Biological Strategy (2008) (B.4.3, Table B.7, pg 27)

Revisions to the Narrative Proposal: A new section was added into the proposal in response to the panel's comments. Please see B.4 "***Determination of Priority Reaches and Actions"***.

3. ISRP Comment: ***Discuss reviewer qualifications, independence, and ability to avoid potential conflicts of interest. There should be explicit requirements for the qualifications and independence of members of the UCRTT who will be conducting the scientific reviews.***

We realize the importance of providing qualifications on the technical team who would be involved in the project review and apologize for not providing this in the initial proposal. We have provided information below and in the revised proposal on the UCRTT qualifications and

how potential conflicts of interest with regard to project prioritization and funding will be avoided. Please also see the UCRTT operating procedures in (Appendix D)

MISSION STATEMENT: The Upper Columbia Regional Technical Team is a consortium of natural resource biologists, scientists, and professionals that coordinate, review, and advise on technical issues, projects, and monitoring concerning aquatic resources within the Upper Columbia by integrating habitat restoration/protection with management actions and other factors to achieve functioning aquatic ecosystems and sustainable natural fish populations.

MEMBERSHIP: The UCRTT shall consist of persons with appropriate technical skills and new members shall be appointed by the standing UCRTT. The UCRTT may consist of members of private, tribal, public utility, and government entities, but is not representational of these entities. UCRTT members must possess a strong technical background and knowledge of salmonids and their habitats in the Upper Columbia Region. To reduce the potential for conflict of interests, UCRTT members must divest interest in a particular subbasin or activity within the region, and reflect regional responsibilities in their deliberations.

Current UCRTT members:

1. **John Arterburn**, Colville Confederated Tribes, Anadromous Fish RM&E Subdivision Lead. B.S. Colorado State University, M.S. South Dakota State University.
2. **Casey Baldwin** (UCRTT ***Chairperson***), Washington Department of Fish and Wildlife, Research Scientist. B.S. Adams State College, M.S. Utah State University.
3. **Dale Bambrick**, National Marine Fisheries Service, Eastern Washington Branch Chief. B.S. Central Washington University, B.A. Secondary Education, Central Washington University.
4. **Steve Hays**, Chelan County Public Utility District, Fish and Wildlife Senior Advisor. B. S. University of Washington.
5. **Dr. Tracy Hillman**, BioAnalysts, Senior Ecologist and CEO. B.S. Montana State University, M.S. Idaho State University, Ph.D. Idaho State University.
6. **Tom Kahler**, Douglas County Public Utility District, Fisheries Biologist. B.S. and M.S. University of Washington.
7. **Joe Kelly**, Bureau of Land Management, Fisheries Biologist. B.S. Cornell University.
8. **Joe Lange**, Natural Resource Conservation Service, Civil Engineer. B.S. Washington State University.
9. **Russell Langshaw**, Grant County Public Utility District, Fisheries Biologist. B.S. Central Washington University, M.S. Oregon State University.
10. **Dr. Michelle McClure**, National Marine Fisheries Service-Northwest Fisheries Science Center, Integrated Watershed and Nearshore Ecology Team Leader. B.A./B.S. The Evergreen State College, Ph.D. Cornell University.
11. **Keely Murdoch**, Yakama Nation, Senior Monitoring and Evaluation Biologist. B.S. Western Washington University, M.S. Central Washington University.
12. **Chuck Peven**, BioAnalysts, Inc., Fisheries Biologist. B.S. and M.S. University of Washington.
13. **Dr. Karl Polivka**, USDA Forest Sciences Laboratory, Research Fish Biologist. B.S. University of California, Los Angeles, M.S. University of Oklahoma, Ph.D. University of Chicago.

14. **Kate Terrell *(UCRTT Vice Chairperson),*** U.S. Fish and Wildlife Service, Habitat Restoration and Conservation Division Chief. B.S. University of Oregon.
15. **Cameron Thomas**, U.S. Forest Service, Okanogan-Wenatchee National Forest Fish Program Manager, B.S. Humboldt State University.

The UCRTT operating procedures offer the following explanation for how we deal with potential conflicts of interest.

> "UCRTT members with direct involvement in the development of a project, a family relationship to someone directly involved in the project, supervision of an employee directly involved in the project, a high likelihood of involvement with implementation of the project, or other potential conflict of interest should recuse themselves from the scoring and the discussion of the project. This person will leave the room during the discussion and scoring of that proposal. Additionally, reviewers are expected to abstain from submitting scores for a project if they did not have adequate time to read and apply the UCRTT project scoring criteria."

From the RTT operating procedures (http://www.ucsrb.com/Editor/assets/rtt-operating-procedures_3may2010.pdf)

> ***Revisions to the Narrative Proposal:*** This information was also incorporated "***UCRTT Qualifications***" into Section F4. Work Element 114 "***Identify and Select Projects".***

4. ISRP Comment: *A possible alternative to transferring technical review responsibilities to the UCRTT would be for future proposals to be based on the Council's Multi-year Action Plans (MYAPs).*

We are aware of the Council's intent to develop multi-year action plans. In fact, UCSRB staff is currently working with the Council to develop a coordinated MYAP and is populating sections of the Council's MYAPs with up-to-date information on the Upper Columbia's priority actions. The current Upper Columbia multi-year (3 to 5 year) planning documents are based upon a scientific foundation, utilize an adaptive management approach, and are the culmination and amalgamation of years of coordinated recovery planning efforts. The Recovery Plan and UCRTT Biological Strategy have incorporated the sub-basin plans in accordance with the 2000 version of the NPCC Columbia River Basin Fish and Wildlife Program, and habitat actions identified in the MYAPs that would be implemented under the targeted solicitation will be consistent with the goals and objectives of the Program. To date the Upper Columbia Region has put significant effort into developing MYAPs that address specific plans in each of the sub-basins and they include the most current biological priorities by incorporating the Recovery Plan's Implementation Schedule (UCSRB 2007), UCRTT Priorities (UCRTT 2009) (B.4.2, Table B.6, page 16) and new information contained in the completed and future Tributary and Reach Assessments. Although future proposals for the targeted solicitation will be based on priorities in the MYAPs coordinated with the Council, we believe the habitat actions will still need review by the UCRTT because the fundamental intent of our proposal is creation of a process in which each component (MYAP's, project identification, technical support and review, funding coordination,

and M&E) functions in concert with, and as an integral part of, a coordinated regional approach to recovery. In addition, MYAPs alone will not be able to prioritize and rank the most important biological projects.

Revisions to the Narrative Proposal: Additions were made in the proposal in response to the ISRP's comments in C.2.1 Multi-Year Action Plans, page 34. The MYAPs for the Upper Columbia Region are added into the Appendix E.

5. **ISRP Comment:** ***The current proposal contains relatively little technical information, and thus judging the technical adequacy of this project is not possible. Proposals based on completed MYAPs could be incorporated into a habitat-based major project review (Council 2006-21).***

Yes, we provided little technical information on individual project actions, because the intent of this proposal is to outline a programmatic ***process*** for funding projects that implement habitat improvement and protection actions. We are requesting the panel review the Upper Columbia ***process*** and technical foundation for the identification and selection of habitat actions including: the technical criteria currently used for project identification ***(i.e. Recovery Plan/Implementation Schedule, Biological Strategy***), and project selection (***Project Evaluation Criteria***) (page 38). The UCRTT technical review criteria are consistent with the "decision support system" identified in Beechie et al. (2008). We are not requesting a technical review of specific habitat actions because we cannot at this time provide the details of each action that may be proposed, evaluated, and funded by this project in the next few years. We have provided the complete Upper Columbia MYAPs of proposed actions in Appendix E so the panel can see the kinds of actions and the general locations where work is likely to occur in the near term. All priority actions in the MYAP would be reviewed by the UCRTT. Additionally, the steps involved in project development, evaluation, and selection are open to the ISRP. ISRP members are welcome to attend and observe the process in person.

Upper Columbia documents provided as the technical bases for the identification and selection of habitat actions and locations identified in Table 1.:

Technical foundation for the selection of priority reaches and actions

- Upper Columbia Salmon Recovery Plan & Implementation Schedule
- Biological Strategy Prioritization & UCRTT Priorities
- Tributary and Reach Assessments and Resulting AERs

Technical criteria and planning documents to identify actions in the Upper Columbia targeted solicitation

- UCRTT Project Evaluation Criteria
- MYAPs

Table 1. Summary of documents that provide the technical bases for identification and selection of habitat location and actions.

Project Identification Criteria	Upper Columbia Salmon Recovery Plan & Implementation Schedule,	***http://www.ucsrb.com/theplan.asp*** ***Summarized in Section XX in proposal***
	Biological Strategy Prioritization & UCRTT Priorities	***http://www.ucsrb.com/resources.asp*** ***Table B.6 & Appendix B in proposal***
	Tributary and Reach Assessments and Resulting AERs	***http://uc.ekosystem.us/?p=Page_ec733ae6-e3f7-4356-8dd7-284f4c7ed896*** ***Assessment Schedule Section B*** ***AER Example see Appendix D***
Project Selection Criteria	UCRTT Project Evaluation Criteria	***Section F.4.3 in the proposal***
Specific Actions	MYAPs	***Appendix E***

6. **ISRP Comment:** ***Since this programmatic proposal involves incorporating 14 projects that have had a history of funding, the technical justification and project history sections are insufficiently developed. There should be a discussion of limiting factors, integration of the habitat objectives in the subbasin plans and recovery plan, and an explanation of what assessment and analysis is needed to develop the multi-year plans. The project history section needs to describe the status of the work completed, an estimate of what portion of the work identified by the subbasin and recovery plans has been completed, and what has been learned about the efficacy of recent actions.***

We did not adequately articulate that we are proposing to terminate the 14 UPA projects and move towards comprehensive coordination of all implementation occurring with respect to the Recovery Plan. Please refer to the accompanying BPA letter for information about the previous 14 projects. We have provided a discussion of limiting factors, integration of the habitat objectives in the subbasin plans and recovery plan can be found on page 13 of the proposal. (Currently #2 in this point by point summary.) In addition, an explanation of the assessment and analysis needed to develop multi-year plans can be found under #4 in the current point by point summary.

The following section is an effort to address the status of the work completed and what has been learned. The termination of the 14 UPA projects and adoption of a new regional process would move recovery towards comprehensive coordination of all implementation occurring in the Upper Columbia with respect to the Recovery Plan, while working with all funding partners to ensure this coordination. Even before the Recovery Plan was approved, partners were implementing habitat actions. More than 300 projects have been implemented over the last decade in the Upper Columbia Region. These projects were the first generation of actions developed in response to the listing of salmonids in the Northwest. A large proportion of these

projects were simpler habitat "restoration" projects. Over one-sixth of them were "protection" projects. We are now in our fourth year of Recovery Plan implementation; the Plan was designed to take upwards of 30 years to achieve recovery of salmonids species in the Upper Columbia region. In the 2008 ***Washington State of the Salmon Report*** (GSRO 2008; see http://www.rco.wa.gov/doc_pages/other_pubs.shtml#gsro), the report states that the Upper Columbia is approximately 3% toward the goals in each of the VSP parameters, and that the region is on track to meet timeframes established in the Recovery Plan.

The UCRTT recently conducted a scientific analysis workshop that evaluated project and monitoring data available within and outside the Upper Columbia. The results of those analyses are currently being synthesized into a final report that will be used this summer and fall for a series of adaptive management workshops and a habitat science conference. One key message from the workshop is that without a coordinated implementation approach, we are not necessarily on the right trajectory for implementation of the most biologically important projects for salmon recovery. Significant progress in addressing some threats (e.g. barriers) have been made, however, project types (e.g. channel reconnection) that restore riverine processes necessarily require a more coordinated approach, both from a project implementation vantage and the need for coordinated funding to finance more expensive projects. Many projects, such as barrier removal, are often easier to accomplish because the implementation of the projects are discrete in nature, often involving only a single landowner, a single project sponsor, and two funding sources. Many of the priority projects remaining are not as easy to implement as barrier removal or riparian planting. Rather, more assessments, coordination, and planning are needed to implement some of the most biologically important projects that have not had the necessary project planning, selection, and evaluation processes in place to implement successfully. This habitat programmatic project proposal is set up to create a process that will support the implementation of some of the most biologically important habitat projects. A coordinated monitoring strategy for the Upper Columbia will compliment the habitat programmatic project (see M&E section).

> ***Revisions to the Narrative Proposal:*** Additions were made in Section B.5 "***Successes and Challenges in Addressing Limiting Factors in the Upper Columbia Region***" in response to ISRP comments.

7. ISRP Response: *Creating a single assessment, prioritization, and selection structure to encompass the four Upper Columbia subbasins could make project prioritization unwieldy.*

We agree that development of a single assessment, regional project prioritization and selection framework that is understandable, justifiable, and supported by both stakeholders and technical staff is no easy task; however, we believe we have already achieved this goal. The UCSRB created a functional prioritization mechanism following 10 years of partnership and collaborative processes to make regional project and funding coordination a reality. A majority of this framework has been accomplished and we believe this truly represents a solid path for recovery implementation.

The UCRTT has been the regional technical review body in the Upper Columbia for the Washington State Salmon Recovery Funding Board's process since it began in Washington State in 1999, and we have always included the Upper Columbia regional perspective in our deliberations. When the Tributary Fund for the Mid-Columbia Hydroelectric Projects Habitat Conservation Plan (HCP) was established in 2002, the decision was made to request the UCRTT's review and perspective on projects so that technical consistency was established between these different project development and evaluation processes. BPA habitat funding has been the outlying funding source. This programmatic would result in general consistency among the Salmon Recovery Funding Board, HCP Tributary Fund, and BPA prioritization processes within the Upper Columbia Region.

In 2007 the UCSRB asked the UCRTT to provide ESU-level priorities for habitat restoration and protection, which the UCRTT completed through a tiering and ranking exercise. Although this effort provided an ESU-level set of priorities, the potential action list was still long and the WATs, who are charged with the task of updating the implementation schedules and developing MYAPs, needed more specific guidance on potential actions within their respective watersheds. In response, the UCRTT created the "UCRTT priority reaches and actions spreadsheet" (also called ***UCRTT Priorities***), which contained a specific list of actions and reaches within each watershed that had been prioritized within the two major categories of restoration and protection in all four subbasins. We believe that the current structure and approach proposed by the Upper Columbia Region is a comprehensive framework and a refined process designed to integrate reach, Assessment Unit, and subbasin-level considerations across the ESU and achieve regional recovery.

> ***Revisions to the Narrative Proposal:*** Additions were made in Section B.5 "***Successes and Challenges in Addressing Limiting Factors in the Upper Columbia Region***" in response to ISRP comments.

8. ISRP Comment: *The involvement of local technical experts and their role in the annual update of the implementation schedule should be explained further (page 8).*

After the Recovery Plan was formally approved in October of 2007, the Upper Columbia established an adaptive management process for updating the Recovery Plan's Implementation Schedule in order to: (a) incorporate new information for actions that have already been implemented, and (b) enable further review and revision of proposed habitat actions.

Incorporating new information for actions that have already been implemented, part (a), is a basic administrative function and involves working in partnership with WATs to update completed actions into the Implementation Schedule (WATs description Appendix D and Section F).

Part (b), review and revision of proposed habitat actions, are done within the adaptive management framework, the UCRTT is responsible for technical review of the recovery plan's Implementation Schedule as identified in Chapter 8 of the Plan. The UCRTT has established

biological priorities based on the recovery plan, Sub-basin Plans, Ecosystem Diagnosis and Treatment (EDT) modeling, Reach Assessments, current scientific literature, and other relevant information. These priorities are articulated in the UCRTT's Biological Strategy and the UCRTT Priority Reaches and Actions Spreadsheet.

For proposed habitat actions that are developed by the WATs for inclusion in the implementation schedule and MYAPs for the targeted solicitation, the RTT performs a "crosswalk evaluation" between the biological priorities and the implementation schedule to identify where there is consistency between the biological priorities and the actions that are on the list. The ongoing scientific evaluation role performed by the UCRTT enables interpretation of information gathered from monitoring and research, an assessment of deviations from targets or anticipated results (hypotheses), and provides an opportunity for the UCRTT to recommend changes in policies or management actions where appropriate.

> ***Revisions to the Narrative Proposal:*** Additions were made in Section B.3 "***Limiting Factors***" page 8 in response to ISRP comments.

9. ISRP Comment: ***The proposal would be improved by further description of the models – in particular, do they account for out-of-basin factors such as downriver, estuary and ocean conditions? How are limiting factors in freshwater identified? The proposal would also be improved by consideration of persistent organic pollutants in addition to the standard parameters such as nutrients and sediment.***

As requested by the panel, the methods and models employed to develop priorities and quantify the extent of improvements to limiting factors that could be achieved based on restoration options are now provided in Section B. We added an intermediate-level description of the history and technical foundation. To summarize, limiting factors were identified through a number of assessments and processes that included U.S. Forest Service Biological Assessments, Washington Conservation Commission limiting factors analyses, EDT modeling in sub-basin plans, Shiraz modeling in the Wenatchee, PHabSim modeling in certain watershed plans, the Interior Columbia Technical Recovery Team (ICTRT) intrinsic potential analysis and others. Human caused habitat degradations were evaluated in terms of their importance to various life history stages for target species and their relation to viability and recovery objectives using the ICTRT criteria, intrinsic potential analysis, EDT, and expert opinion.

EDT was the primary and most consistently applied model that informed the prioritization process for priority reaches. We recognize that EDT model output is only as good as the data put into it, and the level of confidence we had in the inputs varied depending on the parameter and the location. Tracking our level of confidence in the model input allowed us to recognize the uncertainty in the output. Mainstem hydro, ocean and estuary conditions are part of the full life cycle modeling in EDT; however, we did not have the ability to "turn the dials" on those aspects of the model. Likewise, the EDT model did not account for temporal variability in these parameters. The NPCC used pre-determined and fixed smolt-to-adult survival rates in EDT for sub-basin planning. Although not ideal, that allowed us to focus on freshwater habitat actions and what would be the most effective options for changing species status based on changes to

habitat conditions. The Sub-basin and Recovery Plans all recognize that there may be overriding non-habitat factors that limit the full life cycle viability of the populations. Nonetheless, there is little doubt that habitat actions are needed to 1) ensure that important and functional freshwater habitats are maintained and 2) cumulative effects of habitat restoration are an important component to an all-H strategy to achieve recovery goals.

Finally, the reviewers' suggestion to include consideration of persistent organic pollutants is a good one and we would be interested in finding out about how to accomplish that. We are aware that the U.S. Environmental Protection Agency, Region 10 only recently released a draft Columbia River Toxics Reduction Plan. Despite the parameterization of EDT with the best available data and expert opinion, there is a paucity of information available regarding 1) the quantity of persistent organic pollutants in the local watersheds or 2) the effects these pollutants may have on fish survival. To the extent that data and modeling parameters exist, we would be happy to include consideration of persistent organic pollutants in our future assessments of limiting factors.

> ***Revisions to the Narrative Proposal:*** Additions were made in Section B.3 "***Limiting Factors***" page 8 in response to ISRP comments.

10. ISRP Comment: *There is a need for long-term monitoring of Nason Creek.*

We agree with the panel that long-term effectiveness monitoring is needed on the Nason Creek restoration project and other similar actions. Continued long-term monitoring is currently being funded and conducted by the Washington Department of Ecology and technicians are currently conducting snorkel surveys under the same protocol as the pre and post 2008 BPA funded monitoring effort (Murdoch et al. 2009). Channel reconnections like those on Nason Creek, as well as other types of habitat actions, will be monitored and evaluated by ongoing and new M&E projects that are summarized in the revised proposal's M&E Plan, Appendix F.

11. ISRP Comment: *The proposal should include more information on the IMW work being done in the Entiat and Methow subbasins, as mentioned on page 21.*

We interpret this comment – based in part on context – to refer to how habitat actions funded through this project would relate to the study plans for the Entiat Intensively Monitored Watershed (IMW) and the Methow monitoring program. The UCSRB, in partnership with WATs, are incorporating effectiveness monitoring schedules into the MYAPs to ensure Upper Columbia plans are populated and consistent with effectiveness monitoring efforts, including efforts currently being implemented in the Entiat and Methow subbasins (See Appendix F in proposal). This habitat programmatic project will make it possible for the types of treatments in the Entiat and Methow to be actualized since greater planning and coordination are necessary. The proposed project review and selection process provide the necessary infrastructure to implement the IMW work in these two subbasins.

If more information were desired on the study plans themselves, then please refer to the ISEMP proposal for the Entiat IMW. In the case of the Methow, please see Appendix E and/or contact Pat Connolly:

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12. ISRP Comment: ***The proposal would be improved by further information on the effects of watershed conditions (especially river flows) from the Canadian portion of the Okanogan Basin. Environment Canada is mentioned – is there any international coordination of the restoration work with Canadian authorities?***

As the panel noted, the information on the effects of watershed conditions from the Canadian portion of the Okanogan River Basin was not included in the original proposal. We have now included information on watershed conditions and coordination efforts in Section E.1.1 in the proposal. In summary, the area north of the international boundary is critical to recovery of listed species when we consider the Okanogan River drains an area of nearly 9,000 square miles, of which approximately 70% lies in Canada. Warm water temperatures and reduced flow are two of the primary factors limiting production within selected tributaries stemming from actions occurring in Canada. Currently, entities like the Colville Confederated Tribes continue to work collaboratively with the Okanagan Nations Alliance (ONA) as well as the Ministry of Environment (MOE) to address factors limiting production. To date, the use of U.S. federal funds have been limited in scope in Canada. U.S. federal funds have been utilized to conduct assessments and evaluations, but concerns raised from U.S. entities regarding jurisdiction between countries have prevented these dollars from contributing to on-the-ground actions. Although Public Utility District funds have been successfully gained to implement some large-scale projects, to date accord funds or non-accord funds have not been directed toward implementing habitat rehabilitation projects in Canada. If this were possible, then several more beneficial projects could be accomplished in an abbreviated timeframe.

> ***Revisions to the Narrative Proposal:*** A new section was added in the proposal titled E.1.1 "Effects of Watershed Conditions and International Coordination in the Okanogan Basin, Canada

ISRP Comment #2: Objectives, Work Elements, and Methods (section F)

13. ISRP Comment: ***Provide concrete examples of problems with the current review process; explain why the proposed process represents the best alternative; and explain how this change in procedure will enhance the effectiveness of restoration efforts.***

We appreciate the panel's request to see examples of challenges with the current review process and how the proposed process would present the best alternative. Past funding paradigms and project implementation frameworks have not always facilitated the efficient implementation of the highest priority actions in highest priority reaches, nor have they led to coordinated regional monitoring and evaluation. The proposed programmatic project selection, funding and implementation framework would enhance the effectiveness of restoration efforts in the region in many ways. Below is a summary of the challenges presented by the current review process and anticipated improvements that would result from a programmatic approach.

- The proposed programmatic framework would ensure BPA resources facilitated implementation of high priority actions at a reach scale and that project proponents would use the UCRTT's biological priorities and the Recovery Plan's implementation schedule as the foundation for project development. Funding will be applied where it is needed for any of the populations, allowing for an ESU recovery strategy. Currently, there is not a system in place that ensures regional coordination on recovery actions. Project sponsors may pursue targets of opportunity rather than projects identified in the Recovery Plan that would result in high priority actions in high priority reaches of the region (and consequently take more time and energy to plan and implement).

- By targeting implementation of high priority actions in each sub-basin based on an ESU-wide recovery strategy, the proposed programmatic encourages sponsors from all the Upper Columbia subbasins to work with entities that are a part of an existing regional framework, thereby enhancing coordination on site selection, project design, funding approaches, and monitoring. At this time, a new sponsor may not realize the importance of interfacing or coordinating with existing Watershed Action Teams or the Upper Columbia Implementation Team.

- The proposed approach removes barriers to the implementation of reach-based large-scale projects. All of the funding could be spent in one reach if that is the need, or it may be spread across any number of areas. That determination would be made by the UCSRB, BPA and the UCRTT using the best available information in any given year. In addition, multiple incentives for funding coordination exist within this new proposed process since funding could be "pulsed" for large, more complex projects. Currently, funds in any one year were spread across multiple small/moderate sized projects that were not necessarily part of a reach-based approach to habitat restoration. In addition, funding certainty for longer than 3 years allows planning for larger and more complex actions.

- The new programmatic process provides more local technical input and control at critical points, while preserving broader, higher level review by the ISRP and NPCC during periodic

categorical review processes. The proposed framework would provide project sponsors with the opportunity for guidance and input from local technical experts early in the process on the best site or best action alternative and consistency with the UCRTT Biological Strategy. This in turn would enable sponsors to develop better project alternatives and designs to target desired species and achieve regional recovery goals.

- Project sponsors can propose actions when landowners and designs are ready, rather than having to prepare, predict, and describe in detail the actions that they might implement 3 to 5 years in the future.

- Regional facilitation makes monitoring projects like ISEMP and IMWs possible. The current approach does not promote a coordinated, regional monitoring and evaluation strategy or the data management/sharing required for an adaptive management approach. The proposed programmatic approach would assure that project monitoring and evaluation follow a consistent regional protocol (see Appendix F), and that implementation outcomes are evaluated and used, as appropriate, to update implementation schedules, approach, goals, etc.

  Revisions to the Narrative Proposal: This section was incorporated into the introduction of F.2.1 "***Upper Columbia Project Planning, Identification and Selection***" in the proposal.

14. ISRP Comment: ***Possible work elements (habitat improvement actions) are categorized in section F8, but there is insufficient information given about where these actions will occur. The ISRP will be unable to comment on the scientific adequacy of the objectives, work elements, or methods until the detailed plan is produced.***

We understand the panel is interested in more information about where specific actions will occur and because we are outlining a programmatic ***process*** for funding projects, detailed information was not included. We cannot provide detailed locations and designs now, so many of these habitat work elements are included primarily for completeness and as generic examples. However, in other work elements, and parts of the proposal we provide considerable detail and technical methods appropriate for a programmatic approach. Details include reach and action priorities, multi-year planning, and project evaluation/selection criteria, as described below.

Complete Upper Columbia MYAPs of proposed actions are provided in Appendix E. Priority habitat actions are identified in these MYAPs and are divided into the individual subbasins. These multi-year (3 to 5 year) planning documents are based upon a scientific foundation, utilize an integrated approach, and are the culmination and amalgamation of years of coordinated recovery planning efforts. Upper Columbia priority actions/projects found in MYAPs are determined by the amalgamation of two resources:

a) UCRTT Biological Priorities Spreadsheet of Actions (Table B.6)
b) Reach Assessments in Priority Reaches (Section B)

The priority actions derived from the above resources are then compared to the MYAPs (planning documents separated by subbasin and developed by project sponsors) in order to identify priority actions for the BPA targeted solicitation. This final product is a comprehensive 3-5 year action plan that joins the sponsor's objectives, regional planning/prioritization efforts, UCRTT biological prioritization, and funding coordination together. The BPA targeted solicitation will only target priority actions identified in the MYAPs.

15. ISRP Comment: *Explain and justify the open track. The purpose of the open track was not clear. It would seem that because the targeted process will focus on the priority areas and actions, inclusion of an open process would simply serve to divert resources from the most critical actions.*

The difference between the Open and the Targeted Solicitation process can be confusing because the Open Solicitation is driven by other funding sources that have disparate mandates. With oversight over the programmatic resources, the Upper Columbia Region will be much better prepared to leverage funds from these other sources (i.e. project and funding coordination). Much of the timing and several of the steps in this process are established in statute and policy by the Washington State Salmon Recovery Funding Board (SRFB). This board was created in 1999 by the Washington State Legislature and provides grants to protect or restore salmon habitat. Funding comes from the sale of state general obligation bonds and the federal Pacific Coastal Salmon Recovery Fund. Historically, in order to help assure consistency and coordination, the Rock Island, Rocky Reach, and Wells Dam HCP Tributary Committees have also agreed to use this process and timeline for their funding decisions.

The Targeted Solicitation funds can only be applied to actions that have been identified as regional biological priorities in the MYAPs. The Upper Columbia is proposing that in a given year, these targeted funds ***may*** also be combined with the Open Solicitation funds to pursue larger scale projects, in the event that the full allocation is not applied to a full reach-scale, priority action. Any funds that are unallocated during a targeted solicitation process ***may*** be transferred to the Open 6-step process and application phase, but that will not automatically be the case.

> ***Revisions to the Narrative Proposal:*** New sections have been added into Section F "***Identify and Select Projects***" in response to the panel's comments to better describe the Upper Columbia Open and Targeted Solicitation.

16. ISRP Comment: *Elucidate the importance of the Watershed Category approach. Appendix B provides a description of the process used to identify priority assessment units. Four categories are identified with category One representing the sites of highest priority.*

The ISRP has correctly determined that the Watershed Category approach lacks sufficient detail and technical merit to serve as the primary tool for setting priorities. In reality, we no longer use

this system as the primary method for determining priorities or evaluating projects. The written sections of Appendix B are not a major part of our current process to identify priority areas. The category definitions are part of a pre-Recovery Plan system developed by the USFS and UCRTT that was employed at the time when we were at the early development stage of regional prioritization.

This information was included in Appendix B primarily to describe the previous thought processes and considerations that led to the current prioritization strategy. Although the more recent prioritization tools are focused on listed species, the UCRTT maintained the description and concept of Watershed Categories in the Biological Strategy because it is generally still a relevant coarse scale evaluation of the general characteristics of subwatersheds within a subbasin. However, in only one case is it still in use, and that is as a criterion for scoring of protection projects within the UCRTT project evaluation criteria (see Section F.4.3).

Section 1B of this response contains the most representative and current description of the history, processes, and tools used to determine priority reaches and actions in the Upper Columbia Region. In most cases, the recommendations resulting from the current process are consistent with those that were developed using the previous Watershed Category approach.

ISRP Comment #3: M&E (sections G and F)

17. ISRP Comment: *Provide a completed BiOp RM&E plan.*

To our knowledge, no comprehensive plan for BiOp RM&E has been developed for the Upper Columbia. Monitoring in the Upper Columbia is guided by the Monitoring Strategy for the Upper Columbia Basin (Hillman 2006), and is coordinated at the ESU level, and specific planning and implementation of monitoring is driven by needs and programs at the population level. For more information about monitoring plans and programs in the Upper Columbia, please see the updated Appendix F to the revised proposal.

> ***Revisions to the Narrative Proposal:*** Monitoring Section G and the Summary M&E Plan in Appendix F are revised in response to ISRP comments.

18. ISRP Comment: *Little detail is provided as to how [existing] monitoring efforts will be coordinated with other activities to be supported by this proposal. Will the availability of an existing monitoring program be part of the criteria used in selecting projects?*

Especially where intensive effectiveness monitoring designs are dependent on closely associated habitat actions, strong coordination between planning for action implementation and planning for monitoring activities is critical. The Integrated Status and Effectiveness Monitoring Program (ISEMP) in the Entiat and the U.S. Bureau of Reclamation, with their work in the M2 reach of the Middle Methow River, have both been participating at the subbasin level with the Watershed Action Teams (WATs) responsible for developing implementation plans for each subbasin. The

WATs in the Entiat and Methow have been charged with ensuring that projects on the MYAPs for the Entiat and for the M2 reach are consistent, both project type and sequencing, with the plans and needs of the effectiveness monitoring in those two areas.

19. ISRP Comment: ***At a minimum, project proponents should consider implementing a reach scale habitat monitoring program for the Okanogan. It was not clear from the project narrative whether the intent was to intensify M&E in the Methow and Okanogan to levels similar to what is currently taking place in the other two subbasins.***

Integrated habitat and population status and trend monitoring is currently conducted in the Okanogan by the Okanogan Basin Monitoring and Evaluation Program (OBMEP). The OBMEP monitoring was designed to be the equivalent of monitoring conducted in the Wenatchee Subbasin by ISEMP. There are no current plans for an effectiveness monitoring program in the Okanogan beyond any Salmon Recovery Funding Board Reach-scale Effectiveness Monitoring Program sites that may fall in the subbasin as part of that program's sample design.

While monitoring in the Methow Subbasin is not integrated to the degree that it is in the Okanogan, Wenatchee, and Entiat subbasins, an inventory of monitoring in the Methow (Crandall 2009), completed in 2009, concluded that even without an extensive effort to coordinate monitoring at both the local and regional level, monitoring in the Methow is addressing many aspects of recovery planning set forth in the Recovery Plan (UCSRB 2007) as well as nearly all of the core indicators recommended by the ***Monitoring Strategy for the Upper Columbia Basin*** (Hillman 2006). A habitat status and trends program, run by ISEMP and modeled after the habitat monitoring in the Wenatchee and Entiat, will begin this year. The U.S. Bureau of Reclamation hopes to provide answers about the effectiveness of actions implemented in the Methow through their intensive monitoring in the M2 reach of the Middle Methow River.

20. ISRP Comment: ***The narrative states that M&E plans for both implementation and effectiveness monitoring will hopefully be funded as a new project, either through the Upper Columbia Salmon Recovery Board or through an "independent third-party." Appendix E gives detailed and helpful lists of the status, trend, and effectiveness monitoring efforts that are currently taking place in each subbasin. However, these are only categorical lists, and they provide no information about design, sampling, and analyses that are necessary for scientific review.***

No monitoring will be funded as a part of this proposed habitat programmatic. UCSRB is in the process of working with the BPA, the U.S. Bureau of Reclamation, and others on the development of a proposal (RMECAT-00143) for submission as part of the NPCC's phase-two fast track portion of this year's RM&E Categorical Review. This Categorical Review monitoring proposal includes the collection and management of post-implementation and compliance monitoring metrics for restoration actions implemented in the Upper Columbia, and

an addition of action effectiveness monitoring sites to increase the sample size in the Upper Columbia for effectiveness monitoring conducted by Tetra Tech EC, Inc. for the Washington State Salmon Recovery Funding Board. Although both the post-implementation and the action effectiveness monitoring will be submitted in a separate proposal as part of a completely different process, they are both intended to support work performed as part of this proposed habitat programmatic and the Yakama Nation's Accord proposal, Columbia Cascade Province MOA Habitat Project (2009-00-300). A brief summary of each of these monitoring efforts can be found in the revised Appendix F to this proposal.

21. ISRP Comment: ***The proposal would be improved by additional narrative on the statistical methodology to be used in measuring or comparing project effectiveness.***

Effectiveness monitoring in the Upper Columbia is conducted by three programs: 1) ISEMP in the Entiat Sub-basin, 2) the U.S. Bureau of Reclamation in the M2 reach of the Middle Methow River, and 2) Tetra Tech EC, Inc. for the Washington State Salmon Recovery Board across all of Washington State, with 10 sites currently in the Upper Columbia. Statistical designs and monitoring methods adopted by these three programs are publically available, and have been reviewed by various bodies, including the ISRP, the Pacific Northwest Aquatic Monitoring Partnership and its Effectiveness Monitoring Workshop, and the Washington State Monitoring Forum. The UCSRB relies on these three programs for reports on the effectiveness of project types.

ISRP Comment #4: Benefit to F&W

22. ISRP Comment: ***The proposal consolidates restoration efforts in four adjacent subbasins but seems to be lacking a clear scientific approach to achieve this integration. It could be improved if novel methods that deal with cumulative effects on larger scales were brought to bear on the problem.***

We appreciate the ISRP bringing this interesting modeling approach to our attention. It offers another good tool to integrate into our future efforts for prioritization and sequencing and we'll be sure that the technical team has an opportunity to integrate the concepts into their approach. Certainly, the approaches that have worked for us so far could run into challenges if working relationships break down, as would any approach. We believe that the key to successfully implementing any analytical approach is a series of cooperative partnerships that have strong relationships between the people involved. The UCSRB has and will continue to work very hard to ensure that positive working relationships are maintained between the implementers in each sub-basin, the public, and the various technical review groups.

As previously described, the UCRTT was asked to develop ESU-wide priorities for habitat restoration. In doing this, they took into account the ICTRT VSP criteria and the current status of each species and population. One of the fundamental conclusions was that; none of the populations were viable so there were high priority actions that needed to be implemented within

each sub-basin. This was a simple but critical conclusion that was not based on geographic equity; it was based on current status and the recovery criteria. The reason we point this out here is that the modeling approach by Wu et al. (2000) could overlook this fundamental need and conclude that the most cost effective cumulative actions for one species should occur in only 2 of the 4 subbasins. If we implemented based solely on this strategy we would not achieve recovery since the ESU cannot be delisted until its component populations are all meeting viability standards. Obviously, the solution is an integrated approach where a model, such as the one in Wu et al. (2000), could be modified or integrated into our other prioritization approaches.

<end>

UPPER COLUMBIA REGION

Columbia Cascade Province
Programmatic Habitat Narrative Proposal

(BiOp/Non-Accord/#2010-001-00)

PROPOSAL METADATA

Project Number	2010-001-00
Proposer	Upper Columbia Salmon Recovery Board
Short Description	Upper Columbia Programmatic Habitat
Province(s)	Columbia Cascade
Subbasin(s)	Methow/Wenatchee/Entiat/Okanogan
Contact Name	Julie Morgan
Contact Email	julie.morgan@ucsrb.com

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Appendices

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Hyperlinks

References to figures & tables, appendix, citations (underlined but not in blue font) and select documents are hyperlinked in this document. Control+ Click to follow link and back arrow to return to last place in document.

List of Frequently used Acronyms

Accords Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies
BiOP Federal Columbia River Power System Biological Opinion
BO Biological Opinion
AER Alternative Evaluation Reports
A/P abundance/productivity
BPA Bonneville Power Administration
CCD Cascadia Conservation District
CCNRD Chelan County Natural Resources Department
CCT Colville Confederated Tribes
CCPUD Chelan County Public Utility District
DPS distinct population segment
DCPUD Douglas County Public Utility District
EDT ecosystem diagnosis and treatment
ESA Endangered Species Act
ESU evolutionarily significant unit
FCRPS Federal Columbia River Power System
GCPUD Grant County Public Utility District
HCP Habitat Conservation Plan
HUC Hydrological Unit Code
ICTRT Interior Columbia Basin Technical Recovery Team
IMW Intensively Monitored Watersheds
ISEMP Integrated Status and Effectiveness Monitoring Program
ISRP Independent Scientific Review Panel
LWD Large Woody Debris
M&E Monitoring and Evaluation Plan
MOA Memorandum of Agreement
MSRF Methow Salmon Recovery Foundation
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NPCC Northwest Power and Conservation Council
MYAP Multi-Year Action Plans
OBMEP Okanogan Basin Monitoring and Evaluation Program
PIT passive integrated transponder
PRCC Priest Rapids Coordinating Committee (HCP)
PUD Public Utility District
RA Reach Assessment
Recovery Plan Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan
Reclamation U.S. Bureau of Reclamation
REI Reach-based ecosystem indicators
SRFB Salmon Recovery Funding Board
SS/D spatial structure/diversity
TA Tributary Assessment
TRIB Tributary Committee (HCP)
TRT Technical Recovery Team (see ICTRT)
UCIT Upper Columbia Salmon Recovery Implementation Team
UCRTT Upper Columbia Regional Technical Team
UCSRB Upper Columbia Salmon Recovery Board
USBR U.S. Bureau of Reclamation
USGS U.S. Geological Survey
USFS United States Forest Service
USFWS United States Fish and Wildlife Service
VSP viable salmonid population
WAT Watershed Action Team
WDFW Washington Department of Fish and Wildlife
WDOE Washington Department of Ecology
WDOT Washington Department of Transportation
WRIA Water Resource Inventory Area
YN Yakama Nation

Upper Columbia Programmatic Habitat Narrative Proposal
(BiOP, non-Accord)
2010-001-00

NARRATIVE

Information transfer:

Mission Statement

To restore viable and sustainable populations of salmon, steelhead, and other at risk species through collaborative, economically sensitive efforts, combined resources, and wise resource management of the Upper Columbia region.
– Upper Columbia Salmon Recovery Board

A / Abstract

The recovery of Endangered Species Act (ESA)-listed salmon and steelhead populations in the Upper Columbia Region is dependent on the implementation of habitat restoration and protection actions identified in the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (Recovery Plan) and the Upper Columbia Regional Technical Team's (UCRTT) Biological Strategy (UCSRB 2007; UCRTT 2008). A comprehensive framework is necessary to assure strategic allocation of funds to priority recovery efforts throughout the subbasins of the Upper Columbia Region. This proposal outlines a programmatic process for funding projects that implement habitat improvement and protection actions in the Upper Columbia Region consistent with, and in support of, the Recovery Plan. The process Upper Columbia Regional partners have developed for the selection of projects and actions for funding is based on existing guidance about priority recovery actions and reaches. This guidance has been developed and refined through multiple planning processes and scientific assessments that culminated in the development of the Recovery Plan; this information has been further refined since Recovery Plan adoption through adaptive management. The proposed programmatic approach to identifying/selecting projects for funding will allow us to take advantage of effective ongoing efforts in the Upper Columbia, from project development to technical review of final designs, to ensure implementation of high priority actions that address primary limiting factors associated with habitat degradation in the subbasins. Although the primary goal is to benefit ESA-listed Upper Columbia spring Chinook and steelhead populations, we expect extensive habitat overlap and benefit for other native species in the Upper Columbia Region. Finally, the framework presented in this proposal also includes post-implementation elements that utilize monitoring programs that are currently in place and are being proposed under the Categorical Review to allow us to understand the details of what was implemented, the effects on the physical environment, and the effects to biological characteristics at several spatial scales. When these monitoring results are fed into the Upper Columbia Salmon Recovery Board (UCSRB) Adaptive Management Framework, the certainty of success to address limiting factors and recover listed species increases significantly.

B / Problem Statement

TECHNICAL AND/OR SCIENTIFIC BACKGROUND

There are over 41 fish species in the Upper Columbia Region and three of them are listed as threatened or endangered under the ESA: Upper Columbia spring Chinook salmon, and steelhead and bull trout. Many factors have contributed to the high extinction risk status for these salmonid species including fish harvest, hydropower development, hatchery operations, and degraded habitat conditions. Although substantial improvements have been made, persistent ecological alterations due to past and ongoing land and resource use within the tributary habitat of the Upper Columbia Region have led to a decline in habitat quality and quantity for listed fish species. Habitat protection and restoration are two types of actions that will address the factors currently limiting the establishment and persistence of viable salmonid populations. When combined with previously implemented and ongoing improvements to harvest practices, hatchery operations, and hydropower management, strategic habitat restoration will help move listed species towards recovery.

B.1 Location

The Upper Columbia Region is located in north-central Washington, primarily within the Columbia Cascade Province in the Columbia River Basin. The Upper Columbia Region is composed of the mainstem Columbia River from Chief Joseph Dam downstream to the confluence with Crab Creek (just downstream of Wanapum Dam), including the tributaries. The Upper Columbia Region includes six major "subbasins" (Crab Creek, Wenatchee, Entiat, Lake Chelan, Methow, and Okanogan), 37 smaller watersheds, and the mainstem Columbia River (See Figure B-1. Overview Map). This proposal proposes a programmatic approach to funding, implementation and adaptive management that will address limiting factors and result in habitat actions necessary to recover and maintain a Viable Salmonid Population (VSP) for spring Chinook and steelhead in the Upper Columbia Region.

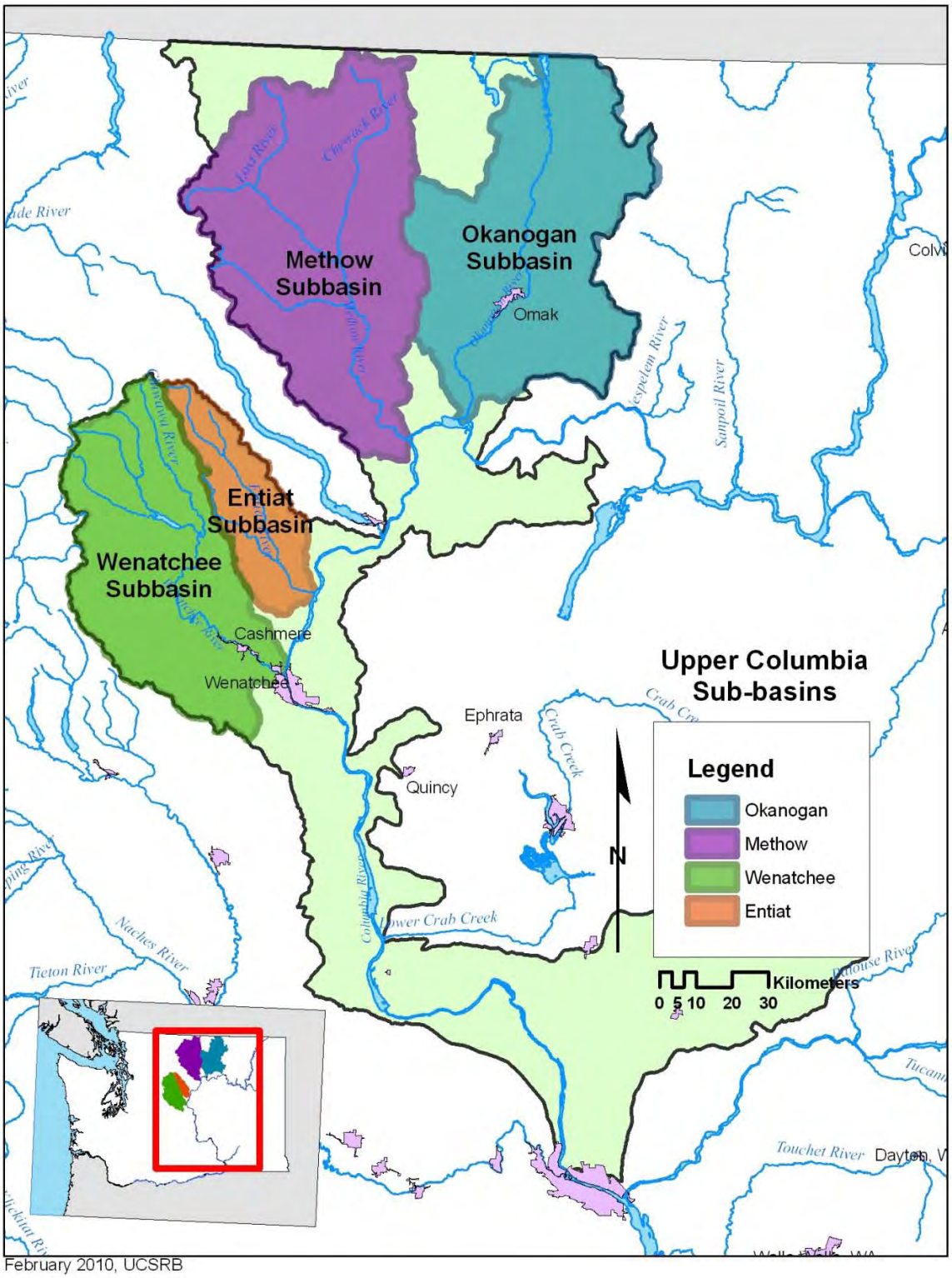


Figure B-1. The Upper Columbia Region and the four subbasins identified in this proposal.

B.2 Evolutionarily Significant Unit (ESU) Status

Since 1991, several species of anadromous salmonid populations inhabiting the Columbia Basin have been listed as "threatened" or "endangered" under the ESA. Upper Columbia steelhead (threatened) and Upper Columbia spring Chinook (endangered) populations have a high risk of extinction when considering the biological factors that contribute to VSP parameters: diversity, abundance, spatial structure and productivity (ICTRT 2007). The Upper Columbia steelhead Distinct Population Segment (DPS) was listed as endangered on August 18, 1997; reclassified as threatened on January 5, 2006; and as a result of a legal challenge, reinstated to endangered status on June 13, 2007. As of June 18, 2009, per U.S. District Court order, the status was again reclassified and downgraded to threatened status in response to an appeal filed by the National Marine Fisheries Service. The Upper Columbia spring Chinook Evolutionarily Significant Unit (ESU) was listed as endangered on March 24, 1999.

The Interior Columbia Basin Technical Recovery Team (ICTRT) defined three independent populations of spring Chinook within the Upper Columbia spring Chinook ESU (Wenatchee, Entiat, and Methow populations). The Upper Columbia DPS for steelhead includes populations located in the Wenatchee, Entiat, Methow, Okanogan, and Crab Creek (ICTRT 2003) (see Figure B-2. ESU Map). According to the Recovery Plan, spring Chinook and steelhead are considered to be at a high risk of extinction in the Wenatchee, Entiat, Methow, and Okanogan (steelhead) subbasins and functionally extirpated from the Okanogan (spring Chinook) and Crab Creek (steelhead) (See Viability Table B-1). A high risk of extinction is defined as a greater than 25% risk of extinction within the next 100 years. This proposal is intended to address habitat factors limiting spring Chinook and steelhead recovery in the Upper Columbia Region at a programmatic scale. Upper Columbia River bull trout are also listed as threatened and are known to occur in the Wenatchee, Entiat, and Methow subbasins. Although they are not specifically addressed in this proposal, bull trout populations and other native aquatic and terrestrial species will also benefit from habitat actions for spring Chinook and steelhead.

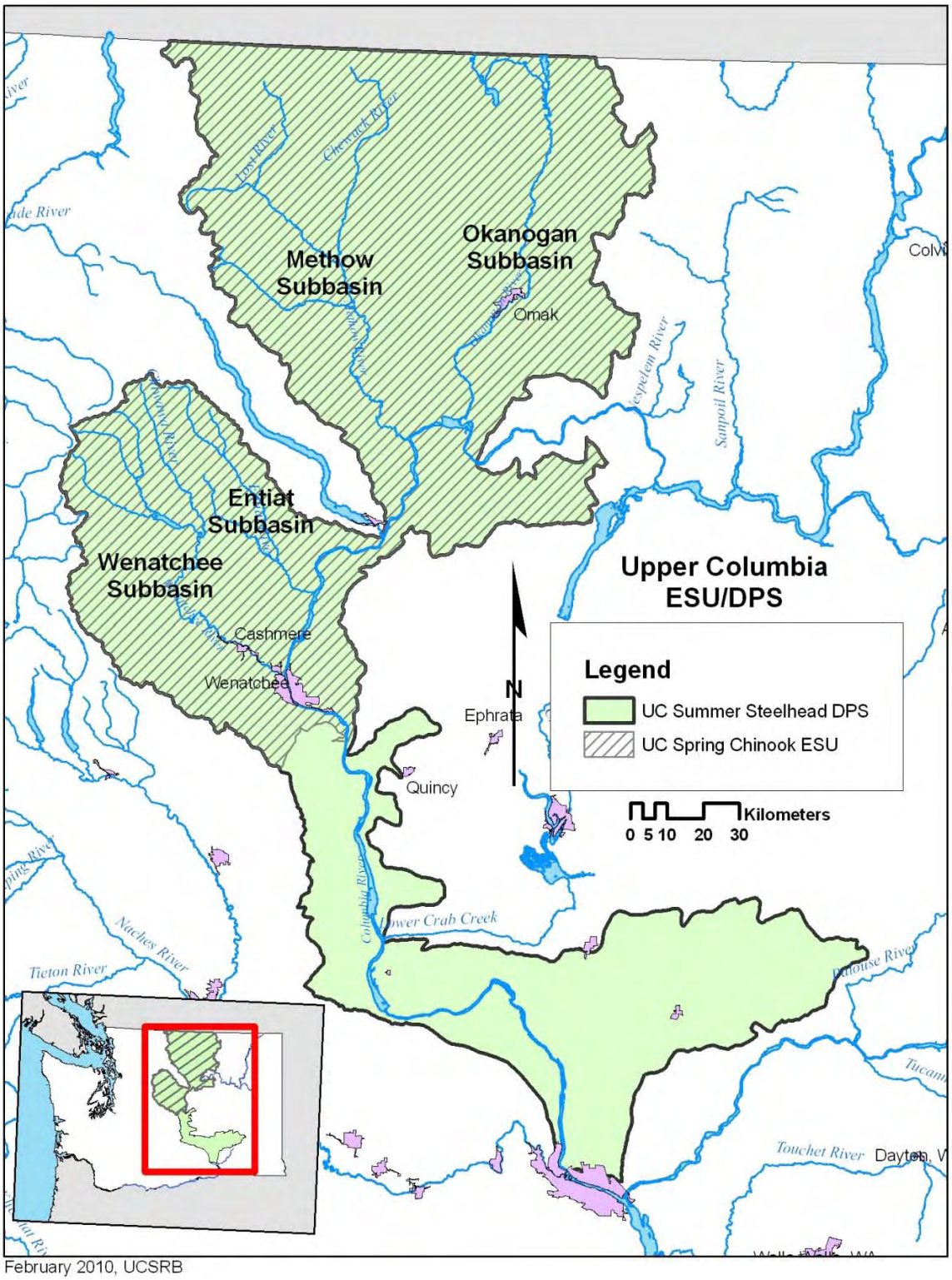


Figure B- 2. Upper Columbia ESU Map

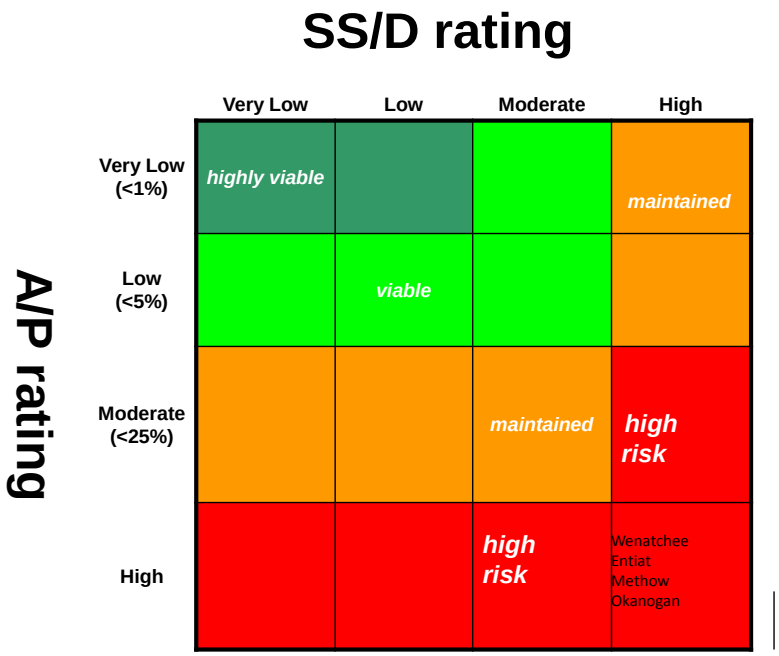


Table B-1. Comparison of A/P and SS/D Ratings. Viability ranking of current populations of Upper Columbia River steelhead and spring Chinook based on spatial Structure/Diversity and Abundance/Productivity (Table developed based on guidance from ICTRT 2005a).

Viability assessment Tables B-2 and B-3 include data on the current abundance, productivity, spatial structure, and diversity of each population within the Upper Columbia Basin. Species population data has not been updated since the adoption of the Recovery Plan (UCSRB) in 2007; however, at the January 2010 UCRTT Analysis Workshop, the ICTRT provided abundance, productivity, spatial structure, and diversity updates for spring Chinook and steelhead. Using data available through 2008, the ICTRT assessments showed that all of the listed populations in the Upper Columbia were still at high risk of extinction (ICTRT 2008). Despite some positive and negative trends in individual parameters and a decrease in risk levels for some parameters and locations, it is evident that considerable improvement of survival conditions within and outside the Upper Columbia watersheds is needed to achieve viable salmonid populations.

Table B-2. Viability assessments for Upper Columbia spring Chinook populations (UCSRB 2007)

Upper Columbia spring Chinook									
Population level	Abundance and Productivity					Spatial Structure and Diversity			Population Level: Overall Viability Rating
	Abundance		Productivity		Overall A/P	Goal A	Goal B	Overall SS/D	
Population	Current Natural Abundance	Minimum Threshold	Current Estimate (R/S)	Minimum R/S Threshold	Minimum R/S Threshold	Natural Processes Risk	Diversity Risk	Integrated SS/D Risk	
Wenatchee River	443	2,000	0.74	1.62	High	Low	High	High	High Risk
Entiat River	108	500	0.76	1.76	High	Moderate	High	High	High Risk
Methow River	645	2,000	0.51	1.62	High	Low	High	High	High Risk
Okanogan River	Extirpated								

Table B-3. Viability assessments for Upper Columbia steelhead populations (UCSRB 2007)

Upper Columbia steelhead									
Population level	Abundance and Productivity					Spatial Structure and Diversity			Population Level: Overall Viability Rating
	Abundance		Productivity		Overall A/P	Goal A	Goal B	Overall SS/D	
Population	Current Natural Abundance	Minimum Threshold	Current Estimate (R/S)	Minimum R/S Threshold	Minimum R/S Threshold	Natural Processes Risk	Diversity Risk	Integrated SS/D Risk	
Wenatchee River	716	1,000	.25	1.20	High	Low	High	High	High Risk
Entiat River	92	500		1.35	High	Low	High	High	High Risk
Methow River	202	1,000	0.9	120	High	Low	High	High	High Risk
Okanogan River	53	500		1.2	High	Low	High	High	High Risk

Table note: Abundance and productivity targets are based on a 12-year geometric mean and represent minimum thresholds to achieve a less than 5% risk of extinction over a 100-year period. The minimum threshold for Okanogan steelhead is for the U.S. portion of the population.

B.3 Limiting Factors

Historic and ongoing land and resource use has caused degradation to watersheds that adversely affects fish populations in various ways. Several planning processes have resulted in detailed assessments of habitat degradations in Upper Columbia watersheds, e.g. Limiting Factors Analyses (Andonaegui 1999, 2000, 2001), watershed plans (CCCD 2004, WWPU 2006), Northwest Power and Conservation Council (NPCC) subbasin plans (NPCC 2004a-d), the Recovery Plan (UCSRB 2007), and the UCRTT Biological Strategy (UCRTT 2008). Within these assessments, various models (e.g. Ecosystems Diagnosis and Treatment (EDT), Shiraz, PHabSim) have been applied to particular habitat attributes and species to quantify the extent of improvements to limiting factors that could be achieved based on restoration options.

The Recovery Plan (UCSRB 2007) includes an Implementation Schedule containing suites of habitat restoration actions designed to address limiting factors and local technical experts (UCRTT) have prioritized those actions in the Implementation Schedule. The UCSRB established an adaptive management process for updating the Plan's Implementation Schedule, as identified in Chapter 8 of the Plan, to enable further review and revision of proposed habitat actions. Review and revision of proposed habitat actions are done within the adaptive management framework. The ongoing scientific evaluation role performed by the UCRTT enables interpretation of information gathered from monitoring and research, an assessment of deviations from targets or anticipated results (hypotheses), and provides an opportunity for the UCRTT to recommend changes in policies or management actions where appropriate.

Additionally, Appendix I of the Recovery Plan includes a logical matrix that links threats and causal mechanisms to habitat degradations, limiting factors, and impaired VSP parameters within each watershed of the Upper Columbia ESU (UCSRB 2007). The most recent effort conducted by the UCRTT to prioritize habitat actions in the most important subbasin assessment units is presented in the UCRTT Priorities Spreadsheet on page 16. Currently, work has been completed to develop Multi-Year Action Plans (MYAPs; described in Section F. WE 174 -Produce Plans and located in Appendix E) for the Wenatchee, Entiat, Methow and Okanogan subbasins. MYAP development is the culmination of Upper Columbia planning efforts to improve understanding of limiting factors and habitat alterations that are the most important to rectify, and help prioritize actions so that funding/projects will result in the greatest improvements to fish status in the Upper Columbia Region. Figure B-3 illustrates how all these planning efforts are connected.

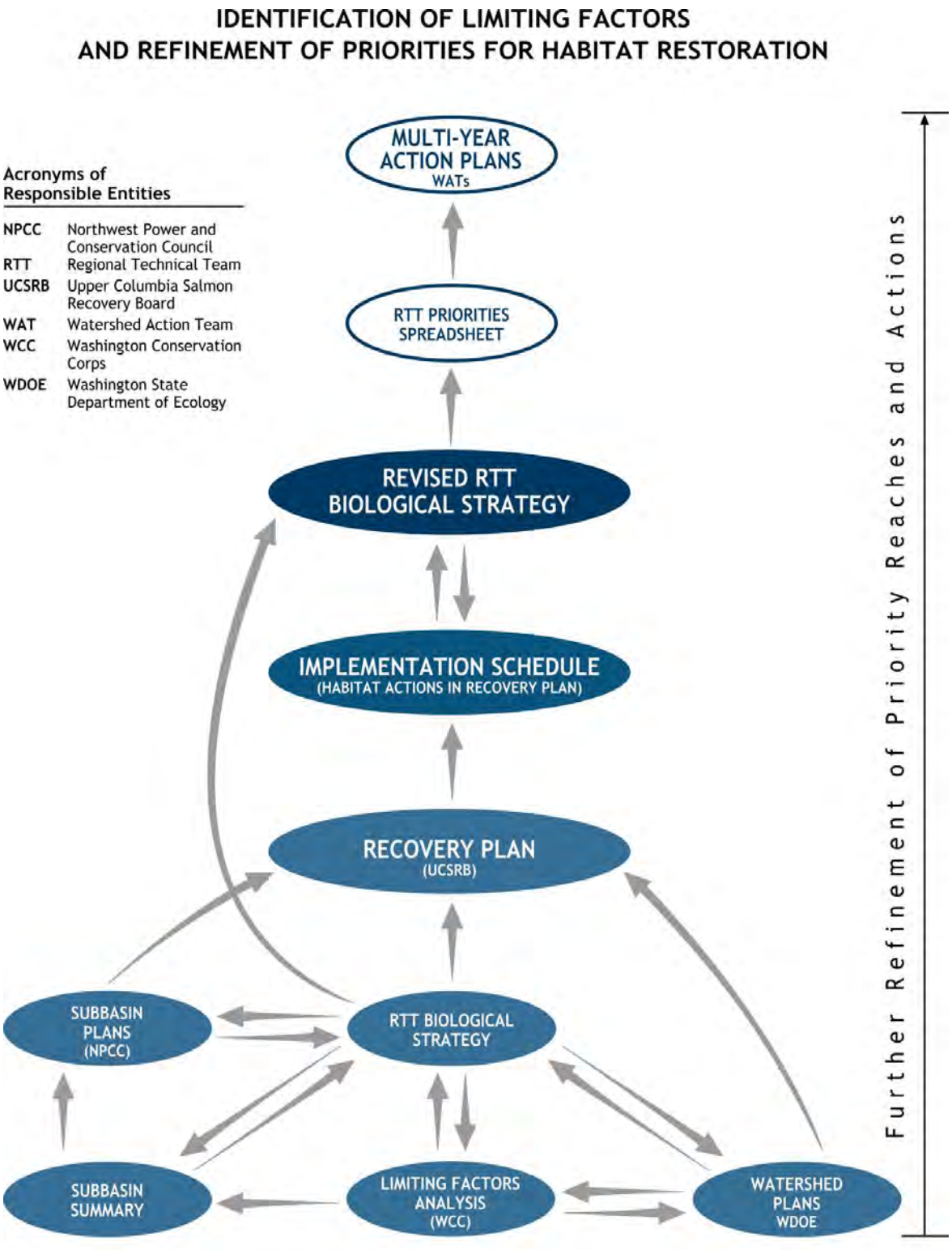


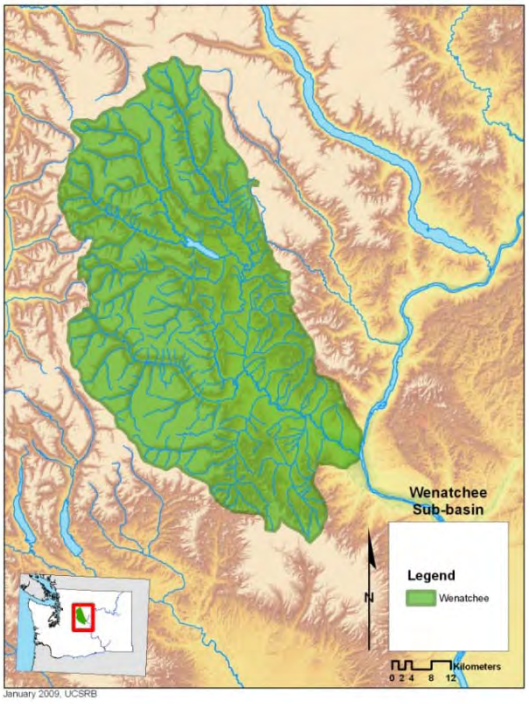
Figure B-3. Identification of limiting factors and refinement of priorities for habitat restoration

B.3.1 Limiting Factors in the Upper Columbia Basin

Although each watershed is diverse, there are some similarities in degraded habitat conditions throughout Upper Columbia tributaries. For example, high road densities and historic logging practices have led to higher sediment levels, stream channel confinement, fish passage barriers, reduced riparian function and reduced recruitment of wood. Irrigation withdrawals have reduced instream flows, which subsequently reduce the quantity of habitat. The four Upper Columbia subbasins (Wenatchee, Entiat, Methow, and Okanogan) discussed in this proposal span an area of over 8 million acres. Therefore, the limiting factors for fish habitat are only summarized in this document. Table B-4 presents a general landscape description of each subbasin. A summary of the primary limiting factors and management priorities identified by the Recovery Plan (UCSRB 2007) and the Upper Columbia Biological Strategy (UCRTT 2008) for the four Upper Columbia subbasins is presented below. Detailed information for each subbasin is presented in the Habitat Matrices (UCSRB 2007, Appendix G of the plan- http://www.ucsrb.com/theplan.asp).

Table B-4. General landscape descriptions of the Upper Columbia Region subbasins

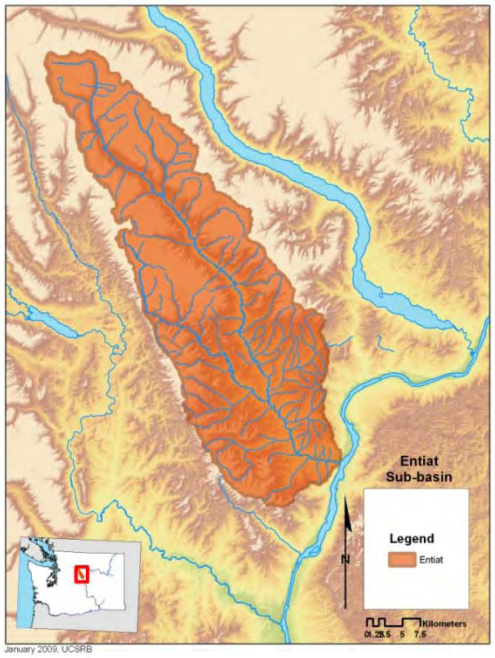
Subbasin	Landscape Description
Wenatchee	The Wenatchee subbasin and nine sub-watersheds (Mission, Peshastin, Chumstick, Icicle, Chiwaukum, Nason, Chiwawa, White, and Little Wenatchee rivers) drain 854,000 acres. Over 80% of the land is in public ownership. There are over 50,000 residents in this subbasin and private land ownership is concentrated in the valley bottoms and riparian areas. Land use consists of private and public timberlands, agriculture (primarily orchards), transportation corridors, and a few cities and towns.
Entiat	The Entiat subbasin, including the Mad River, drains an area of 298,000 acres. Over 90% of the land is in public ownership and the private ownership is concentrated in the valley bottoms and riparian areas. Land use within the Entiat subbasin consists of private and public timberlands, agriculture (primarily orchards and ranching), residential housing, and recreation. New home construction has doubled the population within the City of Entiat and rural populations have increased by 50% between1990-2000.
Methow	The Methow subbasin and seven sub-watershed tributaries (Early Winters Creek, Lost, Chewuch, Twisp, Beaver Creek, Gold Creek, and Libby Creek) drain 1,167,764 acres. Nearly 90% of the land is in public ownership with private land ownership concentrated in the valley bottoms. Approximately 5,000 residents live in the Methow Subbasin.
Okanogan	The Okanogan River subbasin is a large basin (exceeding 8,000 sq. miles) of which nearly 70% lies within British Columbia, Canada. The Okanogan River subbasin is the largest and most populated (300,000 residents) of the four subbasins within the Upper Columbia ESU. One tributary, the Similkameen River, lies mostly within Canada, and contributes 75% of the flow to the Okanogan River. The land use within this subbasin consists of forestry, agriculture (range, crop, orchards), and residential areas. Land ownership is proportioned between public lands (41%), Tribal (21%) and private ownership (38%).



The Wenatchee Subbasin
Watershed Resource Inventory Area (WRIA) 45

The Wenatchee River is unique among subbasins in the Upper Columbia Region in that it supports the greatest population diversity and overall salmonid abundance, yet is facing the greatest risk of habitat loss and degradation. State highways, railroads, and housing developments have substantially diminished the overall function of the stream channel and floodplain. This has impaired stream complexity, wood and gravel recruitment, floodwater retention, late summer flows, and water quality.

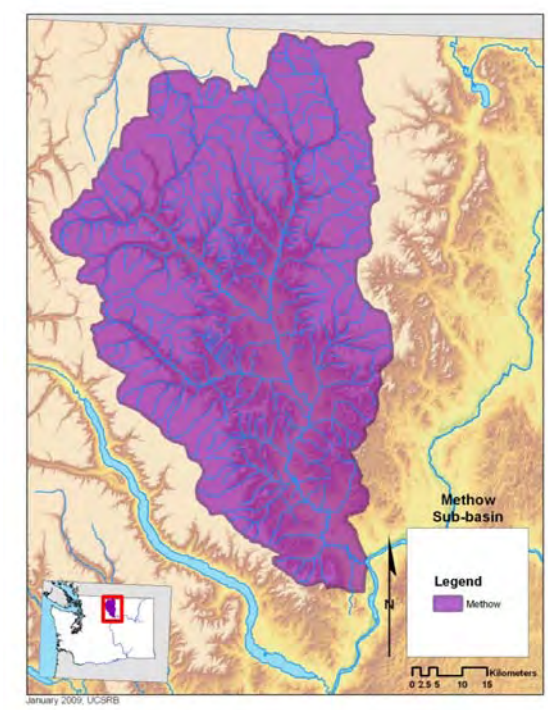
The highest priority within the Wenatchee subbasin is the protection of habitat that supports salmonid communities so that the populations are robust to environmental disturbances, can increase in abundance, and expand their range to adjacent watersheds. These high priority watersheds within the Wenatchee subbasin include the White River, Chiwawa River, and the upper and middle mainstem Wenatchee River (including Lake Wenatchee). Additional priorities are to increase the functionality of watersheds such as Nason, Peshastin, and Icicle Creeks, and the Lower Wenatchee River. In the Wenatchee, watershed restoration efforts have the highest potential to increase abundance and productivity.



The Entiat Subbasin (WRIA 46)

Flood control dikes, channelization, and lack of native riparian vegetation limit fish habitat in the lower Entiat River. Reduced stream channel complexity is the primary limiting factor for salmonid productivity in the lower 10 miles of the mainstem Entiat River. Stream sinuosity is low, with limited gravel accumulation. Instream habitat diversity is also low, with few pools, glides, pocket waters or large woody debris (LWD) accumulations. As a result, there are few resting and rearing areas for both adult and juvenile salmon in the lower mainstem Entiat River. Human development has also impacted water quality by removal of streamside vegetation and increased water withdrawals.

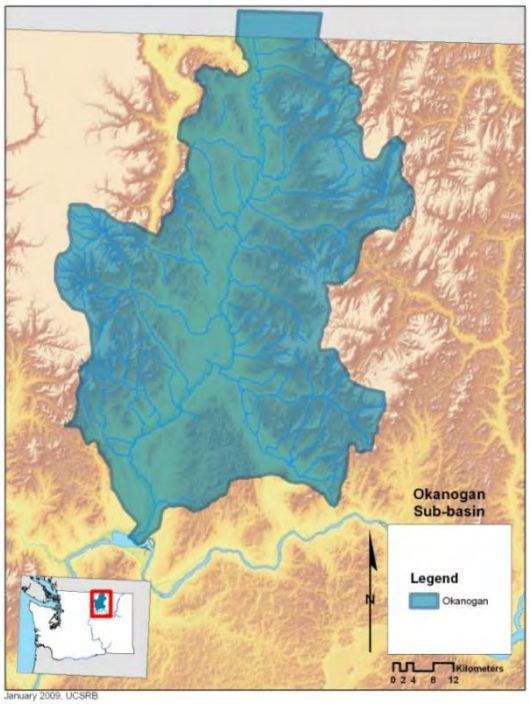
The most pressing needs on the lower Entiat River are to enhance the lack of instream complexity and riparian cover, yet there are other factors that adversely affect salmonids. Instream flows have also been identified as a limiting factor for salmonid production in the lower Entiat River.



The Methow Subbasin (WRIA 48)

The Methow River contains large amounts of pristine habitat in the headwaters of tributaries that should be protected; however, the middle and lower mainstem of the Methow River and lower reaches of tributaries have been adversely affected by state highways, county roads, housing, and agricultural development, diminishing the overall function of the stream channel and floodplain. Consequently, the stream channel has reduced complexity, limited wood and gravel recruitment, reduced floodwater retention, and impaired water quality. Additionally, reduction in late summer and winter flows impair migration, spawning, and rearing conditions for native salmonids.

The highest priority within the Methow subbasins is the protection of habitat that supports robust salmonid populations that have the capacity to be resilient to environmental disturbances, can increase in abundance, and expand their range to adjacent watersheds. Priority watersheds to protect within the Methow Subbasin are the Lost, Twisp, Chewuch, Upper and Middle Methow Rivers, and Early Winters Creek. Additional priorities are to increase the functionality of watersheds such as the Twisp, Chewuch, and mainstem Methow Rivers, including subwatersheds Wolf, Gold, Libby, and Beaver creeks. In the Methow, these watersheds offer the highest potential to increase abundance and productivity through restoration efforts.



The Okanogan Subbasin (WRIA 49)

Over the past century, ecosystem processes have been negatively impacted throughout the Okanogan River subbasin, creating a fragmented mixture of altered or barren fish and wildlife habitats. Disruptions to the hydrologic system have resulted in elevated water temperatures in the main stem substantially reducing the suitable migratory period for adult Chinook and sockeye salmon to access productive habitat. Furthermore, severe alterations to coldwater tributaries have diminished the amount of coldwater refugia in the mainstem and spawning and rearing habitat for summer steelhead. Consequently, other stream-type anadromous fish species, such as spring Chinook salmon are now extirpated in the Okanogan River. In addition to inhospitable thermal conditions in the mainstem and lack or loss of stream flow in the tributaries, excessive amounts of fine sediment and migration barriers are other factors limiting salmonid production within the Okanogan River subbasin.

The immediate strategy is to restore and protect the remaining steelhead, sockeye, and summer Chinook spawning and rearing habitat. In particular, high priority protection areas include the summer steelhead spawning and rearing habitat in Salmon and Omak Creek and several other small tributaries that could support spawning and rearing steelhead populations.

B.4 Determination of Priority Reaches and Actions

Several planning processes have resulted in detailed subbasin assessments that identify the highest priority tributaries/reaches most appropriate for large restoration programs. Systematic and consistent efforts began with the Washington Conservation Commission authoring Limiting Factors Analyses (Andonaegui et al. 1999, 2000, 2001) and the UCRTTs development of the Upper Columbia Biological Strategy (UCRTT 2003, 2008). The limiting factors analysis effort was a very comprehensive attempt to glean the best available science from agency biologists regarding human-induced degradations throughout the landscape. Though not a quantitative evaluation of the effects to fish, these documents are still a useful reference for understanding the history and condition of habitat in the watersheds. Subsequently, habitat limiting factors and the effects to certain species (i.e. steelhead and spring Chinook) were evaluated using the EDT model during the NPCC Subbasin Planning effort (NPCC 2004a-d) (*Note*: EDT was not completed during Subbasin Planning in the Wenatchee but was completed during recovery planning.) The EDT model helped local recovery planners identify the human-induced degradations that were likely having the largest influence on the target species. Priority reaches for restoration and protection were established based on the model predicted outcomes in terms of fish performance. Survival factors from the model were linked back to action types that would increase those survival factors, and subsequently, lists of action types within each Assessment Unit were developed.

B.4.1 TRIBUTARY AND REACH ASSESSMENTS

Concurrently (and still ongoing), the UCSBR was/is conducting detailed Tributary and Reach Assessments in key areas (see Table B.5), which identified the cause of disrupted watershed processes, catalogued the human-induced degradation within the reach and provided a detailed, site-specific list of potential actions for habitat action implementers (i.e. Watershed Action Teams -WATs) to choose from.

This reach-based approach to project development incorporates information from Tributary (Example: Nason Creek, Wenatchee Watershed http://www.usbr.gov/pn/programs/fcrps/thp/ucao/wenatchee/nasoncreek/tributary-assmt.pdf), and Reach Assessments, (Example: Preston Reach Assessment Entiat Subbasin http://www.usbr.gov/pn/programs/fcrps/thp/ucao/entiat/prestonreach/main.pdf)

Table B.5 Upper Columbia Region Reach and Tributary Assessment Status & Schedule

Upper Columbia Region Reach and Tributary Assessment Status & Schedule			
	LOCATION	ASSESSMENT TYPE	ENTITY
	Wenatchee Subbasin		
Completed	Lower Wenatchee (RM 0-4)	Channel Migration Zone Study	Jones and Stokes
	Nason Creek (RM 0-4)	Channel Migration Zone Study Habitat Assessment	Jones and Stokes Reclamation
	Nason Creek (RM 4-14)	Tributary Assessment	Reclamation
	Nason - Upper White Pine RM (12-14.5)	Reach Assessment	Reclamation
	Nason - Lower White Pine RM (9.45-11.55)	Reach Assessment	Reclamation
	Nason - Kahler (RM 4.65-8.9)	Reach Assessment	Reclamation
In Progress	Peshastin RM (0-7)	Reach Assessment	Yakama Nation
Future Priorities	Upper Wenatchee (Lake Wenatchee-Tumwater Canyon)	Reach Assessment	Yakama Nation
	Icicle (boulder field)	Reach Assessment	Reclamation 2011/2012
	Entiat Subbasin		
Completed	Entiat RM (0-26)	Tributary Assessment	Reclamation
	Preston RM (22.7-23.3)	Reach Assessment	Reclamation
	Stormy RM (17.9-18.1)	Reach Assessment	Reclamation
In Progress	Entiat 3D RM (24-25)	Reach Assessment	Yakama Nation
Future Priorities	Entiat 2A, 3C, 3F (RM 16.1-17.9, RM 23.3-24, RM 25.6-26)	Reach Assessment	Yakama Nation (completed by 2017)
	Entiat 1B, 1C, 1E (RM 0.8-4.3, RM 6.3-6.9)	Reach Assessment	TBD (completed by 2014)
	Entiat 1D, 1F (RM 4.3-6.3, RM 6.9-10.6)	Reach Assessment	TBD (completed by 2020)
	Methow Subbasin		
Completed	Methow Subbasin (RM 0-80)	Tributary Assessment	Reclamation
	Big Valley (RM 54.2-60)	Reach Assessment	Reclamation
In Progress	Methow mainstem to Winthrop (RM 40-51.5)	Reach Assessment	Reclamation
	Chewuch (RM 0-20)	Reach Assessment	Yakama Nation
	Lower Twisp (RM 0-15)	Reach Assessment	Yakama Nation
Future Priorities	Methow mainstem, Winthrop to Wolf Creek (51.5-54.2	Reach Assessment	Reclamation
	Methow mainstem, Weaman Bridge to Mazama (RM 61-67)	Reach Assessment	TBD
	Methow Silver (RM 29-40, RM 52-55)	Reach Assessment	Reclamation

B.4.2 EDT MODELING

During development of the Recovery Plan, the VSP criteria for recovery of listed species were unveiled and adopted by the UCSRB in development of the Recovery Plan. Because of the breadth and complexity of

the EDT input and output, the linkages to recovery planning and intrinsic potential modeling by the Interior Columbia Basin Technical Review Team, and other information available in a subset of areas (i.e. Shiraz model in Wenatchee, PHabSim model, Reclamation reach assessments), the UCRTT was asked to develop a set of priority reaches and actions for each watershed (see UCRTT priorities spreadsheet table). Specifically, the UCRTT's objective was to create a concise product that would help to guide the WATs in their tasks of project type and location selection, updating the implementation schedules, and developing a mid-range work plan. Priority levels for this exercise were determined based on the professional judgment of the UCRTT but took into consideration the many qualitative and quantitative assessments described above.

Our proposal remains consistent with the general approach outlined in the UCRTT Biological Strategy, while providing more specific guidance to the WATs. We recognize that many other actions and reaches have been identified for habitat improvements and could also make important contributions to recovery. However, we believe that the habitat-related actions outlined in the spreadsheet are the highest priority for maintaining and contributing to the restoration of the viability of listed salmonid populations in the Upper Columbia Region (see spreadsheet table).

Tables B.6 UCRTT priorities for reaches and actions for implementing habitat actions

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Wenatchee	Nason	2	Restore natural channel processes	1	1		Sidechannel and/or offchannel connection or other actions that address causal mechanisms for limiting factors and maintain processes that promote the retention and recruitment of large woody debris. Feasibility of implementing priority actions is very low in the first 3 years. Need to focus initial effort on making progress with DOT and the Railroad and putting together a restoration plan. Instream structures should not be implemented until progress is made with restoring natural processes and addressing the causes of limiting factors.
Wenatchee	Upper Wenatchee (Lake to Tumwater Canyon)	1	Increase LWD retention and recruitment to increase complexity in a manner that is consistent with natural channel structure and function.	1	2		Need an assessment and implementation plan to determine appropriate locations and prescriptions. Preference for actions that enhance natural accumulations of LWD.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Wenatchee	Icicle Creek	2	Assess passage at boulder field, reconfigure Icicle/City of Leavenworth diversions	NR-1	3		If the boulder field is currently inhibiting passage due to anthropogenic effects, then take measures to improve upstream adult passage over the boulder field. *(EDT and ICTRT intrinsic potential model predict very large increases in capacity for steelhead with access to the upper Icicle).*
Wenatchee	Peshastin	2	Geomorphic assessment / Instream flow / Channel complexity	1	4		The geomorphic assessment needs to include the entire area impacted by the highway (at least to Tronson Ck confluence). After the assessment is completed, then develop a restoration plan that includes restoration of natural processes where possible, normative flow levels, migration corridors, and holding and rearing habitat in lower Peshastin Creek.
Wenatchee	Lower Mainstem (Mouth to Tumwater Canyon)	2	Restore natural channel processes	1	5		Sidechannel and/or offchannel connection or other actions that address causal mechanisms for limiting factors. Some priority areas include Cashmere Ponds, above Sleepy Hollow Bridge, Monitor Flats; need to re-evaluate potential benefits of other CMZ sites in the Lower Wenatchee.
Wenatchee	Wenatchee Subbasin Wide	NA	Nutrient Enhancement	2	6		Develop a nutrient enhancement plan in coordination with the WHSC, WQSC, and ISEMP, then implement a nutrient enhancement project in appropriate areas using hatchery carcasses and / or carcass analogs.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Wenatchee	Nason	2	Land Protection, Acquisition or Lease	1		1	May need 1-2 yr to assess and prioritize risks and opportunities. Combine Reclamation assessment information with lower 4.6 miles and determine priority areas for protection based on biological function and risk of development.
Wenatchee	White River	1	Land Protection, Acquisition or Lease	1		1	At risk areas are in the lower reach where there is no spawning and very limited rearing. The majority of primary spawning and rearing areas are already protected.
Wenatchee	Upper Wenatchee	1	Land Protection, Acquisition or Lease	1		1	Select opportunities that protect or allow for sidechannel reconnection would be higher priority.
Wenatchee	Chiwawa	1	Land Protection, Acquisition or Lease	1		1	Chikamin Flats, the majority of other private ownership is in the lower 4 miles that is primarily a migration corridor and not as high a priority. There could be select areas of high priority, but without an assessment we are not aware of those opportunities.
Wenatchee	Lower Mainstem	2	Land Protection, Acquisition or Lease	1		5	Select opportunities that protect or allow for sidechannel reconnection would be higher priority.
Wenatchee	Peshastin	2	Land Protection, Acquisition or Lease	1		6	Select opportunities that protect or allow for sidechannel reconnection would be higher priority.
Wenatchee	Wenatchee Subbasin wide	NA	Instream Flow	1 or 2	NR	NR	Strategic acquisition of water for instream benefits. Priority level depends on quantity and location.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Wenatchee	Subbasin wide	NA	Riparian Habitat	1 or 2	NR	NR	In general it needs to be done in association with other primary projects, need to be sure it is done in areas where other processes are functioning and restoration has a high likelihood of success. Priority level of stand alone projects depends on the quantity and location.
Entiat	Stillwater Reach (16-25)	1	Restore natural channel processes	1	1		Restoration of channel migration processes such as sidechannel and offchannel connection or other actions that address causal mechanisms for limiting factors and maintain natural processes and promote the retention and recruitment of large woody debris.
Entiat	Lower Entiat (0-10)	2	Restore natural channel processes	1	2		Restoration of channel migration processes such as sidechannel and offchannel connection or other actions that address causal mechanisms for limiting factors and maintain natural processes and promote the retention and recruitment of large woody debris.
Entiat	Entiat Subbasin wide	NA	Treat or relocate roads.	1	3		The objective is to reduce artificially high rates of sediment input and restore other upland watershed processes such as runoff patterns and LWD recruitment.
Entiat	Stillwater Reach (16-25)	1	Increase LWD retention and recruitment to increase complexity in a manner that is consistent with natural channel structure and	1	4		Should be appropriately sited and scaled and numerically consistent with the Entiat watershed DIP and the ISEMP monitoring design.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
			function.				
Entiat	Lower Entiat (0-10)	2	Instream structures designed to form and maintain large pools, such as appropriately sited channel spanning cross vanes.	1	5		Large pools are defined in Hillman (2006) and should be numerically consistent with the Entiat watershed DIP and the ISEMP monitoring design. Other structures, such as large ELJs, could address the limiting factor (lack of primary pool habitat) but may have considerably higher risk of failure due to ice flows, etc. in the lower 16 miles and may not be appropriate in many locations along the main channel.
Entiat	Lower Entiat (0-10)	2	Large woody debris, log structure or log jam, rootwads	NR-2	6		Moderate sized structures would need to be strategically placed in lower energy areas such as sidechannels. Small wood structures along the margin of the main channel would not be a priority, particularly when existing riparian vegetation would need to be cleared in order to install them.
Entiat	Entiat Subbasin wide	NA	Nutrient Enhancement	2	7		Develop a nutrient enhancement plan in coordination with the EHSC, WDOE, ISEMP, and others then implement a nutrient enhancement project using hatchery carcasses and / or carcass analogs.
Entiat	Lower Entiat (10-16)	2	None	NR	NR	NR	In general, reserve for a reference reach for the ISEMP project. Certain actions that contribute to habitat restoration or species survival may be appropriate, if they don't interfere with the ISEMP study design.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Entiat	Stillwater Reach (16-25)	1	Land Protection, Acquisition or Lease	1		1	Large pristine areas would be the highest priority but also areas that have some degradation and an opportunity to conduct restoration activities.
Entiat	Lower Entiat (0-16)	2	Land Protection, Acquisition or Lease	1		2	Select opportunities that protect large intact riparian areas or allow for sidechannel reconnection would be a priority.
Entiat	Entiat Subbasin wide	NA	Instream Flow	1 or 2	NR	NR	Strategic acquisition of water for instream benefits. Priority level depends on quantity and location.
Entiat	Entiat Subbasin wide	NA	Riparian Habitat	1 or 2	NR	NR	In general it needs to be done in association with other primary projects, need to be sure it is done in areas where other processes are functioning and restoration has a high likelihood of success. Priority level of stand alone projects depends on the quantity and location. The Entiat River Watershed Riparian Areas Prioritization Project (GeoEngineers 2007) offers a useful guide for areas that are likely to be a priority.
Methow	Middle Methow (Weeman to Winthrop)	2	Restore natural channel processes.	1	1		Sidechannel and/or offchannel connection or other actions that address causal mechanisms for limiting factors and maintain processes that promote the retention and recruitment of large woody debris. Implementation of the Big Valley Reach Assessment. Hancock Creek also has enhancement opportunities that are good early implementation options.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Methow	Lower Twisp	2	Increase instream flow; restore natural channel processes.	1	2		MVID west efficiencies to increase instream flow. Where possible remove dikes and levees and manage roads to allow for natural channel migration. These actions will likely have additional benefits to other limiting factors such as water temperatures.
Methow	Middle Methow (Winthrop to Carlton)	2	Restore natural channel processes.	1	3		Pending the M2 reach assessment and the assessment from Twisp to Carlton. Sidechannel and/or offchannel connection or other actions that address causal mechanisms for limiting factors and maintain processes that promote the retention and recruitment of large woody debris.
Methow	Lower Chewuch	2	Instream Flow	1	4		Still may be some opportunities with the Chewuch and Fulton irrigation withdrawals (I.e. maintaining the ongoing agreement with WA Rivers Conservancy). These actions will likely have additional benefits to other limiting factors such as water temperatures.
Methow	Lower Chewuch	2	Restore natural channel processes.	1	5		Sidechannel and/or offchannel connection or other actions that address causal mechanisms for limiting factors and maintain processes that promote the retention and recruitment of large woody debris. Need to develop a watershed restoration strategy utilizing the PWI assessment and the Reclamation geomorphic assessment. These actions will have additional benefits to other limiting factors such as water temperatures.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Methow	Methow Subbasin Wide		Treat or relocate roads.	NR-1	6		The objective is to reduce artificially high rates of sediment input and restore other upland watershed processes such as runoff patterns and LWD recruitment.
Methow	Beaver	2	Instream Flow	1	7		Now that structural passage barriers are nearly complete, efforts should focus on guaranteed water in the creek and connection with the Methow River. Other protection and restoration measures that contribute to increasing or maintaining instream flow would also be a priority.
Methow	Methow Subbasin Wide		Nutrient Enhancement	2	8		Develop a nutrient enhancement plan in coordination with monitoring efforts and the MRC. Then implement in appropriate areas (based on monitoring results) using hatchery carcasses and/or carcass analogs.
Methow	Lower Twisp	2	Land Protection, Acquisition or Lease	1		1	Lower 12 miles, 4 reaches were rated the same due to similar potential for loss of important spawning and rearing areas.
Methow	Middle Methow (Weeman to Winthrop)	2	Land Protection, Acquisition or Lease	1		1	4 reaches were rated the same due to similar potential for loss of important spawning and rearing areas.
Methow	Upper Methow	2	Land Protection, Acquisition or Lease	1		1	4 reaches were rated the same due to similar potential for loss of important spawning and rearing areas.

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Methow	Lower Chewuch	2	Land Protection, Acquisition or Lease	1		1	4 reaches were rated the same due to similar potential for loss of important spawning and rearing areas.
Methow	Middle Methow (Winthrop to Carlton)	2	Land Protection, Acquisition or Lease	1		5	Not rated as high due to less relative fish use. There may still be critical areas within this reach and may be important in conjunction with restoration actions.
Methow	Methow Subbasin wide		Riparian Habitat	NR	NR	NR	In general it needs to be done in association with other primary projects, need to be sure it is done in areas where processes are functioning and restoration has a high likelihood of success. Priority level of stand alone projects depends on the quantity and location.
Methow	Methow Subbasin wide		Instream Flow	NR	NR	NR	Strategic acquisition of water for instream benefits. Priority level depends on quantity and location.
Okanogan	Omak Creek	2	Passage	1	1		Mission Falls
Okanogan	Antoine Creek	3	Instream Flow and habitat access, barrier removals	NR-1	2		Long term water lease, barrier removals,
Okanogan	Loup Loup Creek	3	Instream Flow and habitat access, barrier removals	1	3		Change in water diversion, remove barrier culverts

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
Okanogan	Okanogan Subbasin wide		Treat or relocate roads.	NR-2	4		The objective is to reduce artificially high rates of sediment input and restore other upland watershed processes such as runoff patterns and LWD recruitment. Many of the known high priority areas in Omak Creek have been treated. Other problem areas should be addressed as they are discovered.
Okanogan	Upper US Okanogan (US Border to Similkameen Confluence)	2	Temperature, side channel habitat	NR-1	5		Develop detailed reach assessment, construct control structures to maintain flows on both side of Driscole Island, determine conceptual designs to address thermal pollution expelled from Osoyoos Lake.
Okanogan	Lower Middle US Okanogan (Siwash Creek to Salmon Creek)	2	Enhancement / development of coldwater refugia and off-channel habitats	2	6		Develop off channel coldwater refugia to take advantage of spawning habitat production.
Okanogan	Salmon Creek	2	Land Protection, Acquisition or Lease	NR-1		1	Protection above OID diversion
Okanogan	Similkameen River (Enloe Dam To Confluence with Okanogan)	2	Land Protection, Acquisition or Lease	3		2	Lower 3 miles: Conservation easements and acquisitions that are focused on the riparian, floodplain or adjacent to spawning habitats. Although originally rated a tier 3 priority, we believe it was undervalued and should be a priority.
Okanogan	Antoine Creek	3	Land Protection, Acquisition or	NR-2		3	Land acquisition and conservation easements, possibility of 9 miles new habitat

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	
			Lease				
Okanogan	Aeneas Creek	2	Cold water refugia	2		4	Protect cold water input, channel reconfiguration
Okanogan	Bonaparte Creek	4	Instream Flow and habitat access, barrier removals, sediment reduction	2		5	Protect Springs, reduce sediment through instream structures, long term water lease/water rights purchase
Okanogan	Lower Middle US Okanogan (Siwash Creek to Salmon Creek)	2	Land Protection, Acquisition or Lease	2		6	Protect lands adjacent to spawning areas.
Okanogan	Okanogan Subbasin wide	NA	Instream Flow	1 or 2	NR	NR	Strategic acquisition of water for instream benefits. Priority level depends on quantity and location.
Okanogan	Okanogan Subbasin wide	NA	Riparian Habitat	1 or 2	NR	NR	In general it needs to be done in association with other primary projects, need to be sure it is done in areas where other processes are functioning and restoration has a high likelihood of success. Priority level of stand alone projects depends on the quantity and location.

[1] Watershed Categories were taken from the UCRTT *Biological Strategy* (2008)

UCRTT priorities for reaches and actions for implementing habitat actions (13 March 2009)

Subbasin	Watershed or Reach	Watershed Category[1]	Priority Action Type or Specific Action[2]	Tier Level[3]	Priority level[4]		Comments
					Restoration	Protection	

[2] Threats and limiting factors that these Action Types and Specific Actions address can be found in appendix G of the Salmon Recovery Plan (UCSRB 2007), the UCRTT *Biological Strategy* (UCRTT 2008), and other documents such as the Detailed Implementation Plan for the Entiat Water Resource Inventory Area (WRIA) 46.

[3] Tier levels for Action Types and/or specific actions were establish in the UCRTT *Biological Strategy* (2008) based on the actions identified in the Implementation Schedules of the Salmon Recovery Plan (UCSRB 2007). "NR" indicates that the action was not rated for Tier levels using the formal process established in the Biological Strategy (UCRTT 2008), the number following NR indicates a judgment call by the UCRTT to estimate the Tier level for this process.

[4] Priority levels were determined based on the professional judgment of the UCRTT for this task. It was our intention to be consistent with the general approach outlined in the UCRTT Biological Strategy, but to provide more specific guidance to Watershed Action Teams. Many other actions and reaches have been identified for habitat improvements and we recognize that those actions could also make important contributions to recovery. However, we believe that the habitat related actions outlined here are the highest priority for maintaining and contributing to the restoration of the viability of listed salmonid populations in the Upper Columbia Region.

B.4.3 UCRTT BIOLOGICAL STRATEGY AND PRIORITIES

The following paragraphs provide a synopsis of key points from the Biological Strategy (UCRTT 2008) in order to provide the ISRP with a summary of the principles. The UCRTT Biological Strategy outlines an approach to protect and restore salmonid habitat in the Upper Columbia Region. The document continues to evolve; it was updated several times between 2000 and 2008. The intent of the Biological Strategy is to provide support for, and the latest guidance on, implementation of the Recovery Plan, which includes actions for spring Chinook salmon, steelhead, bull trout and other habitat restoration activities. The Biological Strategy is intended to serve as a technical foundation to set regional priorities for habitat protection and restoration, based on available information and the professional judgment of fisheries biologists familiar with the Upper Columbia Region. The UCRTT Priorities spreadsheet (see section x) is a product of the approach found in the Biological Strategy.

The consensus of the UCRTT is that protection and restoration should focus first on maintaining the best remaining examples of biological integrity, connectivity, and diversity. This strategy will contribute to improvements in abundance, productivity, spatial structure, and diversity over the long term. The highest priority for protecting biological productivity is to allow unrestricted stream channel migration, complexity, and flood plain function. Protection of existing stream flows in virtually all subbasins in the Upper Columbia Region is also important to maintaining biological productivity.

The highest priority for increasing biological productivity is to restore stream channel and floodplain complexity. The UCRTT recommends a range of strategies for habitat restoration in the Upper Columbia Region, based on the fundamentals of promoting habitat diversity and improving instream flows and water quality throughout the watersheds. Most of these efforts will likely be implemented on the lower stream reaches and in aggradation zones (typically areas of low stream gradient where deposition of substrate material occurs). Restoration in these areas would benefit a broad range of species and populations.

The UCRTT recommends that structural manipulation of the stream channel (such as boulder or log placements) not be used unless: (1) they are designed at the reach level or context, (2) those factors that are causing the habitat degradation cannot be corrected, or (3) the area is critical for achieving a viable population. Actions that rectify the effects of improper land use practices can have more benefits to biological productivity in the long run, may be economically more efficient, and may be more permanent than measures that mechanically alter the stream channel.

Attempts to restore habitat are likely to fail if structures are placed in the stream channel without addressing those activities that are causing habitat degradation (Beechie et al. 2010). In some isolated situations, restoration projects may be accomplished with both short- and long-term objectives. For example, large woody debris placement may secure erosive banks and create interim stream bank protection and salmonid habitat, while passive restoration and revegetation will ensure proper functioning riparian conditions in the long-term. The UCRTT recognizes that projects involving structural manipulation may be biologically effective when a short-term strategy is integrated with a long-term strategy. Therefore, each active restoration project must be reviewed on a case-by-case basis.

In summary, successful restoration requires a holistic approach that considers processes operating at different spatial and temporal scales. A watershed or ecosystem assessment of current and historical conditions and disrupted processes is necessary to identify restoration opportunities that are consistent with re-establishing the natural processes and functions that create habitat (Beechie and Bolton 1999; Roni et al. 2002; Beechie et al. 2010). The Biological Strategy provides the guidance necessary for the

development and implementation of strategic actions that will help achieve recovery across the Upper Columbia Region.

In addition to general and theoretical guidance, the Biological Strategy also offers information specific to every Assessment Unit within the Upper Columbia Region. Appendix C of the Biological Strategy provides an overview of each Assessment Unit and a list of actions that were generated from the previous version of the strategy, as well as the Implementation Schedule for the Recovery Plan. The actions identified for each Assessment Unit have been grouped into Tiers based on an evaluation of potential biological benefit. A subgroup of the UCRTT applied the biological benefit portion of our project review criteria (see section x) to the lists of potential actions. Scores were sorted regardless of the subbasin/Assessment Unit and four Tiers were established across the ESU by separating the scores into quartiles. Therefore, a Tier 1 action in the Methow is approximately the same priority as a Tier 1 activity in any of the other subbasins, resulting in an ESU level prioritization of the Implementation Schedule.

Table B.7. Example of one of the Assessment Unit Summaries from the UCRTT Biological Strategy (2008). Appendix C of the Biological Strategy contains a similar table for every assessment unit in the Upper Columbia.

TWISP RIVER ASSESSMENT AND STRATEGY
Species: Spring Chinook salmon, steelhead, bull trout, westslope cutthroat trout. Drainage area: 157,000 acres
STATUS: Category 2, Major spawning area for spring Chinook and steelhead and a core area for bull trout. ▪ Designated as a key watershed in NWFP.
SIGNIFICANT SUBWATERSHEDS: Middle Twisp, Lower Twisp, North Creek, Buttermilk Creek, Little Bridge Creek
FACTORS AFFECTING HABITAT CONDITION: ▪ Low instream flows and high water temperatures in the lower Twisp River affect several species at several life history stages. ▪ The Twisp River (from Buttermilk Creek to the mouth) has been cut off from its floodplain and side channels through dikes and riprap in places, resulting in a highly simplified channel. ▪ In the lower Twisp River (RM 0.0 – 16.5) LWD levels and recruitment potential are well below amounts expected. ▪ The MVID West Canal diversion on the Twisp River at RM 3.9 is a river cobble levee dam that must be pushed up each year, disturbing salmonid rearing and spawning habitat. ▪ The lower Twisp River is listed on the Washington State 303(d) list for inadequate instream flow and for temperature exceedance. ▪ Development of riparian and floodplain areas from river mile 0-17. ▪ The road in Little Bridge Creek affects stream channel function.
LEVEL OF CERTAINTY / DATA GAPS: ▪ Field habitat analyses have been conducted on public lands, allowing a high confidence in assessment. ▪ Field analyses are incomplete on private lands, yet reviews of aerial photographs in combination with field reviews have allowed strong inferences on habitat needs. ▪ Some uncertainty exists on relation of instream flows and fish habitat. ▪ Increasing recreational demand in key salmonid production areas in the Upper Twisp River is a concern.
HABITAT ACTION RECOMMENDATIONS: Tier 1 Protect remaining floodplain and riparian habitat. Water Quantity (Lower Twisp)

- Reduce water withdrawals and lease/purchase water rights.

Floodplain Restoration

- Remove or modify levees and dike were appropriate
- Replace undersized culverts to restore alluvial fan function and delivery of LWD and gravel to Twisp River.
- Side channel reconnection and restoration
- Reestablish beaver populations (some additional benefits to water quantity and winter temperatures).

Sediment

- Road maintenance, road reconstruction, heavy maintenance and obliteration where appropriate

Riparian Restoration

- Fence wetlands and riparian areas on USFS to allow recovery from livestock grazing and beaver recolonization.
- Increase LWD recruitment and retention in the lower 11 miles of Twisp River.

Tier 2

Ecological Interaction

- Add nutrients using hatchery carcasses and/or carcass analogs

Tier 3

Obstructions

- Improve passage (*any mainstem Twisp passage impediments would be Tier 1*)
- Replace any culverts that impede anadromous fish passage (tributaries)

Riparian Restoration

- Manage recreation site impacts to floodplain (North Creek/Gilbert area, Reynolds Creek)

Ecological Interaction

- Reduce or eliminate brook trout

B.4.4 TARGETED SOLICITATION ACTIONS

Potential project sponsors, through the WATs, use the tools described above to determine where to work and what kinds of projects will address restoration priorities. These project concepts are included on the Implementation Schedule and the more detailed in the 3-5 year plans (MYAPs) that are discussed in Section F.3 Work Element 174 and located in Appendix E. In partnership with the Upper Columbia Staff, project lists are then cross-referenced back to the UCRTT priority spreadsheets to be sure that targeted solicitation projects are consistent with high priority reaches and actions. For the Upper Columbia solicitation processes, the UCRTT will conduct a formal project review and scoring (See project review Criteria in Section F4. Work Element 114. Identify and Select Projects.)

B.5 Successes and Challenges in Addressing Limiting Factors in the Upper Columbia Region

More than 300 projects have been implemented over the last decade in the Upper Columbia Region. These projects were the first generation of actions developed in response to the listing of salmonids in the Northwest. A large proportion of these projects were simpler habitat "restoration" projects. Over one-sixth of them were "protection" projects. We are now in our fourth year of Recovery Plan implementation; the Plan was designed to take upwards of 30 years to achieve recovery of salmonids species in the Upper Columbia region. In the 2008 *Washington State of the Salmon Report* (GSRO 2008; see http://www.rco.wa.gov/doc_pages/other_pubs.shtml#gsro), the report states that the Upper Columbia is approximately 3% toward the goals in each of the VSP parameters.

The UCRTT recently conducted a scientific analysis workshop that evaluated project and monitoring data available within and outside the Upper Columbia. The results of those analyses are currently being synthesized into a final report that will be used this summer and fall for a series of adaptive management

workshops and a habitat science conference. One key message from the workshop is that without a coordinated implementation approach, we are not necessarily on the right trajectory for implementation of the most biologically important projects for salmon recovery. Significant progress in addressing some threats (e.g. barriers) have been made, however, project types (e.g. channel reconnection) that restore riverine processes necessarily require a more coordinated approach, both from a project implementation vantage and the need for coordinated funding to finance more expensive projects. Many projects, such as barrier removal, are often easier to accomplish because the implementation of the projects are discrete in nature, often involving only a single landowner, a single project sponsor, and two funding sources. Many of the priority projects remaining are not as easy to implement as barrier removal or riparian planting. Rather, more assessments, coordination, and planning are needed to implement some of the most biologically important projects that have not had the necessary project planning, selection, and evaluation processes in place to implement successfully. This habitat programmatic project proposal is set up to create a process that will support the implementation of some of the most biologically important habitat projects. A coordinated monitoring strategy for the Upper Columbia will compliment the habitat programmatic project (see Monitoring and Evaluation in the Upper Columbia Section G, Appendix F).

The administrative infrastructure of project sponsors, the UCSRB and UCRTT, and direction provided by the Recovery Plan and several other comprehensive planning documents, are in place to facilitate implementation of strategic actions throughout the Upper Columbia Region in a programmatic manner as described by this project proposal. The proposed programmatic project addresses some long-standing hurdles to implementation in Upper Columbia Region and stages it to continue addressing priority actions and limiting factors. The UCSRB has already created a functional prioritization mechanism following 10 years of partnership and collaborative processes to make regional project and funding coordination a reality. Two recently completed projects that have, at least initially, resulted in increased fish abundance, serve as good examples of implementation of high priority actions in the Upper Columbia Region and are described in the narratives that follow.

B.5.1 NASON CREEK OXBOW, WENATCHEE SUBBASIN

The Chelan County Natural Resources Department (CCNRD) recently restored fish access to a 0.5 mile oxbow in Nason Creek (see Figure B-5. Aerial). Located between Lake Wenatchee and State Highway 2 this channel of Nason Creek was disconnected when the highway was constructed. Reactivating this side channel habitat was identified as a priority in the Biological Strategy. The project involved the installation of two, 12-foot bottomless arch culverts resulting in fish access to 21.7 acres of off-channel refuge and over-wintering habitat for juvenile salmonids.

Restoring the Nason Creek oxbow provided the opportunity to monitor the biological benefits of implementing this type of action. To assess the response by fish populations, snorkel surveys were conducted one year following project construction in Nason Creek and a reference reach. Target species and life stages were observed utilizing the project area and significant increases in juvenile Chinook and steelhead abundance were detected post treatment (Murdoch et al. 2009). Although preliminary observations indicated that listed juvenile Chinook and steelhead are utilizing the reconnected oxbow, additional long-term monitoring is currently being conducted. The Washington Department of Ecology has continued the monitoring efforts and is currently conducting snorkel surveys using the same protocol as the 2008 monitoring effort (Murdoch et al. 2009). These are the types of projects that will be included in a comprehensive regional Monitoring and Evaluation (M&E) strategy (Monitoring and Evaluation in the Upper Columbia Section G, Appendix F).

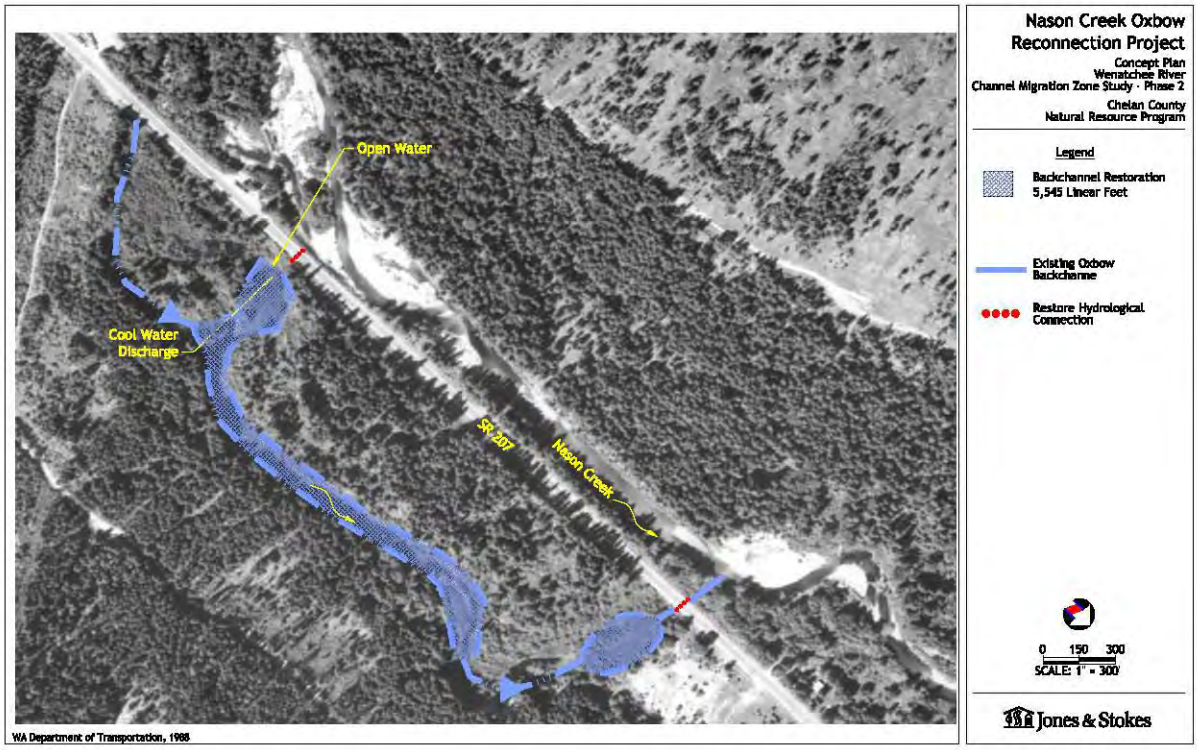


Figure B-4 Nason Creek oxbow reconnection, Wenatchee subbasin

B.5.2 BEAVER CREEK FISH PASSAGE, METHOW SUBBASIN

A fish passage barrier at Highway 20 previously blocked fish migration upstream in Beaver Creek. Once the Washington Department of Transportation (WDOT) updated this structure to facilitate fish migration, efforts to increase fish access focused on removal of various diversion dams upstream. Landowners, government agencies, and non-profit groups cooperatively developed and implemented a project to provide fish passage in Beaver Creek, which resulted in access to 23 miles of historic bull trout habitat, the lower 13 miles of which are suitable for anadromous steelhead spawning and rearing while the lower 8 miles are potentially suitable for reintroduced coho salmon and rearing juvenile spring Chinook salmon (J. Molesworth, U.S. Bureau of Reclamation (Reclamation), personal communication). Completed in 2004, this project involved the removal and retrofitting of four irrigation diversions which were replaced with two to three rock vortex weirs (see Figure B-6 photo). The Fort Thurlow diversion dam was reduced from 5.5 feet to 3.75 feet and four rock vortex weirs were installed providing access to 0.5 miles of spawning and rearing habitat for summer steelhead, which at the time were federally-listed as "endangered" (Reclamation 2004a-c).

Figure B-5. Rock vortex weirs in Beaver Creek, Methow Subbasin

U.S. Geological Survey (USGS) Western Fisheries Resource Center Columbia River Research Laboratory (Martens and Connolly 2008) conducted a monitoring study on Beaver Creek to 1) to assess effectiveness of the modified irrigation diversion structures for passage of fish, and 2) and document subsequent changes in fish populations in Beaver Creek. Using passive integrated transponder (PIT) tags provided a relatively new technology to measure change in fish assemblage, smolt production, and diversity of life history upstream of the rock vortex structures. The structures were effective at passing juvenile salmonids at all flow levels and connectivity was reestablished for a number of species. There was a four-fold increase (2005-06 to 2007-08) in the number of adult steelhead utilizing the habitat in Beaver Creek, re-colonization of further upstream habitat is occurring and steelhead spatial structure has improved.

B.5.3 CHALLENGES IN RECOVERY

Over the last decade, Upper Columbia regional partners have completed numerous habitat protection and restoration projects, including the two described above, which have improved habitat characteristics in the Upper Columbia Region; however, critical challenges to addressing the primary limiting factors that will lead to recovery in the Upper Columbia Region have been identified, including:

1. the lack of funding flexibility;
2. the lack of ability to implement large-scale actions;
3. a coordinated regional approach with all funders and sponsors working under the same implementation infrastructure; and,
4. the lack of comprehensive effectiveness monitoring and evaluation (M&E) for habitat actions.

The first challenge is the lack of funding flexibility. For over a decade, salmon recovery funding in the Upper Columbia Region has largely operated on an annual basis. Access to these annual funding sources has been competitive and dominated by single, discrete, single action-focused recovery actions that correspond to the short-term nature of funding commitments.

The second challenge is the inability to implement large-scale actions. There is a growing consensus among biologists, project managers, and funders that the most effective habitat restoration projects to address primary limiting factors are typically long-term, reach-based, complex, and large-scope recovery actions. These can be single, large expensive projects or groups of actions that, when implemented together, adequately address reach-based processes. By their very nature, these long-term projects are more difficult to design, fund, coordinate, and implement. It has also become increasingly clear that the Upper Columbia Region cannot achieve listed species recovery without the implementation of these large-scale, reach-based projects.

The third challenge under the historic funding framework, project sponsors were encouraged to coordinate within the Upper Columbia implementation infrastructure (i.e. WATs, the Upper Columbia Implementation Team, and Upper Columbia Regional Technical Team (UCRTT) to implement priority actions. In reality, site selection, project design, and funding coordination have been up to the discretion of the project sponsor. In the historic approach to funding, there was little incentive for sponsors to work in a coordinated regional framework to effectively implement the Recovery Plan. In fact, the old paradigm of funding can lead to increased inter sub-basin competition rather than coordination. Project sponsors sometimes pursued low priority projects simply because they had a willing landowner.

The forth challenge in the recovery of ESA-listed species is the coordination of comprehensive M&E in the Upper Columbia Region. Comprehensive effectiveness monitoring is critical to address scientific uncertainties identified through implementing priority actions. The Upper Columbia Region has high-level project effectiveness monitoring efforts underway in some areas, e.g., the Integrated Status and Effectiveness Monitoring Program (ISEMP) and Intensively Monitored Watersheds (IMWs). Each subbasin in the Upper Columbia has a program that monitors the status and trend of several habitat parameters; each of which varies depending on temporal and spatial effects that are considered critical in each subbasin, or the primary objective of the agency funding the research. One exception is that the Methow subbasin does not have a status and trend habitat monitoring program that includes sites not on federal lands; however, a program has been proposed under the Bonneville Power Administration (BPA) basinwide M&E evaluation that was facilitated by the Columbia Basin Fish and Wildlife Authority in 2009. It is anticipated that these large-scale M&E programs will detect changes at the population scale and correlate these changes to habitat restoration actions, though detectable changes are not expected for several years. Changes are expected to be detectable at a project level in a much more abbreviated time scale, yet currently there is a lack of consistent region-wide project-level effectiveness monitoring for habitat actions. A comprehensive project-level monitoring and evaluation plan has been developed to address the lack of consistent region-wide monitoring for habitat actions (Monitoring and Evaluation in the Upper Columbia Section G, Appendix F) and is summarized as part of this proposal. Funding for additional monitoring is not being requested as part of the proposed programmatic project.

This programmatic project is structured to address the challenges described above, and perhaps for the first time, there is an opportunity in the Upper Columbia Region to overcome the long-standing hurdles to recovery by providing a solid but agile financial base (with opportunities for cost sharing with other funding partners) to implement large-scale, long-term projects consistent with the Recovery Plan. The framework

outlined in this project proposal will enable the Upper Columbia Region to select the best actions in any given year to address top priority recovery actions and limiting factors and also provide the BPA with greater flexibility to meet its Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) obligations. Ultimately, we believe this process improves the quality of projects that BPA will fund.

C / Rationale and Significance to Regional Programs

The proposed project is one element of a comprehensive Upper Columbia regional goal to enhance and restore the productivity of ESA-listed steelhead and spring Chinook populations in the Upper Columbia Region to delisting levels. The actions and programmatic project selection, funding and monitoring strategies described in this project proposal are consistent with, and derived from, assessments of limiting factors and remedies described in the Recovery Plan, NPCC subbasin plans, Public Utility District (PUD) mitigation plans and the FCRPS BiOp. This project proposal/process has also been coordinated with the Columbia River Basin Fish Accords (Accords).

C.1 Upper Columbia River Salmon Recovery Plan

The Recovery Plan was adopted by the National Oceanographic and Atmospheric Administration (NOAA) on October 9, 2007 (NOAA 2007). The Recovery Plan is also aligned with Douglas County PUD and Chelan County PUD Anadromous Fish Agreement and Habitat Conservation Plans (HCPs) for Rocky Reach, Rock Island and Wells hydroelectric projects (2004), and other related hydroelectric relicensing agreements and license requirements. Additionally, the regional Biological Strategy (UCRTT 2008) complements the Recovery Plan by providing further support and guidance, and serves as the technical foundation to set Upper Columbia Regional priorities for habitat protection and restoration actions. Habitat actions implemented through the programmatic process described in this project will be consistent with the Recovery Plan and address limiting factors for ESA-listed fish in the Upper Columbia Region.

C.2 Goals and Objectives of the 2000 Fish and Wildlife Program

Each Upper Columbia Subasin Plan was developed in accordance with the 2000 version of the NPCC Columbia River Basin Fish and Wildlife Program (Program). Since the Recovery Plan and Biological Strategy build upon the subbasin plans, habitat actions implemented under this project will also be consistent with the goals and objectives in the 2009 version of the Program. The text below provides additional discussion of how the existing work of the Upper Columbia Region and the Program is a logical component of, and is integrated into, this project's proposed programmatic framework, which is designed to provide benefits to spring Chinook and steelhead in the Upper Columbia Region.

The Recovery Plan, Biological Strategy, and Program are used to guide decision-making and provide a reference point for evaluating success. In other words, these plans include biological objectives that set the management strategies. The scientific basis for the framework explains why management actions result in physical habitat or ecological conditions that benefit fish and wildlife populations. The goals and objectives are based upon a scientific foundation and an integrated approach to Upper Columbia regional fish and wildlife mitigation and recovery.

The Recovery Plan, Biological Strategy, and Program emphasize an adaptive management approach due to the significant level of uncertainty as to whether any single project or suite of actions contribute to salmonid recovery. A description of the Recovery Plan's adaptive management program is included in Appendix A of this proposal.

The Program states that:

> Implementation of strategies at all Program levels will be more effective if developed further into coordinated, *multi-year action plans* with a sufficient funding commitment and clear obligations for ongoing performance review and reporting. In 2008, Bonneville [BPA] and the other federal agencies made such implementation commitments to certain elements of the Council's [NPCC] Program, including the commitments made in the FCRPS and Willamette Biological Opinions as well as in the Columbia Basin Fish Accords [Accords]. As discussed in the Program's Implementation Provisions (Section VIII), the Council will work with Bonneville, fish and wildlife managers, and others to develop multi-year action plans for all areas of the Program (NPCC 2009)

C.2.1 MULTI-YEAR ACTION PLANS

UCSRB staff are currently working with the NPCC to develop a coordinated multi-year action plan (MYAP) and is populating sections of the council's MYAPs with up-to-date information. The current Upper Columbia multi-year (3 to 5 year) planning documents are based upon a scientific foundation, utilize an adaptive management approach, and are the culmination and amalgamation of years of coordinated recovery planning efforts (see Upper Columbia MYAPs Appendix E). The approach described in this project proposal furthers the goals of the Program with the development of MYAPs for each subbasin, which incorporate the Recovery Plan's Implementation Schedule (UCSRB 2007) and information contained in UCRTT Priorities for Reaches and Actions for Implementing Habitat Actions (UCRTT 2009) (Table B.6). The final component to the existing Upper Columbia Region planning process is the research, monitoring, and evaluation phase (Section G) to test the critical uncertainties associated with recovery objectives, strategies, and actions. Monitoring results will be evaluated and used as part of the existing Upper Columbia Region adaptive management process to make adjustments to the MYAPs/Implementation Schedule, and Recovery Plan, as needed.

C.2.2 SUBBASIN PLANS

Funded by the NPCC and completed in 2004, subbasin plans for the Wenatchee, Entiat, Methow, and Okanogan characterize existing conditions, identify management goals and objectives, and establish priorities for allocating mitigation and restoration funds to support and implement projects. The Entiat and Wenatchee subbasin plans outline the following goals: maintain existing high quality habitat; enhance and restore degraded areas and return natural functions; restore, maintain, and enhance fish and wildlife populations to sustainable and harvestable levels while protecting the biological integrity and genetic diversity of each species; increase public involvement; improve management, regulations, and funding for habitat protection and restoration efforts. The Methow and Okanogan subbasin plans describe the overall goal as increasing fish run sizes to provide for stock recovery and mitigation of the effects of hydropower operations.

The Wenatchee, Entiat, Methow and Okanogan subbasin plans were integrated into the Recovery Plan thereby making the actions consistent in the recovery of Upper Columbia salmonids. The primary limiting factors and threats identified in the subbasin plans contributed to the development of the Recovery Plan Implementation Schedule. Therefore, subbasin plan objectives and recommended actions are linked directly to the Recovery Plan and forthcoming MYAPs.

C.3 The Columbia River Basin Accords

The goals of the Accords are to provide biological benefits for Columbia Basin fish; acknowledge all of the participants; provide certainty for funding; support and enhance actions in the Biological Opinions (BOs)for recovery; create and support partnerships; and move from litigation to project implementation (Columbia Basin Fish Accords 2008). This project proposal outlines a process for distribution of Action Agency funds to project sponsors that complements the Accords' goals to fund projects that benefit fish, create partnerships among the salmon recovery participants, and support and implement habitat recovery actions in the Upper Columbia Region.

C.4 FCRPS BiOp

The 2008 NOAA FCRPS BiOp requires the Action Agencies to implement a strategy to protect and improve tributary habitat based on biological needs and prioritized actions (NMFS 2008). The Reasonable and Prudent Alternative (RPA) 34 calls for implementation of several specific habitat projects in Upper Columbia subbasins funded by BPA through the FY07-09 Fish & Wildlife Program solicitation cycle. To the extent that portions of these projects were infeasible, RPA 34 indicates that comparable replacement projects may be implemented in 2010-2013 to maintain habitat quality improvements. This portfolio of Upper Columbia BiOp habitat projects, most of which were labeled as Updated Plan of Action (UPA) during the FY07-09 funding cycle, are listed in Section D, below.

RPA 35 calls for the Action Agencies to identify and implement additional habitat projects during 2010 to 2018. These actions are expected to achieve the population-specific habitat quality improvements for Upper Columbia River spring Chinook and steelhead listed in Table 5 of RPA 35, BiOp Appendix (NMFS 2008).

The BPA and the other Action Agencies have determined that achieving these regional habitat quality improvements will require maintaining the FY07-09 level of BiOp habitat effort (funding) in the Upper Columbia into subsequent years. This effort, equivalent to approximately $3.5 million per year, is therefore needed in addition to the new effort associated with habitat projects being implemented under the Accords. In 2010, BPA was able to maintain the effort only partially by extending ongoing projects that could accomplish additional worthwhile work within the scope and intent of their FY07-09 proposals. The funding effort requested as part of this new programmatic project is proposed as the vehicle to continue most of the BPA-funded portion of the BiOp non-Accord habitat strategy in the Upper Columbia Region beyond 2010.

C.5 Mid-Columbia Habitat Conservation Plans and Settlement Agreements

The hydroelectric projects owned and operated by Douglas County PUD (Wells), and Chelan County PUD (Rocky Reach and Rock Island) have developed HCPs under Section 10 of the ESA. Funds from the Rocky Reach and Rock Island HCPs are directed to the Columbia River and tributaries from Rock Island Dam to Chief Joseph Dam. Grant County PUD chose to develop the Priest Rapids Settlement Agreement (GCPUD 2005) to provide mitigation and ESA coverage for its operation of Wanapum and Priest Rapids Dams. Funds from the Wells HCP are directed to the Columbia River and tributaries from Wells Dam to Chief Joseph Dam. Funds from all three HCPs include waters of British Columbia that flow into the Okanogan watershed. These funds are intended to compensate for 2% of the unavoidable mortality to steelhead and Chinook, sockeye, and coho salmon at each of the three hydroelectric projects. ESA "take" permits are issued by the National Marine Fisheries Service on the basis of approved HCPs and agreements, and approved actions are included as terms and conditions of the FERC licenses issued to the PUDs. The emphasis of these funds is on project implementation, rather than studies, planning, or administrative support. The HCPs include robust monitoring and evaluation components that require project operators to document that protection and mitigation measures do not adversely affect the status of listed populations.

The two HCP Tributary Funds (Chelan County PUD Rocky Reach and Rock Island) are part of the current Upper Columbia Open 6-Step funding process (Appendix D) and another tributary fund (Grant County PUD Priest Rapids Settlement Agreement) is a potential funding and coordination partner.

D / Relationships to Other Projects

D.1 Ongoing and Future Implementation of Priority Habitat Actions in the Upper Columbia

Under the new proposed Upper Columbia Programmatic Habitat Project (2010-001-00) the 14 UPA projects will be terminated and the UCSRB and partners will begin a new coordinated programmatic approach to site selection, project design, funding, and evaluation. Under the new process, there is a focus on the most important biological reaches, consistent with the UCRTT's biological priorities and the Recovery Plan's Implementation Schedule, so project sponsors will be encouraged to seek out and gain the support of willing landowners in areas that have been identified as high priority by the UCRTT. Under the new paradigm, the UCRTT will be involved with selecting the best project alternatives and provide input on the project design early in the process.

The new proposed Upper Columbia Programmatic Habitat Project (2010-001-00) is modeled after the ongoing UCSRB Salmon Recovery Finding Board (SRFB) and PUD HCP Tributary Fund processes, and projects implemented through the proposed programmatic framework will be closely coordinated with these existing efforts. The Upper Columbia Region currently uses a reach-based action approach to ensure priority habitat projects are implemented with a clear understanding of the existing physical processes. This reach-based approach to project development incorporates information from the Tributary Assessments (TA) (Example: http://www.usbr.gov/pn/programs/fcrps/thp/ucao/wenatchee/nasoncreek/tributary-assmt.pdf)and Reach Assessments (RA) (Example: http://www.usbr.gov/pn/programs/fcrps/thp/ucao/entiat/prestonreach/main.pdf) completed by Reclamation and Yakama Nation (YN), which assures restoration and protection actions are based on a sound scientific assessment of channel processes (see Assessment Schedule in Table B.5). As reach-level degradations and processes are defined, Alternative Evaluation Reports (AERs; see example in Appendix D) are produced in order to identify, sequence, and prioritize specific actions to protect and/or restore channel and floodplain connectivity and complexity. In concert with this reach-based approach, the Entiat and Methow subbasins are implementing the IMW approach, which pairs reach-based actions with Level 3 effectiveness monitoring in order to assess the effectiveness of actions implemented within an experimental framework. The Upper Columbia Region is moving from a reach-based towards a landscape-level approach to recovery.

The programmatic project described in this proposal will also help enable the Upper Columbia Region to begin implementing more long-term, complex, and large-scope recovery actions with the highest biological benefit. Additionally, this project includes a strategy for addressing project-level monitoring to address the lack of consistent Upper Columbia Region-wide monitoring for habitat actions (Monitoring and Evaluation in the Upper Columbia Section G, Appendix F). Funding coordination is another aspect where the old and new systems are vastly different for two primary reasons 1) certainty of funding through 2017 facilitates planning and development of specific actions/projects, which, in some cases, could take multiple years to complete; and 2) year-to-year flexibility in funding specific (potentially large) priority actions improves our ability to identify funding opportunities and responsibilities collaboratively with other sources of significant funds (e.g., the Accords and Reclamation mitigation funds). Funding will be coordinated with funding partners using MYAPs as a planning tool at least 3 years in advance. Lastly, the evaluation will follow a consistent protocol that is discussed in the monitoring and evaluation section of this proposal. All priority restoration actions identified in the Upper Columbia Region subbasin MYAPs, are derived from the

Recovery Plan Implementation Schedule, UCRTT Priorities for Reaches and Actions for Implementing Habitat Actions (UCRTT Priorities) (UCRTT 2009), and assessment AERs. These actions will be included in the BPA/NPCC targeted solicitation that would occur under this programmatic project in FY2010.

Tables D-1 and D-2 characterize ongoing and future strategies within the four Upper Columbia subbasins that will be covered by this programmatic project. Table D-1 describes projects related to future priority actions in each subbasin that would be covered by this programmatic project, and Table D-2 lists the BPA BiOp habitat restoration efforts that comprise the 12 UPA-labeled projects from the Fish and Wildlife Program's FY07-09 solicitation cycle that will be subsumed under the new programmatic, along with projects that have been funded by BPA, SRFB, HCP Tributary Committee and other funders that are related to ongoing and potential future projects under the new programmatic. Table D-2 also includes ongoing Research, Monitoring and Evaluation (RM&E) projects.

Table D-1. Future action implementation strategies in individual subbasins under this programmatic proposal

SUBBASIN	Future Action Implementation Strategies in Individual Subbasins Under the Programmatic Proposal
WENATCHEE	Future habitat restoration projects in the Wenatchee subbasin will follow a primarily reach-based approach for implementing habitat actions. For example, a significant effort will be made in Nason Creek, which is located within the highest priority reach in the Wenatchee subbasin (UCRTT 2009) and is consistent with the Reclamation's Nason Creek TA and Nason Creek Upper and Lower White Pine and Kahler RAs (Reclamation 2008a, 2009 b-d). Projects proposed in Nason Creek include numerous high priority large-scale habitat restoration actions such as reconnection of side-channel and/or off-channel habitats to restore natural processes that may begin as soon as 2011.
ENTIAT	Future habitat restoration actions in the Entiat subbasin are also moving towards a reach-based approach for implementing habitat actions. A significant restoration and synchronized IMW effort will be made in the mainstem Entiat with several restoration actions slated to commence in 2011. These actions are consistent with the Reclamation's Entiat TA and Preston RAs (Reclamation 2009a, 2009e). Phase one will be in Preston Reach (RM 21.2 to 23), located within the highest priority Stillwater reach in the Entiat subbasin (UCRTT 2009). Actions will be clustered to increase habitat quantity, channel structure, and complexity to detect a reach and population level response. Phase two (planned implementation in 2014) will focus on the lower Entiat River.
METHOW	Future habitat restoration actions in the Methow subbasin will address ongoing and remaining screen and barrier issues as opportunities arise. In addition, similar to the Wenatchee and Entiat subbasin strategies, sponsors are moving towards a reach-based approach for implementing habitat actions, with a focus on improving habitat complexity, channel reconnection, floodplain restoration, and increasing instream flow. A significant restoration and synchronized monitoring effort, referred to as M2, will be made in the Middle Methow River beginning in 2012. This substantial effort aims to assess reach and population level effects of several restoration actions slated to occur on the mainstem Methow between Twisp and Winthrop. The restoration actions for the M2 will be informed by the Middle Methow RA that will be completed by Reclamation in 2010. The pre-treatment monitoring phase of M2 began in 2008 and will continue through 2012. Implementation of restoration projects will take place in 2012 and 2013, followed by post-treatment monitoring through 2014. Similar to the Entiat's IMW monitoring effort, the monitoring component of M2 is a reach-scale effectiveness monitoring project (conducted by USGS and Reclamation.
OKANOGAN	Future habitat restoration in the Okanogan subbasin will continue to be directed towards the reconnection of tributary habitat. Resources dedicated to habitat improvements in tributaries will continue to support the re-establishment of summer steelhead in this basin and would also provide cold water refugia for migrating Chinook and sockeye salmon. The Colville Confederated Tribes (CCT), using MOA funding, have directed efforts to restore habitats in perennial tributaries of the Okanogan River. However, other opportunities to augment these restoration efforts were not recognized or were not developed and included within the Tribes' MOA. These include additional water savings through irrigation efficiencies programs which would be dedicated to instream flow in the tributaries. For example, the project partners are spearheading efforts to implement an irrigation efficiencies program throughout the basin. The results will likely increase stream flows in many of the tributaries in which the Tribe has reestablished habitat connectivity.

Table D-2. Relationship to existing projects

The following 12 UPA projects in the Upper Columbia Region are being replaced under the new programmatic:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
BPA	2007-086-00	UPA Wenatchee Subbasin Riparian Enhancement Proposal	Occurs in Wenatchee subbasin. Involves planting native vegetation and fencing to establish a properly functioning riparian buffer in the Wenatchee Assessment Units, to benefit UC steelhead, spring Chinook and bull trout.
BPA	2007-325-00	UPA Wenatchee Subbasin Complexity Proposal	Occurs in Wenatchee subbasin. Implements five potential habitat complexity projects to benefit UC spring Chinook, steelhead and bull trout.
BPA	2007-400-00	UPA Wenatchee Subbasin Access Programmatic (Wenatchee Access)	Occurs in Wenatchee subbasin. The Wenatchee Access projects will be located in the Chumstick Creek watershed in the Wenatchee subbasin. Replacing the Chumstick Creek barrier culverts will primarily benefit UC steelhead
BPA / Reclamation / USFS	2007-055-00	Entiat River - UPA - Lower Entiat River Off-Channel Restoration Project	Occurs in Entiat subbasin. Provides 0.28 miles of off-channel habitat to benefit UC steelhead, spring Chinook, and bull trout, as well as irrigation channel enhancement for rearing and spawning habitat.
BPA / USFS	2007-231-00	UPA Entiat Subbasin Riparian Enhancement Program	Occurs in Entiat subbasin. Involves Tillicum Creek Fence and programmatic riparian projects to benefit UC spring Chinook, steelhead and bull trout.
BPA / Reclamation / USFWS / Grant PUD Habitat Fund	2007-318-00	Entiat River - UPA - Knapp-Wham Hanan Detwiler Irrigation System Consolidation Project	Occurs in Entiat subbasin. Consolidates the Knapp-Wham and Hanan Detwiler irrigation systems to eliminate partial fish passage barriers associated with two surface water diversions, add instream habitat within the lower Entiat River, and enhance instream flows via water saved.
BPA / Landowner match / WDFW	2007-035-00	UPA Project - Methow Basin Riparian Enhancement	Occurs in Methow subbasin. Identifies and prioritizes riparian enhancement projects to add value to passage, access and conservation projects. All projects focus on threatened and endangered species and habitat.
BPA / Reclamation / MVID / SRFB / HCP Trib Fund	2007-172-00	UPA Project - MVID West Canal Diversion and Headworks	Occurs in Methow subbasin. Involves moving point of diversion 175' upstream by installing new concrete diversion headworks, realign 150' of West Canal intake and build new access road to connect new headworks, construct permanent channel-spanning natural rock roughened channel permanent diversion.
BPA / Reclamation	2007-214-00	UPA Project - Fender Mill Floodplain Restoration - Phase 1	Occurs in Methow subbasin. Restores natural channel process, reestablishes side channel rearing habitat, restores-improves riparian forest habitat, adds wood complexes in main stem, installs rock structure to keep majority of flow in main stem, breaches existing levee, connects side channels

The following 12 UPA projects in the Upper Columbia Region are being replaced under the new programmatic:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
BPA / Reclamation	2007-237-00	UPA Project - Elbow Coulee Floodplain Restoration	Occurs in Methow subbasin. Eliminates a dike; opens an existing side channel and floodplain; reconnects a wetland; and uses large woody debris and boulders to split flows, to increase habitat complexity and create more dynamic habitats for listed salmonids.
BPA / Reclamation / MVID / SRFB / HCP Trib Fund	2007-251-00	UPA Project - Methow Valley Irrigation District East Diversion Dam Replacement	Occurs in Methow subbasin. Removes the present channel-spanning irrigation diversion dam and replaces it with a reinforced earth and rock wing dam parallel to the thalweg. This project will also re-open 1/4 mile of side channel habitat blocked by a pushup berm.
BPA / HCP Trib Fund / SRFB	2007-264-00	UPA Project - Programmatic Habitat Complexity Projects in the Methow River Subbasin	Occurs in Methow subbasin. Eliminates dikes, opens side channels, and enhances floodplain connectivity at various sites in the Methow subbasin.
BPA	2007-325-00	UPA Wenatchee Subbasin Complexity Proposal	Occurs in Wenatchee subbasin. Implements five habitat complexity projects to benefit Upper Columbia spring Chinook, steelhead and bull trout. Includes completing implementation of the Channel Migration Zone (CMZ) Site 11, Site N4, Nason Creek and the future implementation of CMZ Site 6, Site 20.
BPA / WA State/ Landowner	2007-034-00	Columbia Cascade Pump Screen Correction	This project is an inventory of irrigation pump screens within the subbasins in the UC ESU. This is a voluntary compliance pump screen correction program in the four subbasins with a priority on the Okanogan River, since no prior assessment has been conducted. Upgrading screens on valid withdrawals will reduce juvenile fish losses due to entrapment in water diversions as called for in the most recent FCRPS BiOp.
BPA	2007-145-00	Okanogan Livestock & Water for Habitat Improvement	Provides a cost share program to assist producers in developing offsite water for livestock and provide assistance fencing riparian areas. Allowing producers to respond to and prevent complaints.

The following projects have been funded by BPA,SRFB, HCP Tributary Committee and other funders and are related to ongoing and future projects under the new programmatic:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
SRFB / State grant	SRFB 07-1885N	Burlington Northern Santa Fe RR Coordination Protocol Development	Developed a project coordination protocol and review process with Burlington Northern and Santa Fe (BNSF) Railroad to facilitate the implementation of the high priority large scale floodplain reconnection projects in Nason Creek on BNSF land.
SRFB/ Local and other grants	SRFB 09-1472	Nason Creek LWP Floodplain Reconnection Alternatives Analysis Phase 1	Project includes an Alternatives Analysis and stakeholder coordination as the first phase to reconnecting the two highest priority floodplain reconnection projects in Nason Creek. This assessment builds directly from Reclamation's TAs and RAs on Nason Creek and is related to the BNSF RR Coordination Protocol Development Project and future complexity priority actions in the Nason priority reach.

The following projects have been funded by BPA,SRFB, HCP Tributary Committee and other funders and are related to ongoing and future projects under the new programmatic:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
SRFB/DOE	SRFB 04-1503	Bridge to Bridge Phase 1 and 2	The "Bridge-to-Bridge" (B-to-B) reach (~RM 3.2 to RM 4.4) is the highest priority restoration area in Water Resource Inventory Areas (WRIA) 46 to restore geomorphology, floodplain function, habitat complexity/diversity, off-channel habitat, and shading, benefiting adult & juvenile Chinook, steelhead and coho. There are plans for a 3rd phase of this project to be implemented.
SRFB/ Reclamation/BPA/WA Rivers Conservancy (now WWP-TU)	SRFB 06-2216	Chewuch Canal Efficiencies	Multi-year phased project to reduce conveyance loss through canal seepage. The long-term goal of the project is to develop a fully piped, pressurized system. The canal efficiencies are needed to reduce diversion demands from the Chewuch River. This will result in increased stream flows in the lower 8 miles of the Chewuch River.
BPA	2002-013-01	Columbia Basin Water Transactions Program (CBWTP)	The project is used to fund water right transactions that restore streamflows in the Columbia Basin. To date, the project has supported well over 200 water transactions, with 4.3 million acre-feet of water committed to enhancing flow-limited tributaries in the Columbia Basin over the life of the water transactions. In 2008, over 3251 acre-feet and 49 cfs of flow was acquired through the water transactions project to benefit UC ESUs (UC Region steelhead and Chinook).

The following table includes 6 RM & E projects:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
BPA / NOAA / Reclamation / USFS / WDFW / WA DOE / Chelan PUD	2003-017-00	Integrated Status and Effectiveness Monitoring Program (ISEMP)	ISEMP is a collaborative effort to design, implement and evaluate Status and Trends Monitoring for salmon and steelhead populations and habitat and watershed-scale Effectiveness Monitoring for restoration actions impacting salmon habitat in the Columbia River Basin.
BPA	2003-02-200	Okanogan Basin Monitoring and Evaluation Program (OBMEP)	BPA funded the CCT to design and conduct a monitoring and evaluation program to provide status and trend data for all anadromous fish species in the Okanogan River subbasin for the next 20+ years that will also include monitoring, status, trend, and effectiveness of restoration actions.
BPA / Chelan PUD / Grant PUD	2003-039-00	Monitor Repro In Wenat/Tuc/Kal	Continued quantitative evaluation of the relative reproductive success and survival of naturally spawning hatchery and natural origin spring Chinook salmon in the Wenatchee River watershed above Tumwater Dam.
BPA / PSC / CDFO	2008-503	Studies into Factors Limiting the Abundance of Okanagan and Wenatchee Sockeye Salmon	This project seeks to expand the knowledge on the factors limiting production of Okanogan and Wenatchee sockeye salmon stocks.
BPA	2009-001	Expanded Multi-Species Acclimation in the Wenatchee/Methow Basins.	This acclimation project will further develop acclimation for UC steelhead and spring Chinook by developing new semi-natural ponds similar to what has been uniquely successful in the

The following table includes 6 RM & E projects:			
FUNDING SOURCES	PROJECT #	PROJECT TITLE	RELATIONSHIP
			Mid-Columbia Coho Restoration Project (BPA Project #1996-04000).
BPA / NMFS / WDFW / CCPUD/ DCPUD / GCPUD	1996-040-00	Mid-Columbia Coho Restoration Project	The long term vision of this restoration project is to restore Coho salmon to the Wenatchee and Methow river basins at biologically sustainable levels that will support harvest in most years.

E / History of Ongoing Projects

Although this is a new programmatic project proposal, it combines and sustains BPA BiOp habitat restoration efforts that include UPA-labeled projects from the Fish and Wildlife Program's FY07-09 solicitation cycle (see list in Section D). Over the last decade, many of the habitat restoration actions in the Upper Columbia have been directed towards targets of opportunity and characterized by single, discrete, projects identified in the Recovery Plan corresponding to the short-term nature of funding commitments. Over 360 projects have been completed including habitat protection (land acquisition, conservation easement), habitat restoration (access, riparian restoration, irrigation efficiencies, reduced sediment delivery, increased bank stability, etc.), assessments (limiting factors analysis, subbasin planning), and monitoring (status and trend, project effectiveness). While these single project-focused actions have provided critical contributions to recovery, many of the most cost-effective and immediately beneficial single, project-focused actions already have been accomplished. Future on-the-ground actions will be similar to those being implemented by the 14 FY07-09 BiOp projects, although planning, selection, and monitoring will be improved (see descriptions in Section F and Section G).

Table E-1 below presents a brief history of a portion of past actions that have been implemented in the individual Upper Columbia subbasins. A reasonably extensive table entitled the "History of Past and Ongoing Projects" that presents many of the accomplishments/metrics of the FY07-09 BiOp projects funded by BPA, plus some examples of action projects funded by the SRFB, HCP Tributary Fund, and others is located in Appendix C, History of past and Ongoing projects . There are few effectiveness monitoring results to report for the BPA-funded projects because monitoring was not an integral part of the work originally proposed; that will change under this programmatic project. To view all Upper Columbia projects in detail, visit the Upper Columbia Salmon Habitat Implementation Schedule and Projects online database at http://uc.ekosystem.us/ .

Table E-1. Accomplishments in the Upper Columbia Region subbasins

SUBBASIN	Accomplishments in the Upper Columbia Region subbasins (See Appendix C for more information/metrics on past projects)
WENATCHEE	Habitat protection and restoration actions in the Wenatchee subbasin have focused on the removal of obstructions, habitat complexity, and increasing habitat quantity or protection of intact habitats. Recently, significant restoration actions have been implemented resulting in the replacement of 27 culverts opening up more than 38 miles of habitat (Wenatchee Passage Program (WPP) and Chumstick Culvert Replacements), 8 complexity r to create 2.13 miles of off channel habitat (Channel Migration Zone Study (CMZ) and subsequent implementation) and the protection of over 400 acres and 3.6 miles of shoreline (White River and Little Wenatchee tributaries). When combined with other instream flow, irrigation improvements, and riparian planting projects, these efforts have enhanced conditions in this subbasin.
ENTIAT	Habitat protection and restoration actions in the Entiat subbasin have primarily focused on actions to increase habitat quantity, channel structure and complexity, and water quantity. These restoration actions have resulted in the replacement of 10 culverts opening up more than 20 miles of habitat (U.S. Forest Service (UFSFS) passage recovery efforts), 3 complexity projects to create 8 acres of off channel habitat (Wilson Creek Side Channel, Bridge to Bridge Phase 1 and 2, and subsequent implementation, the protection of over 400 acres and approximately 1 mile of shoreline (Stormy Creek Preserve, Middle Stillwater, and Troy parcel Acquisitions. When combined with other instream flow, irrigation improvements, and riparian planting projects these projects enhance fish habitat conditions in this subbasin.
METHOW	Habitat restoration actions in the Methow subbasin have primarily focused a large number of protection actions, the removal of obstructions, and complexity projects. For the early part of the program (through 2006), efforts focused primarily on addressing diversion screens and passage barriers. While miles of stream opened and acres of habitat improved are more difficult to quantify, we do know that during that time project sponsors addressed at least 8 screens and 9 partial or complete barriers. Significant restoration actions have been completed in 2007-2008 which have resulted in the 97.5 cfs acquired or enhanced to benefit Upper Columbia Region Steelhead (63.4 to benefit Upper Columbia Region spring Chinook), 1 screen addressed, 6 barriers addressed, 113.8 miles of stream opened, and 3.5 stream miles improved.
OKANOGAN	Habitat restoration actions in the Okanogan subbasin have focused on the removal of fish passage barriers and augment in-stream flows. Recently significant restoration actions have been accomplished in Salmon Creek which have resulted in access to 11 miles of suitable spawning and rearing habitat. More recently an increased effort to restore habitat within the Canadian portion of the Okanogan subbasin has occurred due to funding opportunities; McIntyre Dam, formerly the terminus for anadromous salmonids, was modified with “overshot” gates which allowed fish to pass, providing access to 7 miles of mainstem habitat. Previous habitat rehabilitation efforts, such as removing a fish passage barrier in 1999, which allowed access to 5 miles of habitat and excluding livestock within a 1.2 mile reach thereby increasing canopy closure and reducing stream temperatures in Omak Creek, have resulted in successful natural reproduction for both summer steelhead and spring Chinook salmon. See next section for a description of conditions and action occurring in the Canadian portion of the Okanogan Basin.

*Project information was provided by staff from Cascadia Conservation District (CCD), Chelan Douglas Land Trust (CDLT), Chelan County Natural Resources Department (CCNRD), Methow Salmon Recovery Foundation (MSRF), Methow Conservancy, and Colville Confederated Tribes (CCT).

E.1.1 EFFECTS OF WATERSHED CONDITIONS AND INTERNATIONAL COORDINATION IN THE OKANOGAN BASIN, CANADA

The Okanogan River drains an area of nearly 9,000 square miles, of which approximately 70% lies in Canada. The valley floor, in both countries is wide, averaging over a mile wide. The Okanogan River flows generally southward at a gradient of approximately 1% through a chain of 4 lakes. Three of these 4 lakes have been modified by the installation of a flood control structure at the outlet. Flows released from the structure originate from the surface. Due to the flood control structure the surface area of the lake is greater than the historical area thereby receiving a larger amount of solar heating. Recognizing the discharge from the lake is released from the surface, it is presumed that current water temperatures are elevated over historical levels and peak discharges are likely attenuated due to the flood control structures. In addition, due to the large wide valley form, the Okanogan Basin was favorable towards agricultural production. Consequently, tributaries that were small, bankful of ~ 20 ft., were subjected to withdrawals. Flows from some tributaries, such as Vaseux Creek, Inkaneep Creek, Shuttleworth Creek and Mclean creeks were reduced by more than 25%, and during low flow periods would not reach the main stem of the Okanogan River. This reduction in tributary flow, not only reduced the flow into the Okanogan River but also exacerbated the already warm water temperatures by diminishing the cold water input.

Currently there is an effort by area fish management agencies to provide alternative water sources for users in lieu of these users withdrawing water directly from these tributaries. If successful these efforts will increase stream flows in the tributaries thereby increase rearing habitat, reduce mortality due to entrainment of unscreened or poorly screened irrigation diversions, and by providing additional coldwater input into the mainstem of the Okanogan River.

The Colville Confederated Tribes' effort originated with securing funding to conduct a 3-year study to evaluate re-introduction of sockeye salmon to Skaha Lake (BPA project # 20124). More recently the Colville Tribes assisted in the development and securing funding for habitat restoration projects. These projects have included the Okanogan River Restoration Initiative (ORRI) and Fish Passage at McIntyre Dam. ORRI, was the reconnection of two disconnected river meanders, which were formerly isolated due to channelizing the Okanogan River during the early 1950's. The Tribe assisted in design review and secured funding through the mid-Columbia River Public Utility Districts Habitat Conservation Plan (Douglas and Chelan County) and Settlement Agreement (Grant County) mitigation funding. The total project cost was approximately 1.2 million dollars; the PUD's contributed $800,000 toward the total.

Fish passage was provided at McIntyre Dam, a diversion dam that was originally constructed in the 1950's without fish passage. Consequently, this dam was the terminus for anadromous fish in the Okanogan River. Again the Colville Tribe assisted Okanogan Nation Alliance (ONA) in contractor selection, project development, and securing funding. Approximately 1.4 million dollars were secured through the Priest Rapids Coordinating Committee – No Net Impact funds. The results of this project will provide access to approximately 5 miles of main stem Okanogan River and Shuttleworth Creek, a tributary, which has an estimated 9.5 miles of habitat capable of supporting steelhead.

Currently, the Colville Tribes continue to work collaboratively with ONA as well as the Ministry of Environment (MOE) to address factors limiting production within selected tributaries. These include unscreened irrigation diversions, physical passage barriers and the development of alternative water sources in lieu of surface water withdrawals. To date the use of U.S. federal funds have been limited in scope in Canada. U.S. federal funds have been utilized to conduct assessments and evaluations but concerns raised from U.S. entities regarding jurisdiction between countries have prevented these dollars

from contributing to on-the-ground actions. Although Public Utility District funds have been successfully gained to implement some large-scale projects, if a portion of the Colville Tribes $200 million accord funds or non-accord funds could be directed toward implementing habitat rehabilitation projects in Canada, then several more projects could be accomplished in an abbreviated timeframe.

F / Biological/Physical Objectives, Work Elements, Methods, and Metrics

F1. Biological/Physical Objectives

The overarching objectives described in this proposal are those defined for ESA recovery in the Recovery Plan (UCSRB 2007):

- Increase the abundance of naturally produced spring Chinook and steelhead spawners within each population in the Upper Columbia ESU and DPS to viable levels.
- Increase the productivity (spawner:spawner ratios and smolts/redds) of naturally produced spring Chinook and steelhead within each population to levels that result in low risk of extinction.
- Restore the distribution of naturally produced spring Chinook and steelhead to previously occupied areas (wherever practical) and allow natural patterns of genetic and phenotypic diversity to be expressed.

The Recovery Plan's short-term and long-term habitat objectives could be considered a recovery strategy, but they also serve as the primary project-level objective:

- Protect and restore the ecosystem functions needed for recovery and long-term viability of naturally produced Upper Columbia spring Chinook and steelhead.

The following objective – although not quantifiable or scientific – represents a core value and foundational philosophy for accomplishing the long-term recovery objectives:

- Enlist local stakeholders as caretakers of salmon and steelhead populations by supporting their fullest participation as stream stewards within their local watersheds.

At this time, quantifiable objectives cannot be specified for individual restoration actions or habitat metrics at a particular scale. There are too many statistical uncertainties regarding the use of certain monitoring metrics at the site, reach, watershed, and subbasin scales. . However, actions implemented in the four subbasins under the proposed programmatic project could contribute to over 40 different measured habitat metrics in Pisces. Thus, the approach described in this project proposal will apply resources to the best action opportunities available each year throughout the subbasins based on technical assessments of biological benefits and other factors (Section F, Work Element 114). Refinement of the data collection and

analysis techniques, along with out adaptive management framework will allow for the development of quantifiable objectives at the appropriate time in the future.

F2. Overview – Work Elements, Methods and Metrics

The following section provides an overall work schedule for all of the work elements (WE) (tasks), methods, and metrics associated with the proposed programmatic project.

Work Schedule
FY2010-Transition from the original 14 FY07-09 BiOp projects to the new programmatic project, which would be fully implemented in FY2011. This year's (2010) primary WEs are listed below, with further details under each respective work element.

- 177 PRODUCE PLAN. Continue/complete development of MYAPs that integrate actions from all of the programs involved (see additional text under Upper Columbia project planning, below).
- 114 IDENTIFY AND SELECT PROJECTS. The solicitation/selection process for FY2011 actions would begin in April 2010 and culminate in funding decisions in November 2010. Subsequent solicitation and selection processes would begin in October (Targeted Solicitation) or May (Open Solicitation) and end the following October for future fiscal years.
- 191 WATERSHED COORDINATION. Continue coordination among local action sponsors within the WATs, IT, UCRTT and the UCSRB in order to prepare for the new programmatic process.

FY2011 THROUGH FY2017-For the duration of the current BiOp period, all work elements may be active in each year. Periodically, for example, every 3 to 5 years, this project would be included in the Upper Columbia Region's regular Fish & Wildlife Program categorical reviews, including technical reviews of results.

F.2.1 UPPER COLUMBIA PROJECT PLANNING, IDENTIFICATION AND SELECTION INTRODUCTION

Sections B and C of this project proposal outline the limiting factors analyses and Upper Columbia regional planning processes that have occurred to date. Section F outlines the framework for the planning, identification and selection of actions. This project implementation framework will facilitate the efficient implementation of large-scale, complex projects, followed by coordinated regional monitoring and evaluation. This proposed programmatic project selection, funding and implementation framework will enhance the effectiveness of restoration efforts in the region in many ways. Below is the anticipated improvements that would result from a programmatic approach.

- The proposed programmatic framework would ensure BPA resources facilitated implementation of high priority actions at a reach scale and that project proponents would use the UCRTT's biological priorities and the Recovery Plan's implementation schedule as the foundation for project development. Funding will be applied where it is needed for any of the populations, allowing for an ESU recovery strategy. Currently, there is not a system in place that ensures regional coordination on recovery actions. Project sponsors may pursue targets of opportunity rather than projects identified in the Recovery Plan that

would result in high priority actions in high priority reaches of the region (and consequently take more time and energy to plan and implement).

- By targeting implementation of high priority actions in each sub-basin based on an ESU-wide recovery strategy, the proposed programmatic encourages sponsors from all the Upper Columbia subbasins to work with entities that are a part of an existing regional framework, thereby enhancing coordination on site selection, project design, funding approaches, and monitoring. At this time, a new sponsor may not realize the importance of interfacing or coordinating with existing WATs or the Upper Columbia Implementation Team.

- The proposed approach removes barriers to the implementation of reach-based large-scale projects. All of the funding could be spent in one reach if that is the need, or it may be spread across any number of areas. That determination would be made by the UCSRB, BPA and the UCRTT using the best available information in any given year. In addition, multiple incentives for funding coordination exist within this new proposed process since funding could be "pulsed" for large, more complex projects. Currently, funds in any one year were spread across multiple small/moderate sized projects that were not necessarily part of a reach-based approach to habitat restoration. In addition, funding certainty for longer than 3 years allows planning for larger and more complex actions.

- The new programmatic process provides more local technical input and control at critical points, while preserving broader, higher level review by the ISRP and NPCC during periodic categorical review processes. The proposed framework would provide project sponsors with the opportunity for guidance and input from local technical experts early in the process on the best site or best action alternative and consistency with the UCRTT Biological Strategy. This in turn would enable sponsors to develop better project alternatives and designs to target desired species and achieve regional recovery goals.

- Project sponsors can propose actions when landowners and designs are ready, rather than having to prepare, predict, and describe in detail the actions that they might implement 3 to 5 years in the future.

- Regional facilitation makes monitoring projects like ISEMP and IMW's possible. The current approach does not promote a coordinated, regional monitoring and evaluation strategy or the data management/sharing required for an adaptive management approach. The proposed programmatic approach would assure that project monitoring and evaluation follow a consistent regional protocol (see Section G, Appendix F), and that implementation outcomes are evaluated and used, as appropriate, to update implementation schedules, approach, goals, etc.

F3. Work Element 174 – Produce Plan

As mentioned previously, MYAPs are the culmination of fundamental Upper Columbia Region planning documents (identified in Section B, Figure B-3) and the footing for the solicitation and funding process described in this programmatic project. Figure F-2 is a comprehensive schematic that illustrates how these MYAPs fit within the process proposed in this programmatic project. The Upper Columbia WATs have developed MYAPs based upon the actions in the Recovery Plan/Implementation Schedule and updated UCRTT Priority recommendations (see Table B.6). MYAPs are 3-5 year action plans that identify the upcoming implementation opportunities for high priority restoration actions. These MYAPs are updated

annually by the WATs and then reviewed by the UCRTT to ensure proposed actions meet Recovery Plan and BiOp priorities. The MYAPs will also be refined by the UCRTT based on new information produced from the TAs and RAs, completed by Reclamation and YN, in order to develop restoration and protection strategies based on a sound scientific assessment of channel processes (see Assessment Schedule in Section B.4). AERs (see example in Appendix D) will be produced from these assessments for the high priority actions and reaches, and be sequenced and prioritized to protect and/or restore channel and floodplain connectivity and complexity and address other limiting factors. Completed MYAP tables are reviewed by the IT and the basis for targeted solicitation. The flow chart (Figure F-1) outlines the process for development of the MYAPs and resulting targeted solicitation.

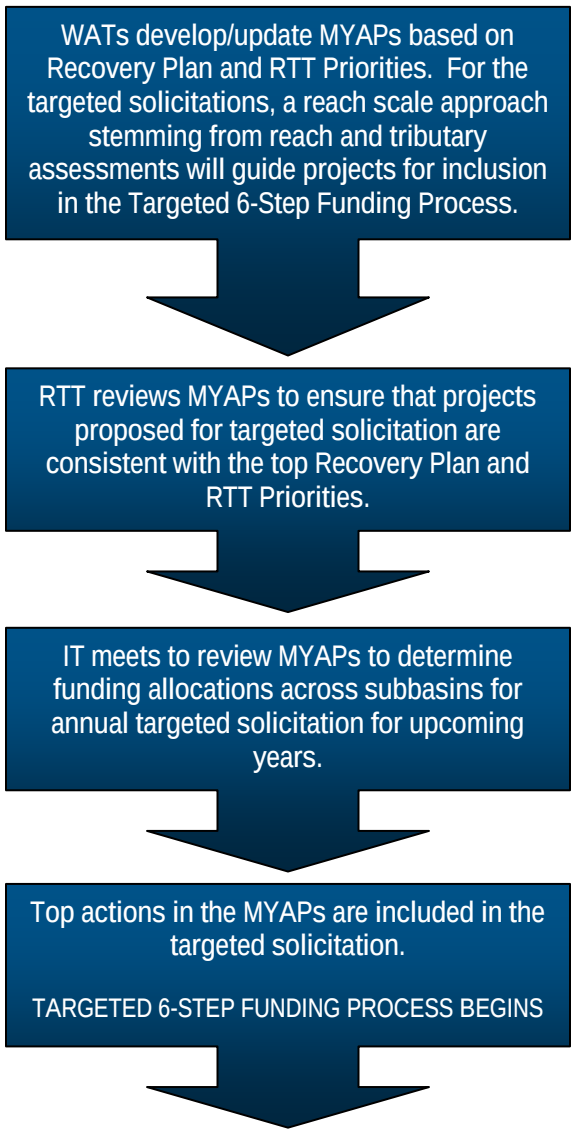
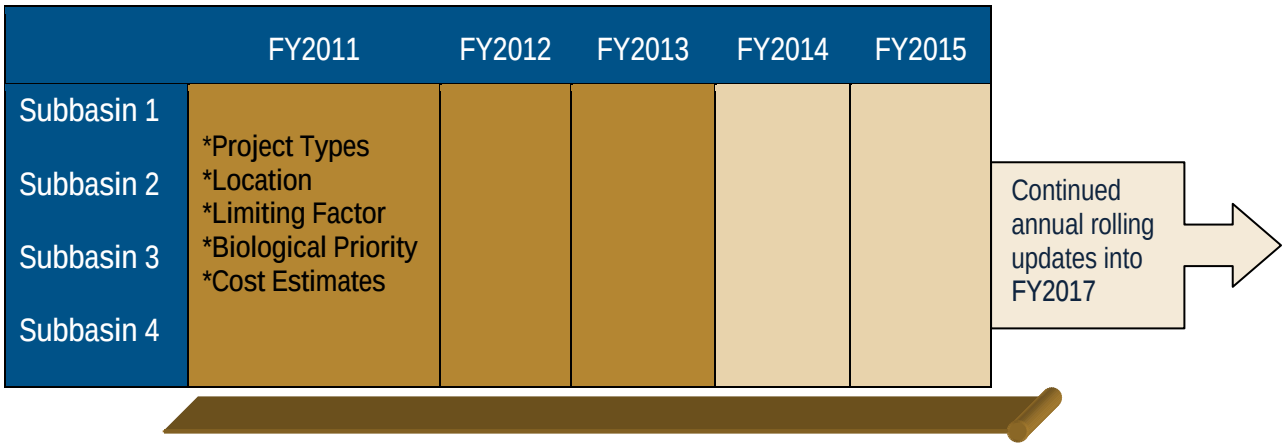


Figure F-1. Annual Multi-Year Action Plan development process

The MYAP tables include project types, location, limiting factor, biological priority, and cost estimates (Appendix E). The WATs provide annual rolling updates and revisions to the MYAP tables for the subsequent 3-5 years (Table F-1). The final product is a programmatic table guided by the UCRTT's biological priorities table and re-integrated into the Recovery Plan's Implementation Schedule. The MYAPs are also utilized in the coordination of funds across the subbasins and are a critical planning component in the reach scale approach discussed in this proposal.

Table F-1. Multi-Year Action Planning Tables - MYAPs are populated 3-5 years in advance. Tables are revised and updated annually by WATs and reviewed by UCRTT to ensure proposed actions meet the Recovery Plan's highest biological priorities. See the Upper Columbia MYAPs in Appendix E.



SCHEDULE: MYAPs updated annually
DELIVERABLES: Develop 3-5 year strategic plans such as Multi-Year Action Plans for the Upper Columbia Region subbasins that will be the basis for the targeted solicitation.

F4. Work Element 114 - Identify and Select Projects

Project actions will be identified for BPA/NPCC funding through an Upper Columbia Region Annual 2-Cycle Solicitation. Table F-2 is a comprehensive schematic of the Upper Columbia process and illustrates the development of the MYAPs by the WATs down through the temporal progression of project Identification, selection, and funding.

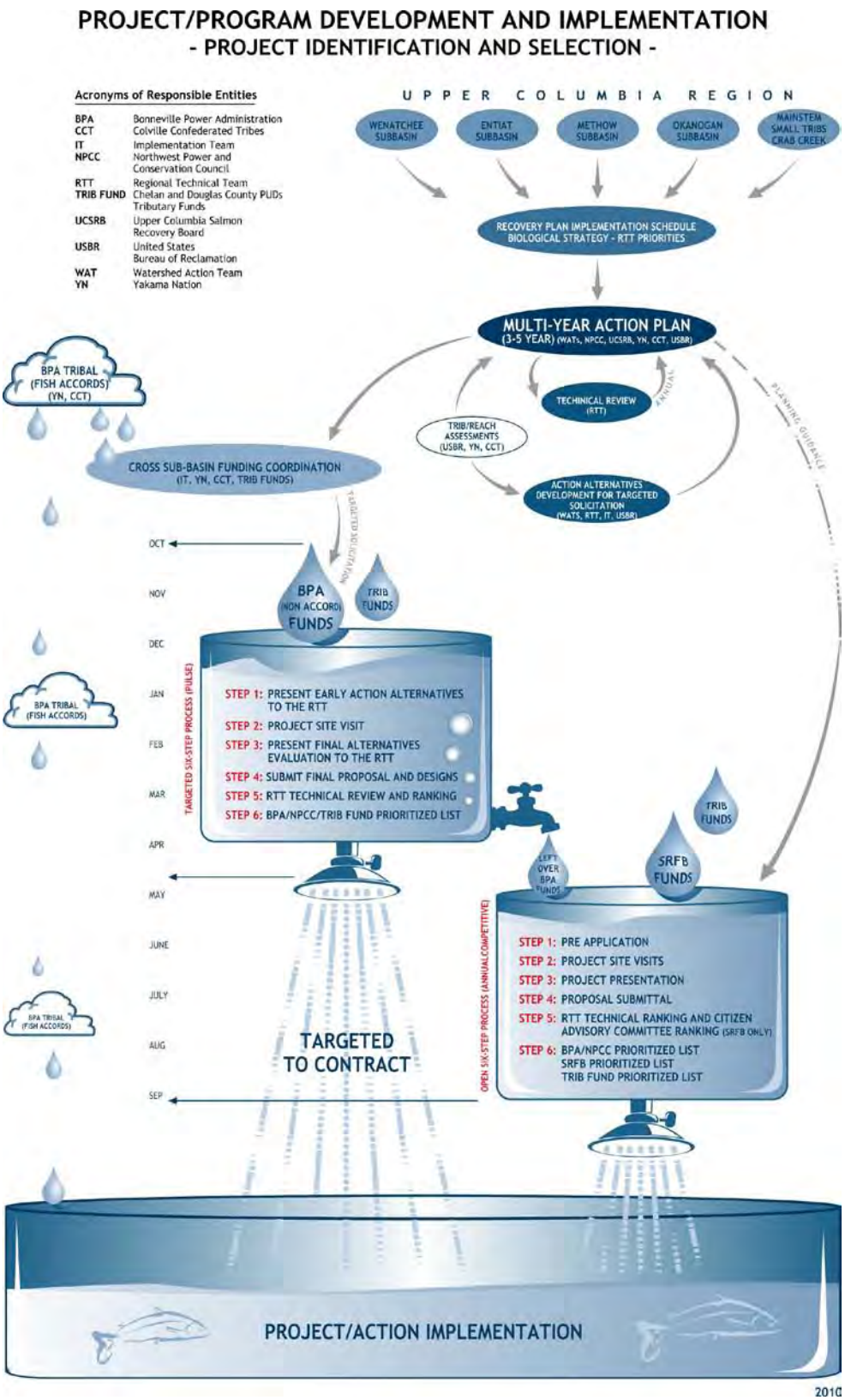


Figure F-2. Upper Columbia Project Planning, Identification, and Selection Process Diagram

F.4.1 Upper Columbia Annual Funding 2-Cycle Solicitation

Targeted 6-Step Funding Process (October – May)

The first cycle will be a new annual targeted solicitation that will take place October through May and is intended to accommodate large, complex or reach-based actions to address the highest biological priorities in the Upper Columbia Region. This new solicitation cycle has been modified from the current Open 6-Step Process for this proposed programmatic project. The Targeted 6-Step process will be very similar to the Open 6-Step process (see description in next paragraph and detailed in Appendix D); however, the UCRTT's role in the targeted solicitation is one of greater input during the planning and project development process. A majority of BPA/NPCC funds will be allocated to this targeted funding process. The solicitation is targeted, meaning the priority watersheds, stream reaches, and types of project actions are pre-defined.

Actions included in the targeted solicitation will be selected from the priority actions identified in the MYAPs (Appendix E). Annually WATs develop MYAPs for each sub-basin. The UCSRB will analyze where these plans crosswalk with the UCRTT biological priorities, which will allow the UCSRB to target an action for funding with the non-Accord funds. This reach-based approach is guided by and consistent with the UCRTT's biological priorities and the Recovery Plan's Implementation Schedule. Tributary and Reach assessments completed by partners (e.g. Reclamation, Yakama Nation) will be used to identify site-specific implementation of actions that address habitat degradation for primary limiting factors of listed populations. For those actions that have been identified as a "targeted solicitation," project sponsors can expect to follow the six step process described below. Any funds that are unallocated during a targeted solicitation process *may* be transferred to the Open 6-step process and application phase. The UCSRB will facilitate this six-step process, and will work closely with project sponsors developing a targeted action.

UCRTT Role in the Targeted Solicitation

The UCRTT's additional role as a result of this BPA/NPCC non-Accord habitat programmatic project is one of input during the project planning process, MYAPs, and AER project development, followed by a project specific formal review. UCRTT review the MYAPs annually to ensure the plans are addressing priority limiting factors. The UCRTT will also review AERs produced from the Tributary and Reach Assessments completed by Reclamation, Yakama Nation, and the Colville Confederated Tribes (see AER example Appendix D). More specifically, for large complex projects in reaches which have been adequately assessed (i.e. Reclamation Reach Assessment), the UCRTT would review the AER's and select the one or two top priority alternatives, as a part of the annual Targeted 6-Step Process, that best address limiting factors, restore natural processes, and have the highest biological benefit. The AERs will have enough detail to include rough cost estimates and preliminary designs. Additional recommendations may be rendered regarding the risks and shortcomings of the other alternatives. If appropriate, this review may include a "pre AER" presentation by an inter-disciplinary (ID) team for initial feedback from the UCRTT before the development of the AER. Additional presentations and feedback sessions during regular UCRTT meetings may occur before the formal assessment of the AER by the UCRTT. Before the application is submitted to the funding source there will be, at a minimum, a feedback loop with the UCRTT and/or a formal scoring of the project using the UCRTT project scoring criteria.

One of the principal roles of the UCRTT in both the Targeted and Open processes is a formal review of specific priority actions using the UCRTT Biological Strategy Project Evaluation Criteria detailed below in Section F4.3. during the project solicitation and selection phase.

Description of the Targeted Solicitation's 6-Steps

Step One: EARLY ACTION ALTERNATIVES

As described above, the UCRTT will review project alternatives produced from reach assessments, and select the one or two top priority alternatives that best address limiting factors, restore natural processes, and have the highest biological benefit. The project alternatives will have enough detail to include rough cost estimates and preliminary designs. Additional recommendations may be rendered regarding the risks and shortcomings of the other alternatives. If appropriate, this review may include a "pre project alternative" presentation by an inter-disciplinary (ID) team for initial feedback from the UCRTT before the development of the project alternatives. Additional presentations and feedback sessions during regular UCRTT meetings may occur before the formal assessment of the alternatives by the UCRTT.

Step Two: PROJECT SITE VISITS

Proposed project site visits are scheduled upon request by the UCRTT or other reviewers and when warranted. Not all projects will need a site visit; this will be negotiated during Step 1.

Step Three: FINAL ALTERNATIVES PRESENTATION

After the preferred alternative is selected and all the field assessments are complete, project proponents are required to present the project with adequate detail (e.g. designs, budget, landowner status, materials) so that technical reviewers and funding agencies have a clear idea of the projects objectives, expected outcomes, location, scale, and techniques. The intent of this presentation is to continue to receive technical feedback from the UCRTT and other reviewers to further refine the project proposal before submitting final designs and materials are developed.

Step Four: FINAL PROPOSAL AND DESIGNS

Project proponents will submit a detailed final proposal to the UCSRB. The format for the proposal is still a work in progress, but could include an official SRFB application form or some other existing format with relevant information. This proposal will then be transmitted to the UCRTT for technical review and scoring using the same criteria and procedures as described in the Biological Strategy, and in the open 6-step process below. The proposal should include enough detail (e.g. project area, permits, designs) that will allow the UCRTT ample opportunity to adequately evaluate the proposal. Scoring of projects is important to develop a record of performance on the targeted solicitation process. Should a proposal score be inadequate to BPA, the project sponsor may be asked to go back to one of the previous steps. However, we hope to avoid sufficient upfront interaction to avoid this.

Step Five: UCRTT TECHNICAL REVIEW AND RANKING

The UCRTT will formally evaluate and score the project using the UCRTT project scoring criteria (see F.4.3) .

Step Six: BPA/NPCC PRIORITIZED PROJECTS

The UCSRB will submit the prioritized projects to BPA for final funding decisions.

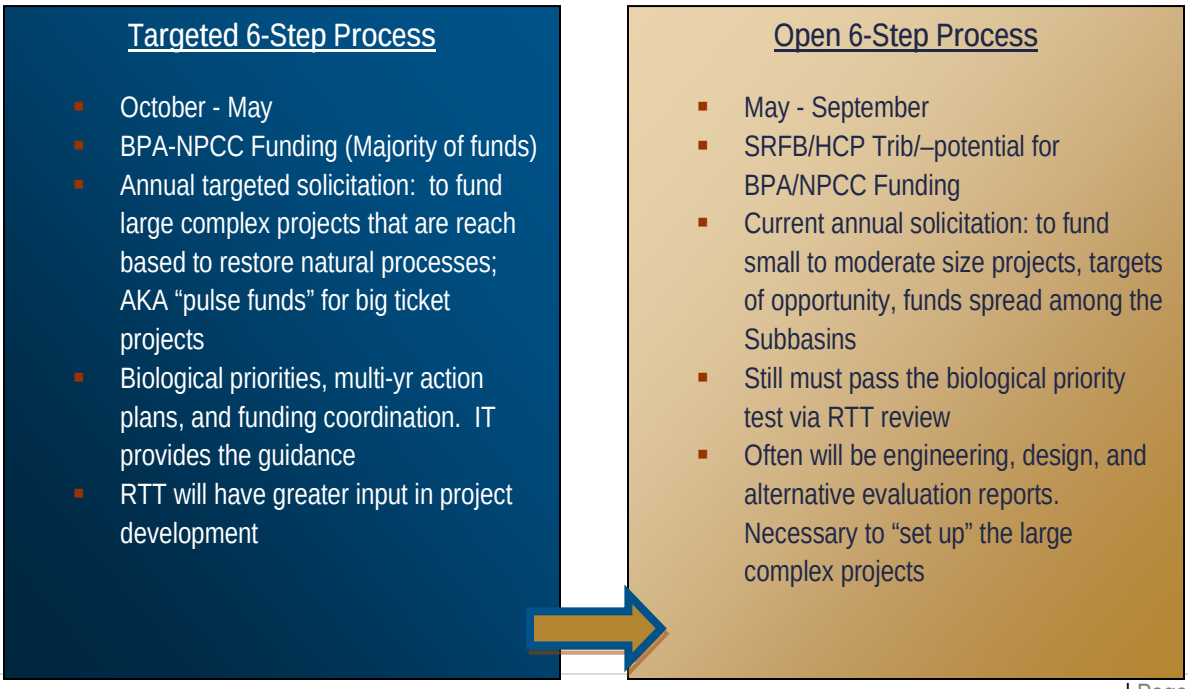
Open 6-Step Funding Process (May – September)

The second cycle is the current Upper Columbia regional Open 6-Step Process. This project selection process has a greater likelihood of spreading the BPA/NPCC, SRFB, and HCP Tributary funds across the Upper Columbia Region subbasins to fund smaller scale actions. These actions will likely be lesser in scope and/or effort in terms of engineering, design, and alternatives analysis preparation than the larger complex projects.

The current Upper Columbia regional Open 6-Step Process is the result of years of collaborative work on the part of all interested parties to establish an effective and efficient process and the "Regional Process Guide" documents this process and provides guidance to project sponsors and partners. Figure F-2 outlines the Open 6-Step Process as well as the newly developed Targeted 6-Step Process; Appendix D includes a more detailed description of the Open 6- steps. The Open Solicitation process is driven by other funding sources that have disparate requirements. Much of the timing and several of the steps in this process are established in statute and policy by the SRFB. This board was created in 1999 by the Washington State Legislature and provides grants to protect or restore salmon habitat. Funding comes from the sale of state general obligation bonds and the federal Pacific Coastal Salmon Recovery Fund. Historically, in order to help assure consistency and coordination, the Rock Island, Rocky Reach, and Wells Dam HCP Tributary Committees have also agreed to use this process and timeline for their funding decisions.

Under this proposed programmatic, the Targeted Solicitation funds will only be applied to actions that have been identified as regional priorities in the MYAPs. The Upper Columbia is proposing that in a given year, these targeted funds *may* also be combined with the Open Solicitation funds to pursue larger scale projects, in the event the full allocation is not applied to a full reach-scale, priority action. Any funds that are unallocated during a targeted solicitation process *may* be transferred to the Open 6-step process and application phase. With oversight over the programmatic resources, the Upper Columbia Region will be much better prepared to leverage funds from these other sources (i.e. project and funding coordination).

Table F-2. Comparison of Targeted vs. Open 6-Step Process



F.4.2 Upper Columbia Regional Technical Team Mission Statement and Membership

The UCRTT has been the regional technical review body in the Upper Columbia for the Washington State Salmon Recovery Funding Board's (SRFB) process since it began in Washington State in 1999, and we have always included the Upper Columbia regional perspective in our deliberations. When the Tributary Fund for the Mid-Columbia Hydroelectric Projects HCP was established in 2002, the decision was made to request the UCRTT's review and perspective on projects so that technical consistency was established between these different project development and evaluation processes. BPA habitat funding has been the outlying funding source. This programmatic would result in general consistency among the SRFB, HCP Tributary Fund, and BPA prioritization processes within the Upper Columbia Region.

Mission Statement: The Upper Columbia Regional Technical Team is a consortium of natural resource biologists, scientists, and professionals that coordinate, review, and advise on technical issues, projects, and monitoring concerning aquatic resources within the Upper Columbia by integrating habitat restoration/protection with management actions and other factors to achieve functioning aquatic ecosystems and sustainable natural fish populations.

Membership: The UCRTT shall consist of persons with appropriate technical skills and new members shall be appointed by the standing UCRTT. The UCRTT may consist of members of private, tribal, public utility, and government entities, but is not representational of these entities. UCRTT members must possess a strong technical background and knowledge of salmonids and their habitats in the Upper Columbia Region. To reduce the potential for conflict of interests, UCRTT members must divest interest in a particular subbasin or activity within the region, and reflect regional responsibilities in their deliberations.

Current UCRTT members:

1. John Arterburn, Colville Confederated Tribes, Anadromous Fish RM&E Subdivision Lead. B.S. Colorado State University, M.S. South Dakota State University.
2. Casey Baldwin (UCRTT *Chairperson*), Washington Department of Fish and Wildlife, Research Scientist. B.S. Adams State College, M.S. Utah State University.
3. Dale Bambrick, National Marine Fisheries Service, Eastern Washington Branch Chief. B.S. Central Washington University, B.A. Secondary Education, Central Washington University.
4. Steve Hays, Chelan County Public Utility District, Fish and Wildlife Senior Advisor. B. S. University of Washington
5. Dr. Tracy Hillman, BioAnalysts, Senior Ecologist and CEO. B.S. Montana State University, M.S. Idaho State University, Ph.D. Idaho State University.
6. Tom Kahler, Douglas County Public Utility District, Fisheries Biologist. B.S. and M.S. University of Washington
7. Joe Kelly, Bureau of Land Management, Fisheries Biologist. B.S. Cornell University
8. Joe Lange, Natural Resource Conservation Service, Civil Engineer. B.S. Washington State University
9. Russell Langshaw, Grant County Public Utility District, Fisheries Biologist. B.S. Central Washington University, M.S. Oregon State University

10. Dr. Michelle McClure, National Marine Fisheries Service-Northwest Fisheries Science Center, Integrated Watershed and Nearshore Ecology Team Leader. BA/BS The Evergreen State College, Ph.D. Cornell University.
11. Keely Murdoch, Yakama Nation, Senior Monitoring and Evaluation Biologist. B.S. Western Washington University, M.S. Central Washington University.
12. Chuck Peven, BioAnalysts, Inc., Fisheries Biologist, B.S. and M.S. University of Washington.
13. Dr. Karl Polivka, USDA Forest Sciences Laboratory, Research Fish Biologist
    B.S., University of California, Los Angeles; M.S., University of Oklahoma; Ph. D., University of Chicago
14. Kate Terrell *(UCRTT Vice Chairperson),* U.S. Fish and Wildlife Service,
    Habitat Restoration and Conservation Division Chief. B.S. University of Oregon
15. Cameron Thomas, U.S. Forest Service, Okanogan-Wenatchee National Forest Fish Program Manager, B.S. Humboldt State University

UCRTT Conflicts of Interest

The UCRTT operating procedures offer the following explanation for how they deal with potential conflicts of interest.

> "UCRTT members with direct involvement in the development of a project, a family relationship to someone directly involved in the project, supervision of an employee directly involved in the project, a high likelihood of involvement with implementation of the project, or other potential conflict of interest should recuse themselves from the scoring and the discussion of the project. This person will leave the room during the discussion and scoring of that proposal. Additionally, reviewers are expected to abstain from submitting scores for a project if they did not have adequate time to read and apply the UCRTT project scoring criteria."

From the UCRTT operating procedures (http://www.ucsrb.com/Editor/assets/UCRTT-operating-procedures_3may2010.pdf)

F.4.3 Regional Technical Team Project Rating Criteria

One of the principal roles of the UCRTT in both the Targeted and Open processes is a formal review of specific priority actions using the UCRTT Biological Strategy Project Evaluation Criteria during the project solicitation and selection phase. The UCRTT Project Rating Criteria is detailed below. *This is a stand-alone document that has been added into the body of this proposal and the Table numbers were not changed; as a result, Table numbers are not in sequence with the larger body of the document.*

The UCRTT has developed a set of project rating criteria that has two major components, biological benefit and certainty of success. The biological benefit component of rating a project has 4-5 criteria, depending on the type of project being assessed (restoration, protection, assessment, or design). These criteria focus on limiting factors and benefits to VSP criteria for listed species (spring Chinook, steelhead, and bull trout). The certainty of success criteria were developed to rate the adequacy of the proposal and the likelihood that the project, as proposed, will achieve its objectives. This is an important set of criteria that is designed to address several technical aspects involved in project development and implementation, with the intention of identifying weaknesses that might lead to project failure or unintended results. A separate scoring system was developed for each project type (restoration, protection, assessment, and project design) with 100 points allotted to the biological benefit criteria and 66 points to the certainty of success criteria.

RESTORATION PROJECTS

Biological Benefit

Abundance and productivity.—The highest proportion of points were allotted to the abundance and productivity criteria because all populations in the Upper Columbia need large improvements in these viability criteria (UCSRB 2007; ICTRT 2007) (Table D1). The point distribution may be reconsidered as population status changes, and considering population-specific impairments. Factors considered for determining high, moderate, or low benefit for this criterion include the scale of the project, the biological significance of the project area, and the number and significance of life stages affected (Table D2). For this criterion, it is particularly important for project sponsors to clearly describe the quantity of habitat affected by the project. Depending on the project type, examples of this would be:

- acres/hectares of riparian habitat restored or protected
- linear distance (ft or m) of channel restored or protected
- linear distance (ft or m) of bank stabilized
- area (m^2 or ft^2) of stream channel affected
- number of pools and area (m^2 or ft^2) of pool habitat created
- quantity that flow is increased (cfs or m^3/s)
- quantity of flow screened (cfs screened compared to cfs in the stream)
- linear distance (ft or m) and area of habitat above a barrier

Table D1. Project rating criteria and scoring system developed by the Upper Columbia Regional Technical Team for rating habitat restoration projects.

Project Name:		Comment summary:
Project ID#		
Project Type: Restoration		
Biological Benefit	Score	Notes
Benefit to VSP abundance and/or productivity	35	See decision support matrix (Table D2.a) for guidance on scoring.
Benefit to VSP spatial structure and/or diversity	15	See decision support matrix (Table D2.b) for guidance on scoring.
Does the project address one or more limiting factors identified in the Recovery Plan or Biological Strategy?	10	See decision support matrix (Table D2.c) for guidance on scoring.
Is this a priority watershed (or major spawning area) for the populations?	10	See decision support matrix (Table D2.d)
Is this project dependent on other limiting factors being addressed first (sequencing)?	20	See decision support matrix (Table D2.e) for guidance on scoring.
Will the project benefit multiple listed species?	10	See decision support matrix (Table D2.f) for guidance on scoring.
Subtotal for biological benefit =	100	
Certainty of Success	Score	Notes
Is the project design adequate to achieve the stated objectives?	30	See decision support matrix (Table D4.a) for guidance on scoring.
Permitting	4	See decision support matrix (Table D4.b) for guidance on scoring.
Restoration costs	32	See decision support matrix (Table D4.c) for guidance on scoring.
Subtotal for Certainty of Success =	66	
Total Score =	166	
Was implementation monitoring included in the project?	Y / N	If yes, the UCRTT will describe the adequacy. See the Project Monitoring section of Appendix D
Was Level 1 effectiveness monitoring included in the project?	Y / N	If yes, the UCRTT will describe the adequacy. See Table D5.
Will the project be included as part of a larger scale Level 2 or 3 effectiveness monitoring program?	Y / N	The project sponsor does not necessarily need to know this. The UCRTT will determine this or determine if the project would be a good candidate for the higher level of monitoring.

Table D2. Decision support matrices for evaluating the potential biological benefit of a restoration project developed by the Upper Columbia Regional Technical Team.

Criteria			
		Benefit	Score
a.	Abundance and Productivity	High	25-35
		Moderate	15-24
		Low	0-14
b.	Spatial Structure and Diversity	Very High	13-15
		High	9-12
		Moderate	5-8
		Low	0-4
c.	Number of Primary Limiting Factors Addressed	3+	10
		2	7
		1	5
d.	Priority Watershed	Category 1	10
		Category 2	8
		Category 3	4
		Category 4-5	2
e.	Sequencing	# of Preceding Limiting Factors	
		0	20
		1	5-15
		2+	0-4
f.	Benefits for Multiple Listed Species	How Many Species?	
		1	1
		2	5
		3	10

Table D3. Details for determining the level of biological benefit to spatial structure and diversity from a habitat restoration action. Major (MaSA) and minor (MiSA) spawning areas were defined in the Salmon Recovery Plan (UCSRB 2007) based on recommendations by the Interior Columbia Technical Recovery Team (ICTRT 2007).

Benefit	Description
Very high	Adding or protecting (in its entirety) a Major Spawning Area
High	Adding or protecting (in its entirety) a Minor Spawning Area
Moderate	Adding, enhancing, or protecting branches or re-capturing previously unoccupied area (m^2) to existing MaSA or MiSA that are "not well occupied". This is an effort to broaden the distribution and strengthen the abundance in spawning areas that have not been acting as strongholds.
Low	Adding, enhancing, or protecting branches or area (m^2) to existing MaSA or MiSA that are already strongholds.

Spatial structure and diversity.—Spatial structure and diversity were allotted fewer potential points (15) because the status assessments indicated that spatial structure and habitat-related diversity metrics were generally not limiting Upper Columbia populations from achieving low to moderate viability risk ratings (UCSRB 2007; ICTRT 2007). Factors considered for determining very high, high, moderate, or low benefit are focused on the Major and Minor Spawning Area concept developed by the ICTRT (2007) and are described in Table D3.

Number of limiting factors addressed.—This criterion was designed to assess whether a project is focused on one or more primary limiting factors identified in the Recovery Plan. Up to 10 points may be allotted for a project that addresses three or more primary limiting factors (Table D2). Considerations for this criterion are also embedded within the abundance and productivity and spatial structure and diversity criteria; however, the UCRTT thought it was important to isolate this criterion to help focus the efforts of project sponsors and ensure that projects are relating directly back to limiting factors identified in previous planning documents.

Priority watershed.—This criterion provides points for projects based on its location and the associated watershed category (as defined in the UCRTT Biological Strategy, see Appendix A of this document). Up to 10 points may be allotted for this criterion (Table D2). If a project area falls outside the boundaries of where the UCRTT has designated watershed categories then the UCRTT will determine the category based on the definitions provided in the Biological Strategy. Considerations for this criterion are also embedded within the abundance and productivity and spatial structure and diversity criteria; however, the UCRTT thought it was important to isolate this criterion to help focus the efforts of project sponsors.

Sequencing.—This criterion was developed to ensure that there are not other limiting factors that should be addressed before those proposed by the project at hand. Full credit is given to a project that has zero limiting factors that should be addressed prior to implementation of the project at hand (Table D2). This criterion is focused on the biological and ecological order of operations for limiting factors in a particular

subwatershed. The UCRTT recognizes that there could be social, economic, or feasibility considerations for implementing projects in a different order. However, those considerations are outside the purview of the UCRTT.

Benefits to Multiple Listed Species.—This criterion assesses benefits to up to three listed species (spring Chinook, steelhead, bull trout), providing up to 10 points for a project that will have direct benefits for all three (Table D2.f). The range of points available within each number of species allows for reviewers to provide more or less points depending on the extent to which multiple life stages will benefit. For example, a project might benefit spawning and rearing for one species but only a small amount of rearing for a second species. In that case, reviewers might want to award fewer points than a project that would provide benefits to all life stages of both species.

Certainty of Success (restoration projects)

The certainty of success criteria were developed to rate the adequacy of the proposal and the likelihood that the project, as proposed, will achieve its objectives. For restoration projects, the criteria include a set of questions regarding the project design, permitting, and budget.

Project design.— Several questions were developed to cover the major areas of importance for this category (Table D4.a).

Permitting.—A small proportion of points were allotted to the permitting question because of the uncertainty in evaluating the likelihood of receiving a permit. This criterion is intended to highlight potential permitting hurdles or project efficiencies for projects that already have permits in hand. Given the major role that permitting plays in implementing projects, the UCRTT thought it was important to include some assessment of the permit status or "permitability" of a particular project (Table D4.b).

Restoration costs.—Thirty-two points were allotted to the criterion for restoration costs and the sub-questions in Table D.c are intended to address two main questions:

1) Are the costs appropriate for the project that is being proposed?
   We developed two questions for this criterion that allow us to focus on technical aspects of the budget. The questions allow the UCRTT to point out discrepancies between the project objectives and the budget. For example, a lower score for restoration cost sub-question 1 in Table D4.c would be likely if a culvert replacement project did not have a culvert identified in the budget. Likewise, a lower score for sub-question two would be likely if a riparian restoration project was supposed to plant 1,000 trees but only included salary line items for a project manager and an engineer.

2) Are the potential ecological benefits appropriately scaled with the costs?

This question takes into account the contribution to ecological benefits and the cost simultaneously. For example, two different culvert projects might provide access to two streams with similar quantity and quality habitat so the biological benefits are similar. Additionally, the project costs for each one might be appropriate for what is needed at each site (i.e. fill, pipe size, road management, etc.) but the final costs could be vastly different. The simpler, low cost project might score well on this criterion whereas the very expensive project would score lower.

Reviewers will consider how the absolute cost relates to their assessment of biological benefits, how this project compares to other projects of similar types (relative cost within the grant cycle) and/or how the costs compares to similar types outside this grant round.

Table D4. Certainty of success criteria developed by the Upper Columbia Regional Technical Team for rating habitat restoration projects.

	Criteria	Sub-question	Score
a.	Project Design	Does the proposal provide adequate information?	0-8
		Is it a proven technique, or if innovative, does it appear it will work?	0-7
		Is the project properly sited and scaled?	0-7
		What is the likelihood that the projects structural integrity will be maintained over the appropriate timeframe?	0-8
		Project Design Subtotal =	30
b.	Permitting	Is it already permitted?	4
		Are permits in process?	3
		Does it appear that permits could be obtained?	2
		It does not appear that permits could be obtained.	0
		Permitting Subtotal =	4
c.	Restoration Costs	Are all necessary materials included in the budget?	0-8
		Are all items in the budget relevant to biological benefits?	0-12
		[1]Are the ecological benefits appropriately scaled with the costs?	0-12
		Restoration Costs Subtotal =	32
		Total for Restoration Certainty of Success =	66

Project Monitoring

Implementation and effectiveness monitoring are important components of the UCRTT certainty of success category; however, certain funding sources have decided not to fund project monitoring. Therefore, the implementation and effectiveness monitoring questions are not included in the certainty of success category and will be assessed separately, if a project sponsor has a monitoring plan that can be implemented from a different funding source. For more information see the Monitoring and Evaluation in the Upper Columbia Section G, Appendix F.

Protection Projects

Biological Benefit

Abundance and productivity.—The same point allotment and decision support matrix was used for protection projects as restoration projects for abundance and productivity (Table D2.a). However, the UCRTT has adopted the over-arching strategy that protecting functional habitat is the highest priority (NRC 1996; Roni et al. 2002); therefore, protection projects are more likely to score in the "high" category for this criterion.

Spatial structure and diversity.—The same point allotment and decision support matrix was used for protection projects as restoration projects for spatial structure and diversity (Table D2.b).

Priority watershed.—A relatively large proportion of points was allotted to the priority watershed criteria for a protection project to ensure that protection efforts were focused in areas were the greatest benefits would accrue (i.e. category 1 and 2 watersheds) (Table D6).

Connectivity to other protected areas.— This criterion was designed to give protection projects credit when they are adjacent to or associated with other protected areas. This will promote creating habitat strong holds with the assumption that large blocks of continuous functional habitat will be more effective and provide more biological benefit than a patchwork approach. Additionally, points can be awarded if there is a demonstrated link between the protection property and some needed restoration projects, such as floodplain connectivity or riparian restoration.

Table D6. Project rating criteria and scoring system developed by the Upper Columbia Regional Technical Team for rating habitat protection projects.

Project Name:		Comment summary:
Project ID#		
Project Type: Protection		
Biological Benefit	Score	Notes
Does the acquisition or easement protect or enhance a benefit to VSP abundance and/or productivity	35	See decision support matrix (Table D2.a) for guidance on scoring.
Does the acquisition or easement protect or enhance a benefit to VSP spatial structure and/or diversity	15	See decision support matrix (Table D2.b) for guidance on scoring.
Is this a priority watershed for the populations?	35	Category 1=35 points; C2=25 points C3=15; C4=10 points; C5=5 points.
Is this acquisition/easement associated with other protected areas (habitat strong holds) or (if needed) restoration projects?	15	0= no ; 1-14= partial; 15 = yes
Subtotal for biological benefit =	100	
Certainty of Success	Score	Notes
Is there a sign letter of commitment from the current land owner?	10	yes = 10; no = 0 or (1-9 pts possible depending on level of landowner interactions described in the proposal.
Has an appraisal been completed?	10	yes = 10; no = 0 ; (or 1-9 pts possible if land-cost comparisons were provided in the proposal.
Do management actions associated with this acquisition/easement promote fish habitat conservation?	14	Proposal needs to describe the parameters of the easement; I.e. what can and cannot be done on the land?
Protection Costs	16	See decision support matrix (Table D4.c) for guidance on scoring.
Subtotal for Certainty of Success =	66	
Total Score =	166	
Was implementation monitoring included in the project?	Y / N	If yes, the UCRTT will describe the adequacy. See the Project Monitoring section of Appendix D
Was Level 1 effectiveness monitoring included in the project ?	Y / N	If yes, the UCRTT will describe the adequacy. See Table D5.
Will the project be included as part of a larger scale Level 2 or 3 effectiveness monitoring program?	Y / N	The project sponsor does not necessarily need to know this. The UCRTT will determine this or determine if the project would be a good candidate for the higher level of monitoring.

Certainty of Success (protection projects)

There are four criteria for certainty of success for protection projects (Table D6).
These criteria cover commitments from the landowners, completed appraisals, the terms and conditions of the protection effort, and protection costs. For the terms and conditions of the protection action, it is particularly important for project sponsors to describe the types and extent of activities (# of homesites before and after, logging, grazing, road building restrictions, etc.) that can or cannot occur on the land and in the stream after the protection action is in place. There should be some site-specific nuances that are articulated in the proposal along with a list of general terms or examples from previous easements.

For protection project costs, we use the same questions and point system as was described for restoration projects (Table D4.c), with the following adjustments / considerations.

1) Are all necessary transaction costs included in the budget? This includes appraisals, outreach, legal review, etc.)

2) Are all items in the budget relevant to biological benefits? For example, the inclusion of upland areas that do not pose a threat to the riparian area or anthropogenic structures that increase the price of the acquisition / easement without adding protection benefits for the riparian area.

Assessment Projects

Biological Benefit

Abundance and productivity.— Thirty five points were available for assessment projects that would lead to a better understanding of limiting factors to abundance and/or productivity or contribute to a status evaluation for abundance and/or productivity (Tables D7 and D8a).

Spatial structure and diversity.— Thirty five points were available for assessment projects that would lead to a better understanding of limiting factors to spatial structure and Diversity or contribute to a status evaluation for spatial structure and diversity (Tables D7 and D8b).

Scale of applicability.—This criterion was designed to evaluate how broadly or narrowly the assessment results might be applied. More points will be given to projects that provide valuable information across multiple spatial scales (Tables D7 and D8c)

Use of information.—This criterion was used to evaluate several aspects related to the usefulness of the information collected during the assessment. There were two main subcategories that were considered for this criterion:
1) Create information
    a) Is the question answerable?
    -i.e. Does the technology exist to answer the question?
    b) Are there foreseeable management actions that could be done to use the information?
    c) Will filling the data gap improve a fundamental scientific understanding?

2) Formulate policy

a) Has the information specifically been requested by management and/or policy makers?

Certainty of Success (Assessment Projects)

Assessment design.—. Proposals need to address the 7 steps for setting up a monitoring plan as outlined in Table D5. Additionally, standard protocols or methods should be used to ensure data quality, repeatability, and statistical comparisons. Or, if new and innovative protocols/methods are implemented sufficient explanation and justification needs to be outlined in the proposal so that the UCRTT can objectively evaluate the likelihood that it will be successful.

Permitting.—See permitting discussion and point allotments described in the restoration project section and in Table D4.b.

Assessment costs.—For assessment project costs, we use the same questions and point system as was described for restoration projects (Table D4.c).

Data management and reporting.—This criteria was designed to highlight the importance of data management and reporting that is particularly relevant to assessment projects. Project sponsors need to be particularly cognizant of multiple levels of data management and dissemination including local, regional, and perhaps statewide or Columbia Basin wide.

Table D7. Project rating criteria and scoring system developed by the Upper Columbia Regional Technical Team for rating assessment projects.

Project Name:		Comment summary:
Project ID#		
Project Type: Assessment		
Biological Benefit	Score	Notes
Benefit to VSP Abundance and/or Productivity	35	See Table D8a. for guidance on scoring.
Benefit to VSP Spatial Structure and/or Diversity	35	See Table D8b. for guidance on scoring.
Scale of Applicability	10	See Table D8c. for guidance on scoring.
Use of Information	20	See Table D8d. for guidance on scoring.
Subtotal for biological benefit =	100	
Certainty of Success	Score	Notes
Is the assessment design adequate to achieve the stated objectives?	26	See Table D9 for guidance on scoring.
Permitting	4	See Table D9 for guidance on scoring.
Does the cost estimate reflect all expected tasks?	16	See Table D9 for guidance on scoring.
Is there an avenue described to disseminate information to interested parties once the assessment is completed?	4	See Table D9 for guidance on scoring.
Subtotal for Certainty of Success =	66	
Grand Total	166	

Table D8. Project proposal evaluation criteria developed by the Upper Columbia Regional Technical Team for rating assessment projects for biological benefit.

	Criteria	Description	Benefit	Score
a	Benefit to VSP, Abundance and/or Productivity	Does the assessment contribute to knowledge of abundance and/or productivity? Or could the assessment directly result in action that will increase abundance and/or productivity?	High	25 to 35
			Moderate	15 to 24
			Low	1 to 14
			None	0
b	Benefit to VSP, Spatial Structure and/or Diversity	Does the assessment contribute to knowledge of spatial structure and/or diversity? Or could the assessment directly result in action that will increase spatial structure and/or diversity?	High	25 to 35
			Moderate	15 to 24
			Low	1 to 14
			None	0
c	Scale of Applicability	Local, Population, ESU	Local	2
			Sub-basin (population)	5
			Regional (ESU)	10
d	Use of Information	Is the question answerable (i.e. does the technology exist)? Are there foreseeable management actions that may use the information? Will filling the data gap improve a fundamental scientific understanding? Has the information specifically been requested by management and/or policy makers?	High	14 to 20
			Moderate	6 to 13
			Low	0 to 5

Table D9. Certainty of success criteria developed by the Upper Columbia Regional Technical Team for rating assessment proposals.

	Criteria	Sub-question	Score
a.	Assessment Design	Does the proposal provide adequate information? (objectives, methods, etc)	0-7
		Is the study design and analysis sufficient to meet the stated objectives?	0-7
		Is the assessment properly sited and scaled?	0-6
		Is it a proven technique, or if innovative does it appear it will work?	0-6
		Assessment Design Subtotal	26
b.	Permitting	Is it already permitted?	4
		Are permits in process?	3
		Does it appear that permits could be obtained?	2
		It does not appear that permits could be obtained	0
		Assessment Permitting Subtotal	4
c.	Costs	Are all necessary materials included in the budget?	0-8
		Are all items in the budget relevant to biological benefits?	0-12
		Are the ecological benefits appropriately scaled with the costs?	0-12
		Assessment Costs Subtotal	32
d.	Dissemination of Information	Is there an avenue identified to disseminate information to pertinent parties? (i.e. agency report, peer reviewed journal, etc plus data management procedures described including QAQC and public access).	4
		Partial credit based on adequacy of proposal to describe how the information will be summarized, shared, and made available.	1-3
		No means of disseminating information is described.	0
		Dissemination of Information Subtotal	4
		Total for Assessment Certainty of Success =	66

Project Design Proposals

These projects are generally the first part of a phased approach that first seeks to determine the right restoration prescription for a specific site and develop the engineering design plans for the chosen alternative.

Biological Benefit

Abundance and productivity.— The same point allotment and decision support matrix was used for project design projects as restoration projects for the abundance and productivity criteria (Tables D10 and D2.a). The UCRTT will evaluate the potential benefits to abundance and productivity for the likely project that will result from the design. In some cases, the exact project alternative will not be known and the UCRTT will have to make and document their assumptions in the project review narrative.

Spatial structure and diversity.—The same point allotment and decision support matrix was used for project design projects as restoration projects for the spatial structure and diversity criteria (Tables D10 and D2.b). The UCRTT will evaluate the potential benefits to spatial structure and diversity for the likely project that will result from the design. In some cases, the exact project alternative will not be known and the UCRTT will have to make and document their assumptions in the project review narrative.

Number of limiting factors addressed.—The same point allotment and rational will be used for this criterion as was described for restoration project proposals. The UCRTT will evaluate the potential number and importance of limiting factors addressed for the likely project that will result from the design. In some cases, the exact project alternative will not be known and the UCRTT will have to make and document their assumptions in the project review narrative.

Priority watershed.— The same point allotment and rational will be used for this criterion as was described for restoration project proposals.

Sequencing.— The same point allotment and rational will be used for this criterion as was described for restoration project proposals. In most cases, project designs should follow an assessment and be consistent with a restoration strategy that aims to restore natural processes within a reach context.

Future Check-ins.—Are there milestones for future check-ins with the UCRTT as the design progresses. This criterion was developed to provide additional points for project sponsors that intend to solicit feedback as the design develops. We believe this will increase the probability that the chosen alternative achieves the intended biological benefit and that Phase 2 (project implementation) will be more successful.

Certainty of Success (Project Design Proposals)

Is the design/feasibility proposal adequate to achieve the stated objectives? — A set of sub-questions was developed to cover the major areas of importance for this category (Table D11). *Will the design/feasibility study produce a product that will be implemented in the next phase.*—

Project costs.— Thirty-two points were allotted to the criterion for project design costs and the sub-questions are consistent with those outlined in Table D4.c.

Table D10. Project rating criteria and scoring system developed by the Upper Columbia Regional Technical Team for rating project design or feasibility proposals.

Project Name:		Comment summary:
Project ID#		
Project Type: Project Design		
Biological Benefit	Score	Notes
Does this design-assessment lead to a project that will benefit abundance and/or productivity.	35	See decision support matrix (Table D2.a) for guidance on scoring.
Does this design-assessment lead to a project that will benefit spatial structure and/or diversity.	15	See decision support matrix (Table D2.b) for guidance on scoring.
Is this design likely to lead to a project that addresses limiting factors identified in the Recovery Plan or Biological Strategy?	10	See decision support matrix (Table D2.c) for guidance on scoring.
Is this a priority watershed (or major spawning area) for the target populations?	10	See decision support matrix (Table D2.d)
Is this design likely to lead to a project that is dependent on other limiting factors being addressed first (sequencing)?	20	See decision support matrix (Table D2.e) for guidance on scoring.
Are there milestones for future check-ins with the UCRTT as the design progresses?	10	30% design = 3 points; 30 & 60% design = 6 points; 30,60,90% = 10 points
Subtotal for biological benefit =	100	
Certainty of Success	Score	Notes
Is the design/feasibility proposal adequate to achieve the stated objectives?	22	See decision support matrix (Table D11) for guidance on scoring.
Will the design/feasibility study produce a product that will be implemented in the next phase (Design or Study Level)?	12	See decision support matrix (Table D12) for guidance on scoring.
Does the cost estimate reflect all expected tasks	32	See decision support matrix (Table D4.c) for guidance on scoring.
Subtotal for Certainty of Success =	66	
Grand Total	166	

Table D11. Certainty of success criteria developed by the Upper Columbia Regional Technical Team for rating Project Design and Feasibility proposals.

Criteria	Sub-question	Score
Project design	Is it a proven technique, or if innovative, does it appear it will work?	0-6
	Is the project properly sited and scaled?	0-8
	What is the likelihood that the projects structural integrity will be maintained over the appropriate timeframe?	0-8
	Project Design Subtotal =	22

Table D12. Certainty of success criteria developed by the Upper Columbia Regional Technical Team for rating Project Design and Feasibility Studies.

Criteria	Level	Sub-question	Score	Notes
Design or Study Level	I (Planning)	Will there be a preferred alternative chosen?	4	Yes= 4; no= 0; partial= 1-3
	II (Permitting)	Will the design be completed to obtain permits?	4	Yes= 4; no= 0; partial= 1-3
	III (Design)	Will the design be final with permits in-hand and ready for construction?	4	Yes= 4; no= 0; partial= 1-3
		Total Score Possible	12	

Schedule: Transition from the original 14 FY07-09 BiOp projects to the new programmatic project will be fully implemented in FY2011. The first cycle, the BPA/NPCC Targeted 6-Step Process, will run annually from October to May - FY2010 to FY2017 and the subsequent Open 6-Step Process will begin in May and run through September.

DELIVERABLE: A prioritized list of actions addressing primary limiting factors from the targeted and open funding cycles.

F5. Work Element 175 – Produce Design and/or Specifications

DESCRIPTION: Surveys (e.g. topographic and fluvial geomorphology) will be needed to develop the project design and specifications. Project design and specifications will be created and submitted to obtain permits.
SCHEDULE: Annual
DELIVERABLES: Designs for specific habitat projects/actions. All work associated with the preparation of engineering or technical drawings, specifications and/or budgets required for the construction/installation of any structure; may include ancillary work such as land surveying, photogrammetric surveys, field surveys, etc.

F6. Work Element 191 - Watershed Coordination (Subbasin)

DESCRIPTION: There is an established and coordinated recovery effort in the Upper Columbia Region; however, BPA's commitment to distribute funds throughout the Upper Columbia Region will further facilitate local coordination and planning. The UCRTT, IT and WAT's are currently increasing coordination efforts across the subbasins. Local WATs in the Wenatchee, Entiat, Methow, and Okanogan subbasins are currently developing MYAPs (3-5 years) focused on the highest biological priorities in their subbasin at a reach scale. These MYAPs will be updated annually using an adaptive management approach to refine the identification of limiting factors based on new information produced from the ongoing TAs/RAs and monitoring efforts.
SCHEDULE: Annual
DELIVERABLES: Coordinate work focused on a local watershed or subbasin. Under this programmatic proposal, watershed coordination will include the four subbasins: Wenatchee, Entiat, Methow, and Okanogan.

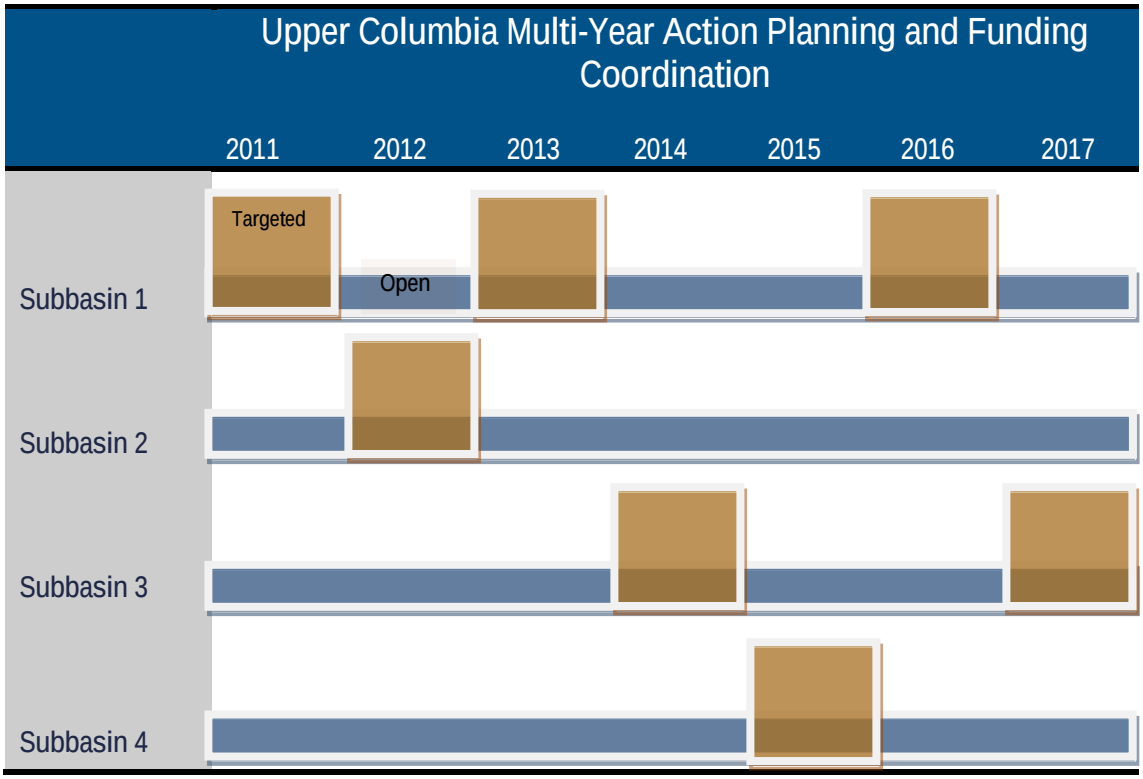
F7. Work Element 189 - Watershed Coordination (Regional)

DESCRIPTION: The improved planning effort and increased partner collaboration described in this programmatic project proposal will address the Upper Columbia Region's long-standing challenges to achieving recovery by increasing the certainty and flexibility of funding to implement the most critical large scale recovery actions. The majority of the BPA/NPCC funds will be allocated to the reach-based or large,

complex projects in the annual Targeted 6-Step solicitation AKA “pulse funds” for big ticket projects. The IT and UCRTT will meet annually to determine how these “pulse funds” will be allocated, based on input from the WATs (MYAPs). A smaller portion (or the remainder) of BPA/NPCC funds will be allocated towards the current Open 6-Step solicitation spread across the subbasins for smaller scale implementation, permitting, and design type projects.

Table F-4. Multi-Year Action Planning and funding coordination.

Open 6-Step Cycle. Spread across the subbasins for smaller scale implementation/permitting/design.
Targeted 6-Step Cycle. Directed toward large scale or reach based actions (Pulse Model).



Funding Coordination to Address Large Scale Projects

This programmatic proposal for dedicated funding will provide a solid financial base to develop opportunities for cost-sharing with other funding partners, in order to facilitate implementation of complex projects that address priority limiting factors in the Upper Columbia Region. Examples of such actions include: the large scale Nason Creek channel reconnection projects in the Wenatchee Subbasin, reach-based IMW efforts in the Entiat and Methow, and large scale side-channel and floodplain reconnection in the Okanogan mainstem and flow restoration within its tributaries. The multi-year planning and action schedules (i.e. MYAP tables) will cover 3-5 years and will be fully vetted by the WATs, IT and UCRTT, thereby providing a high level of assurance to Upper Columbia regional funding partners that large-scale, more complex projects are well coordinated, sequenced, and of high biological priority. One of the primary funding partners is the YN, which has proposed a potential plan to expend approximately $63 million of

Accord money in the Upper Columbia using the established UCSRB process, to the greatest extent possible, to address reach-based limiting factors in areas of high biological priority. The CCT is another prospective funding partner, having secured in excess of $200 million over a 10-year period of Fish Accord funds. Potentially, the CCT is interested in leveraging funds to address projects essential to the recovery of anadromous salmonids. Additionally, the scheduling process will increase coordination with long-standing recovery partners like Reclamation. Reclamation's entire annual FCRPS BiOp tributary habitat budget for 11 FCRPS BiOp subbasins throughout the Pacific Northwest region is about $6 to $7 million; approximately $4 million per year has been allocated to the Upper Columbia Region in recent years.

Reclamation provides technical assistance directly through in-kind services or indirectly by providing financial assistance to local project sponsors who then provide a more limited suite of technical assistance to meet Reclamation and BPA salmon and steelhead survival commitments specified in the 2008 FCRPS BiOp.
SCHEDULE: Annual
DELIVERABLES: Coordination of funding throughout the Upper Columbia Region to address large scale more complex actions with the highest biological benefit.

F8. Explanation for Other Necessary Work Elements

The work elements that will be used as necessary for each project funded through this programmatic project are as follows:

Environmental Compliance Work Element:

165	Produce Environmental Compliance Documentation	Covers any work by the Contractor to assemble, gather, acquire, or prepare documents in support of obtaining environmental compliance from BPA, providing maps, drafting a Biological Assessment, obtaining permits, conducting public involvement activities, completing an archaeological survey, etc.).

Habitat/Passage Operations and Maintenance (O&M) Work Elements:

22	Maintain Vegetation	Activities that include herbicide application, plant competition reduction (scalping, mats), mowing, irrigation, fertilization, prevention or reduction of animal damage (browse repellents, tree tubes).
27	Remove Debris	Removal of items such as trash, old buildings, and abandoned equipment from water or land. Does not include removal of a diversion or instream structure.
186	Operate and Maintain Habitat/Passage/Structure	Operation and maintenance of habitat features including, but not limited to, fences, instream structures, passage facilities, sediment control structures, and off-site water developments.

Instream Passage Improvement Work Elements:

69	Install Fish Screen	Work to install or replace a fish screen associated with a diversion or pump.
80	Install Siphon	Covers work that installs a siphon, flume or other structure to

		separate canal flow from stream flow where the two have been intermingled as part of past irrigation development, resulting in fish using the natural stream course for passage and rearing.
84	Remove/Install Diversion	Work that removes, replaces, or avoids creating a fish passage barrier associated with a stream diversion, including push-up dams.
85	Remove/Breach Dam	Work that facilitates fish passage over a natural (e.g., beaver) or human-made dam by breaching or removal.
184	Install Fish Passage Structure	Install, replace or modify structures when the intent is to improve fish passage and/or flow, typically by removing or modifying a full or partial instream barrier. Includes the following types of structures: fish ladders, bridges, culverts, jump pools, and weirs. Where anadromous fish are present, structure must meet current NOAA specifications and USFWS specifications for bull trout and USFWS recommendations for lamprey.

Habitat Improvement Work Elements:

29	Increase Instream Habitat Complexity and Stabilization	Work that adds natural materials instream to create habitat features or to improve channel morphology. Includes J-hooks, barbs, vortex weirs, and large woody debris (LWD). Can include work to stabilize or maintain a streambank, such as riprap.
30	Realign, Connect, and/or Create Channel	Active attempts to directly add sinuosity, meanders, side channels, and/or off-channel habitats (e.g., sloughs or oxbows). May include reconnection of historical channels (either via excavation or diversion of existing streamflow), excavation of new channels, and/or significantly improving the functionality of existing channels.
33	Decommission Road / Relocate Road	Any activity that makes a road or trail unusable including adding berms, pits, boulders or logs, and/or ripping or obliterating the road or trail with heavy equipment that may involve re-contouring the slope.
40	Install Fence	Work to install various types of fence and/or gates. Can also include cattle guards or water gaps for livestock.
47	Plant Vegetation	Install terrestrial or aquatic plants for purposes such as cover, erosion control, roughness recruitment, shading, restoring native habitat, forage enhancement, road removal, or run-off reduction. May be riparian or upland and includes seeding.
53	Remove Vegetation	Removal, mechanical, biological, or chemical, of one or more plant species or a number of individuals of a plant species. Often are exotic or non-native plants, naturalized plants, or undesirable native plants, all of which may be considered to be noxious, invasive or "weeds". Includes the removal of both aquatic and terrestrial plants. Includes tree stand manipulation in order to create forage openings.
55	Upland Erosion and Sedimentation Control	May include the installation of water bars, gully plugs and culvert outlets, grassed waterways, grade stabilization structures, sediment catchment ponds/basins, and removal of drainage pipes and other blockages to specifically prevent a sediment slump or landslide.
180	Enhance	Refers to the removal, breaching, or alteration/set-back of a dike

	Floodplain/Remove, Modify, Breach Dike	to restore riparian/floodplain or wetland habitat.
181	Create, Restore, and/or Enhance Wetland	Refers to the creation, restoration, or enhancement of a wetland area or function.
190	Remove, Exclude, and/or Relocate Animals	Removal or relocation of non-native or undesirable fish and wildlife species and/or any actions employed to exclude non-native or undesirable fish and wildlife species from a particular area.

Land Acquisitions and Conservation Easements Work Elements:

172	Conduct Pre-Acquisition Activities	Note: Actual acquisition activities and costs are handled by BPA, not by a project's proponent/contractor.

Planning and Coordination Work Elements:

114	Identify & Select Projects	See above.
115	Produce Inventory or Assessment	Covers inventories and assessments specifically designed to support future implementation actions. Can include passage inventories, habitat condition inventories, or watershed assessments.
119	Manage & Administer Projects	Covers the administrative and technical work by the contractor to fulfill BPA's programmatic and contractual requirements such as financial reporting (accruals), and development of an Scope Of Work (SOW) package (includes SOW, budget, property inventory).
122	Provide Technical Review	The review of technical details, including but not limited to engineering plans, restoration plans, project selection, RM&E methods, and deliverable approval.
175	Produce Design and/or Specifications	Covers all work associated with the preparation of engineering or technical drawings, specifications and/or budgets required for the construction/installation of any structure. May include ancillary work such as land surveying, photogrammetric surveys, field surveys, etc.
189	Regional Coordination	Refers to coordination work that covers a large portion of the Columbia River Basin. Coordination which directly supports other project work.
191	Watershed Coordination	Refers to coordination work focused on a local watershed or subbasin.

Reporting Work Element:

185	Produce Pisces Status Report	Covers the reporting of status of milestones, reporting of implementation metrics, and deliverables in each contract. These milestone status reports shall be completed quarterly.

F9. Work Element 157 Collect/Generate/Validate Field and Lab Data

Research, Monitoring and Evaluation (RM&E) and Data Management Work Elements:

Description: This WE would be used for this project primarily if preferred and alternative projects for collecting monitoring data were not funded and functional, therefore requiring this project to fund and implement its own basic Level 1monitoring effort (see Section G, below, Monitoring and Evaluation. Information collected for Implementation/Compliance would be compiled into annual reports, and we do not consider it to be data collection in the context of this WE.
DELIVERABLES: Sets of monitoring data for Level 1 effectiveness monitoring maintained in databases by the UCSRB Data Steward.

F10. WE 132 Produce Annual Progress Report

Description: Reports will include all data necessary to address the performance standards.
Introduction:

- A brief discussion of the objectives and success criteria;
- A section summarizing the organizations involved in the implementation activities and their background/significance to the Upper Columbia Region;
- An overview of all significant activities for each year;
- A general discussion of expenditures (Administration, implementation, and monitoring); and
- A section describing or summarizing regional coordination of activities.

Action Specific:

- A brief description of all actions;
- A discussion of the vegetation, hydrology, and in-water habitat conditions as they relate to corresponding success criteria;
- A presentation of any monitoring data collected on each individual action which was directly funded under this project; and
- A chronological photographic summary and comparison of photographs from established photo points.

Discussion/ Conclusions:

- A discussion of problems, lessons learned, recommendations, and contingency measures taken; and
- A summary and conclusions section.

Each report will focus on the accomplishments of the overall project, progress of each individual action, and any data collection funded by the project for the contract year. Reports will be submitted annually.

SCHEDULE: Annual
DELIVERABLES: A written report of results submitted to BPA at the end of a contract period. Produce Non-technical progress report for all actions completed under this project.

G / Monitoring and Evaluation

Habitat protection and restoration efforts implemented under this project will be monitored and evaluated in several ways, at multiple levels. Doing so requires the use of information produced in a rich and dynamic landscape of RM&E frameworks, strategies, programs, and projects. Many of the existing monitoring programs exist independent of salmon recovery and habitat restoration, and were designed to meet many different program specific objectives (See Rogers 2009 for a description of some of those projects). Fortunately, the Upper Columbia Region has a number of guidance documents that help to bring together the different Upper Columbia monitoring programs in a way that they are useful for the evaluation and planning of salmon recovery and habitat restoration efforts. As our understanding of specific needs in the Upper Columbia increases, these monitoring guidance documents updated and expanded.

While all of the monitoring conducted in the Upper Columbia is important to long-term salmon recovery efforts, of particular importance to the successful implementation of this proposed habitat programmatic are 1) implementation monitoring efforts, which track progress made in protecting habitat and addressing limiting factors, and 2) effectiveness monitoring efforts, which seek to measure the ability of habitat actions to restore natural processes and to improve the abundance and productivity of salmon and steelhead populations. A detailed summary of monitoring planning and efforts in the Upper Columbia can be found in Appendix F, but a brief description of Upper Columbia implementation and effectiveness monitoring is given below. *No new monitoring is being proposed as part of this habitat programmatic.*

G.1 Implementation Monitoring

Implementation and compliance monitoring is conducted at the action level, and is responsible for documenting details of actions that are necessary to track progress that has been made in protecting key habitats, and addressing primary habitat "limiting factors," measure the magnitude and quality of modifications made to salmon habitat, determine whether the actions were implemented correctly, and ensure compliance to the requirements of permits and applicable regulations. Another important role of implementation monitoring is providing near-term feedback on whether actions and their designs continue to function, and adequately stand the tests of time, nature, and human effects. Implementation monitoring is based on design plans and/or action proposals, and relies primarily on visual inspection, photo monitoring, and field notes (Hillman 2005).

Action sponsors currently provide on-site inspectors during construction, and coordinate any on-the-ground deviations with permitting agencies, and require as-built drawings upon completion. Action sponsors also record information in Pisces and the Habitat Work Schedule (http://uc.ekosystem.us) related to action-specific reporting requirements, including project descriptions and location, budget, and planned and actual metrics.

Detailed post-implementation-type information is also collected by independent monitoring programs run by Reclamation and the SRFB. The UCSRB is working with the BPA, Reclamation, and the SRFB to standardize metrics that are collected, to ensure that all salmon recovery actions in the Upper Columbia receive appropriate post-implementation monitoring, and to provide third-party verification of metrics

entered by project sponsors into Pisces. For more information about ongoing and new efforts related to action implementation monitoring in the Upper Columbia, please see Appendix F.

G.2 Effectiveness Monitoring

Effectiveness monitoring in the Upper Columbia is conducted by three programs: 1) ISEMP in the Entiat Sub-basin, 2)Reclamation in the M2 reach of the Middle Methow River, and 2) Tetra Tech for the SRFB Reach-scale Effectiveness Monitoring Program across all of Washington State, with 10 sites currently in the Upper Columbia. Statistical designs and monitoring methods adopted by these three programs are publically available, and have been reviewed by various bodies, including the ISRP, the Pacific Northwest Aquatic Monitoring Partnership and its Effectiveness Monitoring Workshop, and the Washington State Monitoring Forum. The UCSRB relies on these three programs for reports on the effectiveness of project types. As the result of draft recommendations from UCRTT deliberations related to the January 2010 Upper Columbia UCRTT Analysis Workshop, the UCSRB is working with the BPA and Tetra Tech EC to increase the number of sites monitored in the Upper Columbia as part of the SRFB Reach-scale Effectiveness Monitoring Program. Please see Appendix F for more information about effectiveness monitoring efforts in the Upper Columbia.

H / Facilities and Equipment

The UCSRB and staff maintain two fully equipped offices, a main office in Wenatchee, Washington and a field office in Twisp, Washington. Both offices are outfitted with state of the art technology including: high speed internet, network computers and printers, office space for staff members and the capacity to facilitate meetings. The UCSRB also maintains one GSA truck.

- Upper Columbia Salmon Recovery Board Main Office: 11 Spokane Street, Wenatchee, WA 98801
- Twisp Field Office: 206 Glover Street, Twisp, WA 98856

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J / Key Personnel

UCSRB Organization Staff

JULIE MORGAN, MS, EXECUTIVE DIRECTOR

Ms. Morgan assists the UCSRB in guiding the development and implementation of a wide variety of initiatives, programs and policies to accomplish the agency's mission and responsibilities. She has a Master of Science in Resource Management from Central Washington University. Her responsibilities include the full range of managerial functions, including managing financial, personnel, and facility needs. This includes overseeing the development and execution of activities of the committees designated by the UCSRB such as the Upper Columbia Implementation Team, Staff Work Group, and the UCRTT. She will lead all work efforts under this habitat programmatic project as they relate to the Board and other elected or agency officials.

DEREK VAN MARTER, MPA, ASSOCIATE DIRECTOR

Mr. Van Marter will be the project manager for the BPA non-accord habitat programmatic project in the Upper Columbia. Derek received his Bachelor of Science in public affairs/natural resource management from Indiana University, and his Master of Public Administration from the University of Washington. He will continue to provide regional coordination of the BPA/NPCC and SRFB/ Trib Committee funding processes in the Upper Columbia Region. Mr. Van Marter is the key contact for the WATs in each of the Upper Columbia subbasins, and is facilitating development of the Multi-Year Action Plans. In addition, Derek is the regional Upper Columbia Implementation Team Leader for the Recovery Plan, including coordination of the updates to the implementation schedule, adaptive management of the plan, implementation reporting, and facilitation of the Upper Columbia Implementation Team.

JAMES WHITE, BA & MS (CANDIDATE) DATA STEWARD

James White is the Data Steward for the UCSRB. James has a Bachelor of Arts in Geography and is a Candidate for a Master of Science in Resource Management from Central Washington University. James provides technical guidance and assistance to cooperating data generators in the Upper Columbia Region, including database and data software training, troubleshooting and support, assistance in documenting monitoring protocols, and coordination of data submissions to the Status, Trend and

Effectiveness Monitoring (STEM) databank. James' additional work includes participation in efforts to coordinate monitoring and evaluation activities across the Upper Columbia Region.

CASEY BALDWIN, MS, REGIONAL TECHNICAL TEAM CHAIR (SUBCONTRACT WITH WDFW)

Mr. Baldwin manages, coordinates, and administers the work of the UCRTT and facilitates monthly meetings. Mr. Baldwin has a Masters Degree in Fisheries from Utah State University and 12 years of experience working as a Fish Biologist and Research Scientist for the Washington Department of Fish and Wildlife. He was a contributing author and led the EDT modeling effort for several subbasins for the NPCC Subbasin Plans (2004) and the Recovery Plan (2007) as well as serving on the ICTRT. Currently, half of his time is dedicated to duties as Chairperson of the UCRTT. He will work closely with Derek Van Marter to coordinate the work of the UCRTT and its subcommittees to align the UCRTT's technical review priorities with those of the BPA/NPCC. Mr. Baldwin will facilitate the technical forum to review the habitat actions funded by this programmatic, which will include: 1) review the subbasin WAT's MYAPs, 2) technical evaluations of specific project actions during the Targeted and Open 6-Step Processes, and 3) develop, guide, and coordinate salmonid monitoring plans when necessary.

UCSRB Decentralized Staff Work Group

Lee Carlson, Confederated Tribes and Bands of the Yakama Nation
Chris Fisher, Confederated Tribes of the Colville Reservation
Chuck Jones, Alliance Consulting Group, Inc., for Douglas County
Mike Kaputa, Chelan County
Mike Rickel, Cascadia Conservation District
Char Schumacher, Okanogan County

UCSRB Planning and Implementation Groups

See Appendix A

UCSRB Partners and Project Sponsors

http://uc.ekosystem.us/?p=Page_84cf1201-edec-4aee-bdc3-c208ab8c7513

APPENDIX A

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Upper Columbia Adaptive Management Framework

&

Planning and Implementation Groups

The Habitat Adaptive Management Framework

The Habitat Adaptive Management Framework for the Upper Columbia Spring Chinook Salmon and Steelhead as described below came out of Draft Appendix Q of the Recovery Plan (Hillman et al. 2008).

The Upper Columbia Salmon Recovery Board (UCSRB) intends to guide implementation of the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (Recovery Plan; UCSRB 2007) with an adaptive management process as suggested by the National Marine Fisheries Service adaptive management guidance document (NOAA 2006). Adaptive management uses the scientific method "learning by doing," and then adapting accordingly, and can be an extremely useful tool for moving toward recovery when uncertainty exists regarding the threats to the species, the species' life history, or the effectiveness of various management actions (NOAA 2006). See Adaptive Management Schematic on page 53.

The primary purpose of this adaptive management framework is to facilitate meeting the Recovery Plan's goal to restore viable and sustainable populations of naturally producing salmon, steelhead, and bull trout in the Upper Columbia Basin. Adaptive management must be incorporated into the recovery plan because an exact protocol for achieving species recovery would become outdated as soon as projects are implemented because habitat actions will result in ecosystem changes and new information and project opportunities will arise over time.

The overall goal of Upper Columbia adaptive management is to:

> *Create a program that will enable the Upper Columbia region to learn from the results of salmon, steelhead, and bull trout recovery activities and to create a structure that will adjust decisions accordingly to ensure that Evolutionary Significant Units/Distinct Population Segments (ESU/DPS) and population-based recovery goals are met efficiently and effectively (UCSRB 2007)*

This adaptive management framework has the following objectives:

- Create an adaptive, decision-making structure with benchmarks and timelines.
- Support the salmon, steelhead, and bull trout delisting framework outlined in the Recovery Plan (Section 4) by providing data on Viable Salmonid Population (VSP) parameters and the status of listing factors.
- Design and implement monitoring, research, and evaluation that test the critical uncertainties associated with recovery objectives, strategies, and actions.

To develop an adaptive management structure that will achieve the goals and objectives identified above, the UCSRB adopted a four-step approach, based on the Ecosystem Management Initiative developed at the University of Michigan (http://www.snre.umich.edu/ecomgt/). The approach cycles through the following four questions:

1. What are you trying to achieve?
2. How will you know you are making progress?
3. How will you get the information you need?
4. How will you use the information in decision-making?

The framework for answering these questions is represented in the following diagram. As demonstrated in this schematic, there are numerous entities involved in the evaluation process for incorporating adaptive

management into salmonid recovery. Thus, the coordination among the UCSRB, public, WAT's, UCRTT, IT, lead entities, project sponsors, WDFW, U.S. Fish and Wildlife Service (USFWS), tribes, and NOAA will be a necessary part of the feedback loop for effective adaptive management.

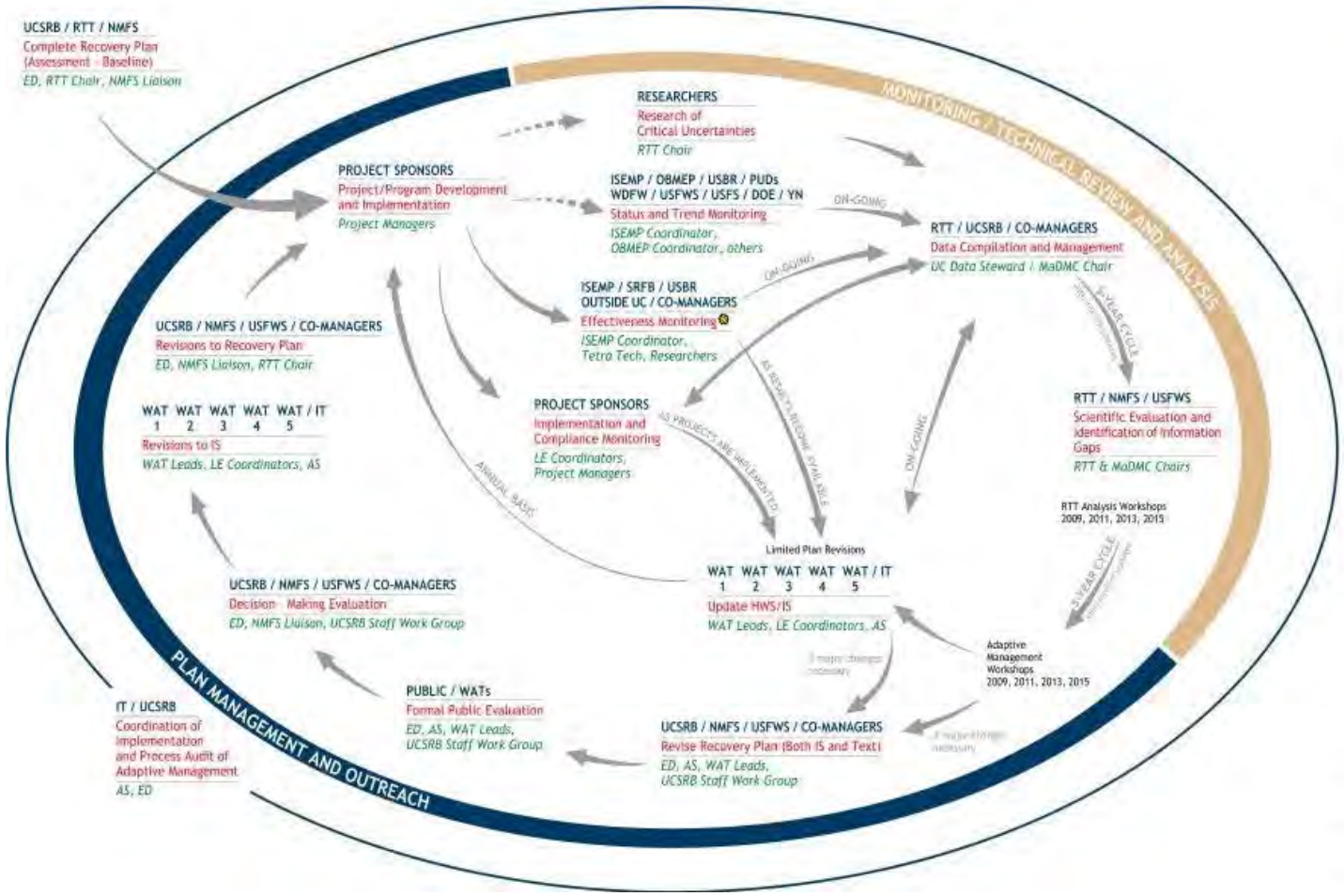
The Recovery Plan also outlines the key elements of a monitoring program that measures the success and progress of the following items:

- Implementation monitoring
- Effectiveness monitoring
- Monitoring the status and population trends for spring Chinook and steelhead
- Monitoring the changes in habitat conditions
- Research on uncertainties, habitat, and ecological interactions

The data collected from monitoring efforts will be managed through a regional database manager and all data will need to be compiled into reports. Results should be communicated to stakeholders through workshops and public meetings. Once the monitoring data has been compiled into reports and adequately vetted, then the monitoring results will be evaluated and adjustments will be made to the implementation schedule and recovery plan, as needed.

HABITAT ADAPTIVE MANAGEMENT FRAMEWORK

- FOR UPPER COLUMBIA SALMON RECOVERY -



LEGEND

- Responsible Entities
- Activity
- Facilitator/Coordinator
- From outside UC as well

The WATs of the Upper Columbia:

Wenatchee Subbasin
Wenatchee Habitat Subcommittee of the Wenatchee Watershed Planning Unit (WWPU)

Entiat Subbasin
Entiat Habitat Subcommittee of the Entiat Watershed Planning Unit (EWPU)

Methow Subbasin
Methow Restoration Council (MRC)

Okanogan Subbasin
Okanogan Restoration Council (ORC)

Douglas County Watersheds
Douglas County Watershed Planning Unit (DCWPU)

Acronyms

AS	Associate Director
DOE	Department of Ecology
ED	Executive Director
HWS	Habitat Work Schedule
IS	Implementation Schedule
ISEMP	Integrated Status and Effectiveness Monitoring Program
IT	Implementation Team
LE	Lead Entity
MaDMC	Monitoring and Data Management Committee
NMFS	National Marine Fisheries Service
OBMEP	Okanogan Basin Monitoring and Evaluation Program
PUD	Public Utility District
RTT	Regional Technical Team
SRFB	Salmon Recovery Funding Board
TRT	Technical Review Team
UCSRB	Upper Columbia Salmon Recovery Board
USBR	United States Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WAT	Watershed Action Team
WDFW	Washington Department of Fish and Wildlife
YN	Yakama Nation

Upper Columbia Planning and Implementation Groups

The Recovery Plan recommends an implementation strategy for recovery of viable salmonid populations (VSP). Specific actions in the Implementation Schedule are listed for each subbasin in Appendix M1 and M2 of the Recovery Plan and further refined in the "UCRTT Priorities for Reaches and Actions for Implementing Habitat Actions" (Appendix A, UCRTT 2009). This strategy will take several years to implement and require cooperation from numerous organizations and individuals. The groups charged with the implementation of the Recovery Plan are the UCSRB, Upper Columbia Implementation Team, UCRTT, and the WATs.

THE UPPER COLUMBIA SALMON RECOVERY BOARD (UCSRB)

The UCSRB is a partnership between Chelan, Douglas, and Okanogan counties, the Yakama Nation, and Colville Confederated Tribes working in cooperation with local, state, and federal partners. This group works to restore viable and sustainable populations of salmon, steelhead and other aquatic species at risk in the Upper Columbia Region.

UPPER COLUMBIA SALMON RECOVERY IMPLEMENTATION TEAM

The IT was convened to facilitate implementation of the Recovery Plan in a coordinated manner across the entire ESU/DPS under direction from the UCSRB and is facilitated by UCSRB staff. The formation of the IT addresses the federal guidelines that measure recovery at an ESU scale rather than in one specific subbasin. The IT is comprised of representatives from a broad spectrum in the recovery of Upper Columbia salmonids including: State Lead Entity representatives from all three Counties, State and Federal agencies, Tribes, mid-Columbia Public Utility Districts, WAT's, and local stakeholders.

UPPER COLUMBIA REGIONAL TECHNICAL TEAM (UCRTT)

The UCRTT was formed by the UCSRB to complete the following objectives: 1) recommend region-wide approaches to protect and restore salmonid habitat, 2) develop and evaluate salmonid recovery projects within the Upper Columbia Region as appropriate, and 3) develop and guide salmonid recovery monitoring plans as appropriate (UCRTT 2009). A critical function of the UCRTT is habitat project review for the Upper Columbia SRFB and HCP Tributary Committee project solicitation and funding process. The UCRTT has developed the scientific foundation for this process to identify projects that will best address priority limiting factors and contribute to the recovery of salmonids listed under the ESA as well as unlisted native salmonids.

THE WATERSHED ACTION TEAMS (WATS)

There are five WATs working within the Upper Columbia whose role in the Recovery Plan is to assist in updating the Recovery Plan's implementation schedule of actions, to ensure a coordinated and sequenced implementation of recovery actions in their respective watershed, and to engage in the adaptive management framework outlined in the Recovery Plan and this adaptive management framework. Each WAT has a lead person responsible for helping to ensure coordination with the Upper Columbia Implementation Team and the UCSRB. The five WATs are:

1. Wenatchee Subbasin: Habitat Subcommittee of the Wenatchee Watershed Planning Unit.
2. Entiat Subbasin: Habitat Subcommittee of the Entiat Watershed Planning Unit.
3. Methow Subbasin: Methow Restoration Council.
4. Okanogan Subbasin: Okanogan Restoration Council.

5. Douglas County Watersheds: Foster Creek-Moses Coulee Watershed Planning Unit.

PROJECT SPONSORS

Project Sponsors are the main point of contact for information regarding on-the-ground implementation details. Project Sponsors work with the Lead Entities, WATs, and the Upper Columbia Implementation Team to identify future projects, sequence the biological priorities of those projects, update the Implementation Schedule, pursue funding from various sources, and implement funded projects. Project Sponsors are typically individuals, public or private groups, e.g., a Regional Fisheries Enhancement Group, city, county, tribe, state agency, or community groups, and non-government organizations or private parties.

CO-MANAGERS

In the Upper Columbia Region, the "Co-Managers" of salmonids include the Washington Department of Fish And Wildlife, Colville Confederated Tribes, Yakama Nation, NOAA Fisheries, and the U.S. Fish and Wildlife Service. Co-management is a term used to describe the government-to-government relationship between the state of Washington and Indian tribes whose fishing rights were established by the federal government in treaties or by Executive Order. The term is generally used to describe the state-tribal management of anadromous salmonids in the Northwest.

Non-Accord Programmatic Project Planning

PROJECT AND FUNDING COORDINATION WORK GROUP

A "Project and Funding Coordination Work Group" was established to outline the details for the BPA project solicitation and the project selection process to meet the needs of the FCRPS BiOp and Recovery Plan priorities for salmon recovery in the Upper Columbia Region. The working group included members from the UCSRB staff, UCRTT, WATs, local project sponsors, and BPA. This working group held a series of facilitated workshops in November and December 2009 and developed the following recommendations for inclusion in this programmatic approach:

1. Project solicitation and funding approach should be consistent with the regional Tribes' signed Accords and the BiOp timeline.
2. The programmatic funding approach is consistent with the UCSRB's existing project and funding coordination effort.
3. Multi-year Action Plans (3-5 Year) derived from Recovery Plan Implementation Schedule/UCRTT biological Strategy and Priorities need to be developed that are focused on the highest reach scale biological priorities in each subbasin.
4. Design the funding process as an annual targeted solicitation (meaning the priority watersheds, stream reaches, and types of action projects are pre-defined).

APPENDIX B

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UCRTT Priority Reaches and Actions

Memorandum

UCRTT
UPPER COLUMBIA REGIONAL TECHNICAL TEAM

To: UCSRB, WATs, other interested parties
From: Casey Baldwin, UCRTT Chair (509-664-3148 casey.baldwin@dfw.wa.gov)
Date: 17 February 2009
Subject: UCRTT priority reaches and actions

Dear Interested Party,

This memo is to accompany and explain the spreadsheet embedded below that the Upper Columbia Regional Technical Team (UCRTT) has created to fulfill a request made by the staff of the Upper Columbia Salmon Recovery Board (UCSRB). The UCRTT was asked to recommend the most biologically important reaches and actions (see Upper Columbia Funding Coordination memo 1/16/2009). The UCRTT Biological Strategy (2008) includes an assessment of the all the actions and/or action types identified in the Salmon Recovery Plan (UCSRB 2007); however, the Implementation Schedules have been updated since the completion of the Recovery Plan. Additionally, a shorter more concise format, including more specific prioritization within the subbasins, was desired for this exercise.

The spreadsheet tables accompanying this memo do not provide a complete picture of threats and limiting factors that the action types and specific actions are intended to address. The background information for why particular reaches and actions are important can be found in appendix G of the Salmon Recovery Plan (UCSRB 2007), UCRTT Biological Strategy (UCRTT 2008), RECLAMATION Tributary and Reach Assessments, the Detailed Implementation Plan for the Entiat Water Resource Inventory Area (WRIA) 46, and other documents.

The UCRTT's objective was to create a concise product that would help to guide the WATs in their task of updating the implementation schedules and developing a mid-range work plan. Priority levels for this exercise were determined based on the professional judgment of the UCRTT. It was our intention to be consistent with the general approach outlined in the UCRTT Biological Strategy, but to provide more specific guidance to the WATs. Many other actions and reaches have been identified for habitat improvements and we recognize that those actions could also make important contributions to recovery. However, we believe that the habitat related actions outlined here are the highest priority for maintaining, and contributing to the restoration of the viability of listed salmonid populations in the Upper Columbia Region.

A subset of UCRTT members will be at the February through May WAT meetings to help explain the priorities and work with the WATs on updating the Implementation Schedules.

Respectfully,
Casey Baldwin

UCRTT Chairperson

UCRTT Priority Reaches and Actions

Click here to open the UCRTT Biological Strategy Priority Reaches and Actions Spreadsheet (UCRTT 2009)

APPENDIX C

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History of Past and Ongoing Projects in the Upper Columbia Region

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
Wenatchee Subbasin				
2007-086-00	UPA Wenatchee Subbasin Riparian Enhancement Proposal	• Riparian Enhancement • Water Quality – Improved Temperature • Water Quality – Sediment Reduction	• 0.66 miles of vegetation improved • 2.60 acres improved	• Photo Reference Points • Vegetation Measures
2007-325-00	UPA Wenatchee Subbasin Complexity Proposal	• Instream Habitat Diversity • Channel Complexity • Riparian Condition	• 0.10 miles of improved complexity • 0.20 acres improved	• Water Quality Data and Flow Measurements • Cross Sections and Channel Profile • Fish Population/eshock /snorkeling on some sites • Vegetation Monitoring • Photo Reference Points
2007-400-00	UPA Wenatchee Subbasin Access Programmatic (Wenatchee Access)	• Fish Passage • Instream Habitat Diversity • Riparian Condition • Streambank Stability • Water Quality - Sediment Reduction	5.4 miles of habitat accessed	• Photo Reference Points • Vegetation Monitoring • Fish Population • Fish spawning/rearing data collection through ISEMP
SRFB/08-1962	Chumstick/North Road Culvert Bridge Replacement	• Fish Passage • Instream Habitat Diversity • Riparian Condition • Streambank Stability • Water Quality - Sediment Reduction	5.4 miles of habitat accessed	• Photo Reference Points • Vegetation Monitoring • Fish Population • Fish spawning/rearing data collection
Multiple/provided upon request	The Upper Wenatchee Passage Program	• Fish Passage • Instream Habitat Diversity • Riparian Condition • Streambank Stability • Water Quality – • Sediment Reduction	9.7 miles of habitat accessed	• Photo Reference Points • Vegetation Monitoring • Fish spawning/rearing data collection on some streams through ISEMP
SRFB 08-1779	Cashmere Pond Off-Channel Habitat Project	• Instream Habitat Diversity • Channel complexity • Riparian Condition	• 0.32 miles of habitat accessed • 2.25 acres improved	• Photo Reference Points • Vegetation Monitoring • Fish spawning/rearing data collection planned
07-1865R	Peshastin Creek Irrigation District Pipeline	• Fish Passage • Instream Habitat Diversity	Over 26 miles of habitat accessed	• Photo Reference Points • Fish Population • Fish spawning/rearing data collection through ISEMP and State spawning surveys

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
Entiat Subbasin				
2007-055-00	Entiat River - UPA - Lower Entiat River Off-Channel Restoration Project	• Off-channel rearing habitat conditions • Flood plain re-connection • Remove fish passage barrier • Improve substrate by placing spawning gravel in channel • Increase canopy and riparian area in disturbed area	Planned: • 0.28 miles of Increased Stream Habitat Complexity • 0.10 miles of habitat accessed • 1 Fish Barrier/Passage Removed • 6 Large Woody Debris Structures	• Photo Reference Points • Vegetation Monitoring • Fish Population/ISEMP • Fish spawning/rearing data collection through ISEMP
2007-231-00	Cement Program	• Riparian Condition • Streambank Stability • Water Quality - Sediment Reduction • Water Quality - Temperature Improvement	• 5.0 miles of riparian fencing • 15 acres improved • 4.4 miles of vegetation improved • 1.0 acre of slope stabilization	• Photo Reference Points • Vegetation Monitoring • Fish Population/ISEMP • Fish spawning/rearing data collection through ISEMP
2007-318-00	Entiat River - UPA - Knapp-Wham Hanan Detwiler Irrigation System Consolidation Project	• Instream flow • Channel complexity • Instream habitat diversity • Water Quality - Temperature Improvement	• 187 acre-feet/year of water screened • 3.0 cubic-feet per second (cfs) of water flow screened • 1,446 acre-feet/year of water conserved • 2.0 cfs of water flow conserved 5.8 miles of primary stream reach improved • 5.8 miles of total stream reach improved	• Fish habitat • Fish habitat utilization • Productivity of salmonid fishes
07-1761	Harrison Side Channel Project	• Instream Habitat Diversity • Channel complexity	• 0.26 miles of opened complexity	• Photo Reference Points • Vegetation Monitoring • Fish Population/ISEMP • Fish spawning/rearing data collection through ISEMP
00-1167	Jon Small Off-Channel Habitat	• Instream Habitat Diversity • Channel complexity	• 0.4 miles of complexity	• Photo Reference Points • Vegetation Monitoring • Fish Population/ISEMP • Fish spawning/rearing data collection through ISEMP
04-1503	Bridge to Bridge Phase 1 and 2	• Instream Habitat Diversity	• Restore 1000 contiguous ft. of riparian	• Photo Reference Points

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
		• Channel Complexity • Water Quality/ Temperature Improvements	vegetation to improve bank temperatures, bank condition, cover, nutrient inputs • enhance juvenile off-channel rearing habitat via rock/LWD placement in ~ 700 ft. irrigation ditch • install 2 instream structures to direct flow to the off-channel habitat and restore resting pools in the lowest portion of the reach	• Fish Population\ISEMP • Fish spawning/rearing data collection through ISEMP

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
Methow Subbasin				
2007-035-00	UPA Project - Methow Basin Riparian Enhancement	• Riparian Enhancement • Water Quality - Sediment Reduction • Water Quality - Temperature Improvement	• 5.15 miles of fence installed • 5.81 miles of vegetation improved • 31.8 acres improved	• Photo Reference Points • Vegetation Measures
2007-172-00	UPA Project - MVID West Canal Diversion and Headworks	• Fish Passage • Instream flow	PLANNED: • 138 miles of habitat accessed	• Photo Reference Points • In Channel Habitat
2007-214-00	UPA Project - Fender Mill Floodplain Restoration -	• Channel complexity • Water Quality - Sediment Reduction • Water Quality - Temperature Improvement	• 0.68 miles of stream with improved complexity • 0.45 miles of vegetation improved • 0.50 acres improved	• Photo Reference Points • flows • In Channel Habitat • Fish Population
2007-237-00	UPA Project – Elbow Coulee Floodplain Restoration	• Channel complexity • Water Quality – Sediment Reduction • Water Quality – Temperature Improvement	• 0.50 miles of stream with improved complexity • 0.20 miles of vegetation improved • 0.50 acres improved • 1 in-stream structure installed; boulder	• Photo Reference Points • In Channel Habitat • Fish Population • Redd Surveys • River Morphology Surveys • Flow monitoring • Temperate monitoring
2007-251-00	UPA Project –	• Fish Passage	PLANNED: • 4 screens installed	• Photo Reference Points • Fish Passage

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
	Methow Valley Irrigation District East Diversion Dam Replacement			• Redd Surveys • River Morphology Surveys
00-1681	Beaver Creek	• Fish Passage • Instream Habitat Diversity	7 miles of habitat accessed	• Photo Reference Points • Fish Population • Fish spawning/rearing data collection through USGS
HCP Trib	Heath Floodplain Restoration	• Fish Passage	• 0.88 miles of off-channel habitat accessed (8.02 acres of pond habitat)	• Photo Reference Points • Fish Population

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
Methow Subbasin				
Funders: SRFB/BPA (2005-007-00)/Douglas CO PUD/Grant CO PUD/UCRFEG/WDFW/Fulton Ditch Company	Fulton Dam Renovation	• Fish Passage • Instream Habitat Diversity	30 miles of habitat accessed	• Photo Reference Points • Fish Population • Fish spawning/rearing • data collection • Passage
Funders: Reclamation / BPA and NFWF facilitated by WWP-TU (formerly WRC)	Chewuch Canal Forbearance	Instream Flow	12-15 cfs returned annually to the Chewuch River during low flows	• None
BPA (project sponsor and funder)	MVID East Fish Screen Replacement	Screening	Installed WDFW and NOAA compliant fish screens at one of the major irrigation diversions on the Methow River	• None
BPA (project sponsor and funder)	MVID West Fish Screen Replacement	Screening	Installed WDFW and NOAA compliant fish screens at one of the major irrigation diversions on the Twisp River	• None

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
04-1489 Other Funders: BPA/Douglas CO PUD	Chewuch Dam Renovation	• Fish Passage • Instream Habitat Diversity	24 miles of habitat accessed	• Photo Reference Points • Fish Population • Fish spawning/rearing data collection • Passage
2005-010-00	Macpherson Side Channel	Floodplain function/channel complexity	Created 0.25 mile off-channel habitat	• Photo Reference Points • Fish Population • Fish spawning/rearing data collection • Temperature monitoring • Flow monitoring • Instream habitat monitoring
Funder: Reclamation	Chewuch Dam Adaptive	• Fish Passage • Boater Safety	Ensured continuing function of fish passage channel; addressed boater safety issue created by previous dam modification	• Photo Reference Points • Fish Population • Fish spawning/rearing data collection
	Tier 1, Level 1 land protection (through CEs)		For the years 2007-2009, we completed the following areas and amounts: • Acreage Riverfront/Miles Riparian • Chewuch 0.36/ 11.3 • Mid-Methow 1.29/141.5 • Upper Methow 2.24/135.8 • Twisp .93/28.3	

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
Okanogan Subbasin				
1996-042-00	Salmon Creek-Restore and Enhance Anadromous Fish Populations and	• Instream flow • Fish Passage • Instream Habitat Diversity • Riparian Condition	11 miles of habitat accessed	• Photo Reference Points • Fish Population • Fish spawning/rearing data • collection through OCMEP

PROJECT #	PROJECT TITLE	PRIMARY LIMITING FACTOR	METRICS	MONITORING
	Habitat			
2007-034-00	Columbia Cascade Pump Screen Correction	• Fish screening	Planned 34.0 cfs of water flow screened	

Explanation for acquiring metrics:
Metric numbers were derived from the Pisces Report Center and extracted from reports which summarize project data in Pisces and obtained from project sponsors by personal communication.

APPENDIX D

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Upper Columbia Project Selection Process

Process for the Identification of Habitat Actions

A five-step planning process is used to identify limiting factors and determine habitat actions necessary to recover and maintain a Viable Salmonid Population (VSP) for spring Chinook and Steelhead in the Upper Columbia Region.

1. SPECIES STATUS – Priority species were based on ESA listings and their population status (abundance, productivity, spatial structure, and diversity).
2. DETERMINING LIMITING FACTORS – Past and present threats were determined using empirical information when available, or in cases where empirical information was lacking, preliminary analysis, local knowledge or professional judgment and modeling were used to identify threats (UCSRP 2007). Additionally, EDT modeling was applied in all 4 subbasins in the development of the Subbasin Plans.
3. THE UPPER COLUMBIA REGION SALMON RECOVERY PLAN (UCSRB 2007) – Categories of recovery actions were then recommended that addressed primary limiting factors within each sector (Harvest, Hatcheries, Hydro, and Habitat) and includes a detailed Implementation Schedule, a living document, that identifies specific habitat actions, costs, and schedules for implementation (Link to http://www.ucsrb.com/theplan.asp -for Implementation Schedules for the Upper Columbia Region subbasins.
4. THE BIOLOGICAL STRATEGY (UCRTT 2008) – This work compliments the Recovery Plan by providing further support, guidance and technical foundation for setting geographic priorities for habitat protection and restoration actions. Using the Biological Strategy, the UCRTT developed a system for prioritizing and sequencing actions and strategies based on their biological benefit to multiple listed species. See Appendix C "UCRTT Priorities for reaches and Actions for Implementing Habitat Actions" (UCRTT 2009) for the recent prioritization of habitat actions found in the Recovery Plan's Implementation Schedule.
5. MULTI-YEAR ACTION PLANS, ASSESSMENTS AND THE ADAPTIVE MANAGEMENT APPROACH – By utilizing the resources described in the previous Steps, IT and UCRTT and WATs in the 4 subbasin's are currently developing multi-year action plans (3-5 Years) focused on the highest biological priorities in their subbasin at a reach scale. These multi-year plans will be updated annually by an adaptive management approach to refine the identification of limiting factors based on new information produced from the tributary and reach assessments. The final component to the planning process is monitoring, research, and evaluation to test the critical uncertainties associated with recovery objectives, strategies, and actions. Monitoring results will be evaluated and adjustments made to the multi-year plans/implementation schedule and recovery plan, as needed.

Upper Columbia Region Tributary and Reach Assessments

As described in WE 177, each of the WATs are developing multi-year action plans for the Upper Columbia Region subbasins. These plans focus on the highest biological priorities in each subbasin at a reach scale. This reach-based approach will be consistent with the UCRTT's biological priorities and the Recovery Plan's Implementation Schedule. Tributary and Reach assessments completed by the U.S. Bureau of Reclamation and Yakama Nation will also be used to identify site-specific actions for implementation, because this information helps prioritize stream restoration and identify specific habitat actions (See Assessment Table below). These assessments contain the hydraulic and geomorphic analysis, which will be used to identify limiting factors for fish habitat. Some of these detailed reach assessments were not available during the development of the most current Implementation Schedule project lists; thus, these tributary and reach assessments provide more detail on the projects that address limiting factors and improve the Upper Columbia Region's ability to prioritize projects.

In 2008, Reclamation initiated tributary and reach assessments (Lyon et al. 2008; Reclamation 2008a, 2008b, 2009) to increase the certainty that habitat actions identified by Reclamation for implementation would contribute to improving VSP parameters for salmonid populations in the Upper Columbia Region. To see Reclamation's Assessment Reports visit http://www.usbr.gov/pn/programs/fcrps/thp/ucao/index.html. Reclamation is conducting these assessments as partial fulfillment of their Federal Columbia River Power System (FCRPS) Biological Opinion obligations (NMFS 2008). In 2009, as part of the Yakama Nation Columbia Basin Fish Accord MOA, the Yakama Nation also began conducting reach assessments in reaches within nine Upper Columbia Region tributaries using Reclamation's assessment protocols. The priority reaches and actions identified in these assessments will be used by the WATs and IT to develop and refine the multi-year action plans.

The primary product produced from the tributary and reach assessments is an alternatives analysis, the Bureau of Reclamation refers to this as an Alternatives Evaluation Report (AER; see example below). As a part of the Upper Columbia Region targeted 6-step project selection process, the UCRTT will review the AER in those priority reaches where reach assessments have been completed. The UCRTT will select the one or two top priority alternatives in the AER that are consistent with the priorities from the Biological Strategy, Recovery Plan, and the UCRTT priority reaches and actions spreadsheet. The AER will contain sufficient detail to include rough cost estimates and preliminary designs. WAT's will use the UCRTT's priority alternatives to update and revise their multi-year plans.

Click here for an example of an Alternatives Evaluation Report

6-Step Project Selection Process for the Targeted and Open Solicitation

Upper Columbia Region Two Cycle Funding Process

The current Upper Columbia regional Open 6-step annual funding process is the result of years of collaborative work on the part of all interested parties to establish an effective and efficient process. The Upper Columbia Process Guide (Process Guide) documents the process and provides guidance to project sponsors and partners (note the schedule changes for each new funding cycle). The 2010 guide will be updated to incorporate the additional Targeted 6-Step Process described in this programmatic. In addition, the UCRTT will have a new and expanded role in the targeted solicitation for "pulse" funds described in detail on the following page.

Click here to open the *2010 Process Guide for Developing and Submitting Salmon Habitat Restoration Projects in the Upper Columbia Region for Funding Through the Salmon Recovery Funding Board (SRFB), Bonneville Power Administration (BPA), and Tributary Committees*

Open 6-Step Process

The following text describes the steps in the current Open 6-Step Process and the new Targeted 6-Step Process that were introduced in Section F. WE 114, Identify and Select Projects.

STEP 1: PRE-APPLICATION – Project proponents fill out a pre-application form for each project being proposed in order to pursue funds from the non-accord BPA funds or other regional funding sources. The pre-application process provides an opportunity for the project proponent to seek technical assistance and identify additional cost-share programs that most effectively leverage the resources needed to implement projects. The UCRTT has the option to recommend a proposal not continue in the review process if the project does not adequately address priority limiting factors.

STEP 2: PROJECT SITE VISITS – Once the suite of potential projects are finalized, the UCSRB will work with local entities to develop an agenda and itinerary for the field tours. Project proponents present information to the UCRTT and other reviewers regarding proposed projects, answer questions, and receive additional technical feedback on the site tours that are frequently followed-up with reviewer comments.

STEP 3: PROJECT PRESENTATIONS – Following the site visits sponsors present projects to technical reviewers. These presentations allow the proponent to continue to receive technical feedback from the UCRTT to further refine project proposals before the final project applications are submitted.

STEP 4: PROPOSAL SUBMITTAL – Following reviewer comments, project proponents have the opportunity to refine the final project proposals before the final submittal.

STEP 5: TECHNICAL RANKING – After final project proposals have been submitted, the UCRTT convenes to rate the technical merits of the proposals. The final technical ratings and notes from the UCRTT are distributed to the partners in the Upper Columbia Region.

STEP 6: FINAL STEP – UCSRB will provide BPA/NPCC with a prioritized list of proposed actions that will be recommended for complete or partial funding.

UCRTT Operating Procedures and Project Review Policy

Click here to open the *Operating Procedures of the Upper Columbia Regional Technical Team*

Click here to open the *Project Review Policy of the Upper Columbia Regional Technical Team*

APPENDIX E

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Multi-Year Action Plans
in the Upper Columbia Subbasins

Entiat

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Entiat	Lower Entiat	**Yes**	Habitat Diversity	Instream	complete removal of two levees, well roads, re-plumbing, riparian revegetation	**ENFH**: RM 6.5 to RM 7.1; USFWS ENFH	Cascadia Conservation District; US Fish and Wildlife Service	Phase 1, including design and implementation funding	$0	-	$0	-	$0	Phase 2, design, permitting funding scope= design of ELJ's, off-channel habitats	$50,000	**$50,000**	**$285,886- costs secured for 2010**	
Entiat	Lower Entiat	**Yes**	Instream Flow	Water Quantity	ARRA Surface to Wells	**ARRA Surface to Wells;** RM 6.4 to RM 5.8	CCD, TU	Implement	$0		$0		$0		$0	**$0**	**$365k- costs secured for 2010**	
Entiat	Lower Entiat	**Yes**	Instream Flow	Water Quantity	Surface to Wells	**Roaring Creek Surface to Wells;** RM 6.4 to RM 6.0	CCD, TU	Implement	$0		$0		$0		$0	**$0**	**$147k- costs secured for 2010**	Planned
Entiat	Lower Entiat	**Yes**	Instream Flow	Water Quantity	Surface to Wells	**Ecology Surface to Wells;** Between RM 2.5 and RM 14	CCD, TU	Implement	$0		$0		$0		$0	**$0**	**$581k- costs secured for 2010**	Planned
Entiat	Lower Entiat		Instream Flow	Water Quantity	TBD: on farm efficiencies, water trusts	TBD	TU	planning/ design/implementation	$0	Implement	$50,000	Planning	$10,000	Implement	$50,000	**$110,000**	**$10k- costs secured for 2010**	Planned
Entiat	Lower Entiat		Obstructions	Pump screen upgrades	Pump Screens: Install or replace existing pump screens	**Pump Screens**: Throughout Assessment Unit	WDFW, CCD	planning/ design/implementation	$0	planning/ design/implementation	$0	planning/ design/implementation	$139,000	planning/ design/implementation	$139,000	**$278,000**	**$139k- costs secured for 2010 and $139k- cost secured for 2011**	Planned
Entiat	Lower Entiat	**Yes**	Habitat Diversity	Instream	Remove portions of two levees and excavate an 1100 linear foot side channel to restore fish access and flows to off-channel habitat and floodplain	**Foreman Side Channel:** RM 2.5	CCNRD	Implement	$0		$0	-	$0	-	$0	**$0**	**$208,592k- cost secured for 2010**	Planned
Entiat	Lower Entiat		Habitat Diversity and Quantity	Riparian Planting	Replant riparian areas disturbed by implementation actions or previously degraded	**Riparian Restoration:** TBD	CCD, CCNRD	Implement	$0	implement	$25,000	Implement	$25,000	Implement	$25,000	**$75,000**	**$80k- costs secured for 2010**	Planned
Entiat	Lower Entiat	**Yes**	Habitat Diversity	Instream	TBD Channel reconfiguration, large wood, off-channel habitat	**2014 IMW Schedule**	USBR, CCD, CCRND and others		$0	Outreach	$50,000	Outreach and Assessments	$500,000	design/permit	$50,000	**$600,000**	**Will need approximately 3 million for implementation in 2014 in the lower Entiat**	Planned

Entiat

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Entiat	Lower Entiat	**Yes**	Habitat Diversity	Instream	LWD Placement	**Keystone:** RM 2.1	YN, CCD	Implement	$0		$0		$0		$0	**$0**	**Project costs are unknown**	Planned
Entiat	Lower Entiat		Water Quality	Riparian Planting	B2B Phase III: Riparian Plantings	**B2B Phase III**	CCNRD, CCD		$0		$0		$0	Work with landowner, planning, design	$10,000	**$10,000**		Planned
Entiat	Middle Entiat (Stillwater's)		Instream Flow	Instream flow	Upgrade to existing irrigation ditch	**McKenzie Ditch**: RM 14.5-15.5	CCD, USBR, TU	Assessment	$0	Plan	$100,000	Implement	$200,000		$0	**$300,000**	**$10k- costs secured for 2010**	Planned
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Land Protection, Acquisition, or Lease	Fee Simple or easements in floodplain and/or riparian areas	**Troy;** RM 20.2-20.7; Stormy Reach	CDLT	Implement	$0	Implement	$350,000		$0		$0	**$350,000**	**$60k- costs secured for 2010**	Completed
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Land Protection, Acquisition, or Lease	Fee Simple or easements in floodplain and/or riparian areas	**Tyee Ranch;** RM 21.1-23.1; Preston Reach	CDLT	Plan	$0	Plan	$6,400	Implement	$1,500,000	-	$0	**$1,506,400**	**$20k- costs secured for 2010 and $13.6k- partial cost secured for 2011**	Completed
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Instream	Remove or modify rip-rap and wood revetment, place LWD, and add riparian planting to reconnect processes and isolated habitat units	**Preston Reach Phase 1;** RM 21.1-21.8; Preston Reach (PR-IZ-4)	CCD, USBR	Implement	$0	-	$0	-	$0	-	$0	**$0**	**$450k- costs secured for 2010 Initial ARRA grant 350K, currently pursuing additional ARRA money to cover remaining cost of project**	Completed

Entiat

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Instream	**Tyee Ranch** LWD placement throughout **River Left:** Remove or modify lower levee to allow side channel and floodplain reconnection Remove or modify upper levee to allow side channel and floodplain reconnection Remove or modify 1960's push-up levee to allow floodplain reconnection Reactivate historic oxbow Address bank riprap Live stalk exclusion fencing with possible alternate watering **River Right:** Reactive historic oxbow	**Tyee Ranch;** RM 21.8-22.3; Preston Reach (PR-IZ-2, PR-IZ-3, PR-IZ-4, PR-DIZ-1, PR-DIZ-2, PR-DIZ-3, PR-DOZ-5, PR-DOZ-7, PR-OZ-8)	CCD, USBR	Design and Permit	$0	Implement	$2,400,000	-	$0	-	$0	**$2,400,000**	**$200k- costs secured for 2010**	Completed
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Instream	Modify X-mas tree revetment	**Preston Reach Phase II** PR-IZ-4 RM 21.5-21.5	CCD, USBR	Design	$0	Implement	$100,000		$0		$0	**$100,000**	**$50k- costs secured for 2010**	Completed
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	Instream	LWD placement throughout. Three back-water channels, one flow-through channel, and one ground-water gallery	**Entiat Reach 3D:** RM 24-25	YN	Design and Permit	$0	Implement	$0		$0		$0	**$0**	**$46,542K- costs secured for 2010; $1.9M - costs secured for 2011**	On-going
Entiat	Middle Entiat (Stillwater's)		Habitat Diversity and Quantity	Riparian Planting	Replant riparian areas disturbed by implementation actions or previously degraded	**Riparian Restoration:** Basinwide	CCD	Implement	$0	Plan and Implement	$25,000	Plan and Implement	$25,000	Plan and Implement	$25,000	**$75,000**	**$80k- costs secured for 2010**	
Entiat	Middle Entiat (Stillwater's)	**Yes**	Habitat Diversity	LWD	Construct ELJ designed to reactive side channel and/or increase access to floodplain	**Dill Creek CDLT ELJ:** RM 21.2-21.4 CDLT Parcel at Dill Creek	CDLT, USFWS,	Design	$0	Implement	$200,000		$0		$0	**$200,000**	**$30k- costs secured for 2010**	

Entiat

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Entiat	Basinwide		Habitat Diversity	Land Protection	Habitat Farming	**Habitat Farming;** TBD:	IRIS, CDLT, CCD	Habitat Assessments	$30,000	Land Acquisitions, Long Term Leases	$100,000	Land Acquisitions, Long Term Leases	$100,000	Land Acquisitions, Long Term Leases	$100,000	**$330,000**		
Entiat	Basinwide	**Yes**	Sediment	road management	FS Road Management: ask USFS	**FS Road Management:** Determine which of the 14 miles of forest roads in Lower Entiat	USFS, CCD, CCNRD		$0			Alt anal, survey, planning for road decommission in lower Entiat in 2014	$75,000	Design and permitting for road decommission in lower Entiat in 2014	$75,000	**$150,000**		
									$30,000		**$3,406,400**		**$2,574,000**		**$524,000**	**$6,534,400**		

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	Lower Wenatchee		Water Quantity	Instream Flow	Change point of diversion, increase efficiencies	**Pioneer Water Users aka CMZ 7**(diversion at RM 7.1)	TU, CCNRD	Design	$0	Planning Design	$2,000,000	Implement	$1,400,000	-	$0	**$3,400,000**	**$100k costs secured for 2010 and $1.6M secured for 2011 and 2012**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Instream	Off-Channel Habitat	**CMZ 7/**Pioneer diversion site	TU, CCNRD	Planning	$0	Design	$150,000	Implement	$350,000		$0	**$500,000**		Completed
Wenatchee	Lower Wenatchee		Water Quantity	Instream Flow	Conversion of small pumps to wells		CCD, TU	Planning	$0	Permit; Implement	$15,000	Implement	$200,000	Implement	$200,000	**$415,000**	**$100k - costs secured for 2010; $100k secured for 2011**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Instream	Construct off-channel habitat	**CMZ 6;** Sleepy Hollow to Monitor	CCNRD	Implement	$0		$0		$0		$0	**$0**	**$240k-costs secured for 2010**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Riparian	Riparian planting/restoration/brush revetment	**CMZ2** Lower Sleepy Hollow	CCD	Implement	$0		$0		$0		$0	**$0**	**$52k - costs secured for 2010**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Instream	Construct off-channel habitat	**CMZ 2; Goodfellow**	YN	Implement	$0		$0		$0		$0	**$0**	**$377,927k- costs secured for 2010**	Completed
Wenatchee	Lower Wenatchee	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation easement or fee simple acquisition	**CMZ 2**	CDLT	Planning	$0	Implement	$10,000	Implement	$1,500,000		$0	**$1,510,000**	**$25k-costs secured for 2010**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Instream	Construct off-channel habitat	**CMZ 20;** confluence of Icicle	CCNRD	Implement	$0		$0		$0		$0	**$0**	**$200k-costs secured for 2010**	Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Riparian Planting	Replant riparian areas disturbed by implementation actions or previously degraded	**CMZ 3, 4, 9, 14, 16**	CCD	Planning	$10,000	Implement	$30,000	Implement	$60,000	Implement	$30,000	**$130,000**		Completed
Wenatchee	Lower Wenatchee		Habitat Diversity and Quantity	Riparian Habitat	Planting		CCD	Implement	$15,000	Implement	$15,000	Implement	$15,000		$0	**$45,000**		Completed
Wenatchee	Mission Creek		Water Quantity	Instream Flow	Water Acquisition, Exchange, POD change	**Mission Creek**	TU		$0	Planning	$85,000	Implement	$175,000		$0	**$260,000**		
Wenatchee	Mission Creek		Habitat Diversity and Quantity	Riparian	Weed Control (Japanese knotweed removal) and Planting	**Chelan Noxious Weed Board inventoried sites**	CCNRD, CC Noxious Weed Board	Implement (site prep)	$40,000	Implement (site prep)	$40,000	Implement (site prep and planting)	$60,000	Implement (planting)	$40,000	**$180,000**		

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	Mission Creek		Habitat Diversity and Quantity	Fish Passage	Replace diversion dams with 5 log weirs	**lower Mission Creek**	CCD	Implement	$50,000		$0		$0		$0	**$50,000**	**currently seeking construction $ from RI HCP Trib Comm.**	
Wenatchee	Mission creek		Habitat Diversity and Quantity	Riparian Habitat	Channel realignment, noxious weed control, Riparian vegetation restoration	**Lower Yaksum Creek**	CCD	Implement	$0		$0		$0		$0	**$0**	**$30k - costs secured for 2010**	
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Assessment	Conduct Reach Assessments	**Peshastin Reach Assessment.** Include some analysis above Ingalls crk in addition to RA from mouth to Ingalls	YN (Reach Assessments)	Implement	$0		$0		$0		$0	**$0**	**$108,724k- costs secured for 2010**	On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Channel Connectivity Off-Channel Habitat	Phase 1 Implementation based on RA (reconnection at multiple sites)	Dependent on results of reach assessment	YN, CCNRD, BOR, CCD, others	Planning (AERs)	$300,000	Planning Design	$300,000	Implement	$3,000,000		$0	**$3,600,000**		On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Channel Connectivity Off-Channel Habitat	Select preferred alternative	**CMZ 17;** Mouth to RM 1	CCD	Planning	$0	Planning; Permitting	$125,000	Implement	$250,000	Implement	$250,000	**$625,000**	**alternatives analysis completed**	On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Instream	Reconnect oxbow based on results of Yakama Nation reach assessment	**Peshastin Oxbow Reconnection, RM 3.5-4**	CCNRD	Planning (AER)	$100,000	Planning Design	$100,000	Implement	$3,500,000		$0	**$3,700,000**		On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Acquire fee simple or conservation easement to support floodplain reconnection project	**Mouth to RM 1.5; CMZ 17**	CDLT	Planning	$0	Planning	$20,000	Implement	$1,000,000	Implement	$750,000	**$1,770,000**		On-going
Wenatchee	Peshastin Creek		Habitat Diversity and Quantity	Instream	Phase 2 Implementation based on RA (install instream structures at multiple sites)	**Mouth to Ingalls Creek**	YN, CCNRD, BOR, CCD, others		$0	Planning (AERs)	$100,000	Planning Design	$150,000	Implement	$400,000	**$650,000**		On-going
Wenatchee	Peshastin Creek	**Yes**	Water Quantity	Instream Flow	Change point of diversion, increase efficiencies	**Mouth to RM 2.5**	CCNRD, PID, TU		$0		$0	Planning	$10,000	Planning Design	$75,000	**$85,000**		On-going

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	Peshastin Creek	**Yes**	Water Quantity	Instream Flow	Change point of diversion, increase efficiencies, Acquisition Lease	**Mouth to Ingalls Creek**	TU		$0	Planning	$10,000		$0		$0	**$10,000**		On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Downstream of Ingalls Creek based on results of Yakama Nation reach assessment	**Mouth to Ingalls Creek**	CDLT	Planning	$10,000	Planning	$10,000	Implement	$400,000		$0	**$420,000**		On-going
Wenatchee	Peshastin Creek		Habitat Diversity and Quantity	Riparian Habitat	Planting	**Throughout Assessment Unit**	CCD	Planning	$10,000	Implement	$30,000	Implement	$60,000	Implement	$30,000	**$130,000**		On-going
Wenatchee	Peshastin Creek	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Acquisition	**Dryden Property Purchase**	YN	Planning	$0	Planning	$0	Implement	$0		$0	**$0**	**$700k- costs secured for 2012**	On-going
Wenatchee	Chumstick Creek		Water Quantity	Instream Flow	Water Acquisition, Exchange, POD change	**Basin Wide**	TU		$0	Planning	$85,000	Implement	$175,000		$0	**$260,000**		
Wenatchee	Chumstick Creek	**Yes**	Obstructions	Fish Passage	Replace remaining fish passage barriers	**Chumstick Culverts,** Above RM 7	CCNRD, USFWS	Implement	$150,000	Implement	$720,000		$0		$0	**$870,000**	**$125k-costs secured but $150k still needed for 2010**	
Wenatchee	Chumstick Creek		Habitat Diversity and Quantity	Riparian	Riparian planting	**North Road Chumstick Creek**	CCD	planning/ Implement	$20,000							**$20,000**		
Wenatchee	Icicle Creek	**Yes**	Habitat Diversity and Quantity	Assessment	Conduct Tributary Assessment, Passage Assessment at Boulder Field and Reach Assessments	**Throughout Assessment Unit**	BOR (Trib, passage assessment, RA) Wild Fish Cons. (lower Icicle RA)	field work for Trib Assessment	$0	Assessment	$0	Complete assessments	$0		$0	**$0**		Planned
Wenatchee	Icicle Creek		Habitat Diversity and Quantity	based on Trib and Reach Assessments	Phase 1 Implementation based on RA and Passage Assessment	**Throughout Assessment Unit**	BOR, Wild Fish, YN, CCNRD, CCD, USFWS others		$0		$0		$0	Planning (AERs) Design	$150,000	**$150,000**		Planned
Wenatchee	Icicle Creek		Water Quality	Water Quality Improvement	Monitor TMDL parameters and implement on-farm BMPs	**Throughout Assessment Unit**	CCD	Planning	$15,000	Implement	$25,000	Implement	$30,000	Implement	$70,000	**$140,000**		Planned

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	Icicle Creek		Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Acquire conservation easement	**Mouth to Hatchery**	CDLT	Planning	$0	Implement	$850,000		$0		$0	**$850,000**	**$10k- costs secured for 2010 and $350k in 2011**	Planned
Wenatchee	Icicle Creek		Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation easement or fee simple acquisition	**Mouth to Hatchery**	CDLT	Planning	$10,000	Planning	$10,000	Planning (20K) Implementation (1 mill))	$1,020,000	Planning (20K) Implementation (2 mill)	$2,020,000	**$3,060,000**		Planned
Wenatchee	Icicle Creek		Water Quantity	Instream Flow	Change point of diversion, increase efficiencies, Acquisition, Lease	**Hatchery/COI C diversion**	TU		$0	Planning	$0	Implementation	$300,000		$0	**$300,000**	**$10k-costs secured for 2010**	Planned
Wenatchee	Upper Wenatchee and Chiwaukum Creek	**Yes**	Habitat Quantity (mainstem Wenatchee)	Assessment	Complete Tributary and Reach Assessments	**Upper Wenatchee Reach Assessment** Lake to Tumwater	YN	Planning	$0	Implement	$0		$0		$0	**$0**	**$318,555k-costs secured for 2011**	Planned
Wenatchee	Upper Wenatchee and Chiwaukum Creek	**Yes**	Habitat Quantity (mainstem Wenatchee)	Instream	Phase 1 construction based on RA (log structures, off-channel habitat at multiple sites)	**Lake to Tumwater**	BOR, Wild Fish, YN, CCNRD, CCD, USFWS others		$0		$0	Planning (AERs) Design	$150,000	Implement	$1,500,000	**$1,650,000**		Planned
Wenatchee	Upper Wenatchee and Chiwaukum Creek	**Yes**	Habitat Quantity (mainstem Wenatchee)	Instream	Phase 2 construction based on RA (log structures, off-channel habitat at multiple sites)	**Lake to Tumwater**	BOR, Wild Fish, YN, CCNRD, CCD, USFWS others		$0		$0		$0	Planning (AERs) Design	$150,000	**$150,000**		Planned
Wenatchee	Upper Wenatchee and Chiwaukum Creek		Habitat Diversity (Chiwaukum Creek)	Instream	Channel Reconfiguration coordinated with WADOT project	**Skinney Creek**	USFS, CCNRD, WADOT	Planning, Design	$150,000	Implement	$250,000	Implement	$250,000		$0	**$650,000**		Planned
Wenatchee	Chiwawa River		Water Quantity	Instream Flow	Irrigation District Improvements	**Wenatchee-Chiwawa Irrigation District**	CCNRD, W-CID	Planning, Design	$50,000	Design	$50,000	Implement	$4,000,000		$0	**$4,100,000**		
Wenatchee	White River	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Acquire conservation easement at White River Nason View	**RM 4.25-5.4**	CDLT	Planning	$0	Implement	$0		$0		$0	**$0**	**$10k-costs secured for 2010and $535k in 2011**	

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	White River	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Acquire conservation easement at White River Dally Wilson	**RM 8.5**	CDLT	Planning	$10,000	Implement	$180,000		$0		$0	**$190,000**		
Wenatchee	White River	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Acquire conservation easement at White River	**RM 7-8**	CDLT	Planning	$5,000	Implement	$500,000		$0		$0	**$505,000**		
Wenatchee	White River	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Acquire conservation easement at White River Tall Timbers Ranch	**RM 11**	CDLT	Implement	$0		$0		$0		$0	**$0**	**$465k -costs secured for 2010**	
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 1 Construction: Breach a levee to reconnect 25 acres of floodplain and off-channel habitat	**Upper White Pine Reach (DOZ-1)** RM 13.3-13.8,	CCNRD	Planning (AER) Design	$0	Implement	$250,000		$0		$0	**$250,000**	**2010 work already funded by BOR**	Completed
Wenatchee	Nason Creek	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Ongoing, acquire as available or based on USBR Assessment	**Mouth to White Pine Creek**	CDLT	Planning	$10,000	Planning Implementation	$1,020,000		$0		$0	**$1,030,000**		Completed
Wenatchee	Nason Creek	**Yes**	Habitat Diversity	Land Protection, Acquisition or Lease	Outreach, site selection and acquire fee or easement	**Kahler Reach**	CDLT	Planning	$10,000	Planning	$10,000	Implement	$2,000,000		$0	**$2,020,000**		Completed
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 1 Construction: Oxbow reconnection	**DIZ-2-Lower White Pine;** RM 10	CCNRD	Planning Design	$325,000	Implement	$3,200,000		$0		$0	**$3,525,000**		Completed
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 1 Construction: Oxbow reconnection	**DIZ-1-Lower White Pine;** RM 11	CCNRD	Planning Design	$325,000	Implement	$3,200,000		$0		$0	**$3,525,000**		Completed
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 1 Construction: Oxbow reconnection	**CMZ N1,** near Coles Corner	CCNRD	Planning Design	$0	Implement	$400,000		$0		$0	**$400,000**		Completed
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 2 Construction: Channel Connectivity Off-Channel Habitat Channel Reconfiguration	**UWP, LWP, Kahler**	BOR, Wild Fish, YN, CCNRD, CCD, USFWS others		$0	Planning (AERs) Design	$100,000	Implement	$1,000,000		$0	**$1,100,000**		Completed
Wenatchee	Nason Creek	**Yes**	Channel Stability	Instream	Phase 3 Construction: Channel Connectivity Off-Channel Habitat Channel Reconfiguration	**UWP, LWP, Kahler**	BOR, Wild Fish, YN, CCNRD, CCD, USFWS others		$0		$0	Planning (AERs) Design	$100,000	Implement	$1,000,000	**$1,100,000**		Completed

Wenatchee

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Wenatchee	Nason Creek		Habitat Diversity	Riparian Habitat	Develop native seed bank and nursery for restoration projects	**watershed wide**	USFS, CCNRD	Implement	$0	Implement	$5,000	Implement	$5,000		$0	**$10,000**		Completed
Wenatchee	Nason Creek		Habitat Diversity	Riparian Habitat	Riparian planting	**Throughout Assessment Unit**	CCD	Planning	$15,000	Implement	$30,000	Implement	$60,000	Implement	$60,000	**$165,000**		Completed
									$1,630,000		**$13,925,000**		**$21,220,000**		**$6,725,000**	**$43,500,000**		

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Methow	Middle Methow		Obstructions	Fish Passage	Barkley Diversion Intake modification	**RM 49.6; Middle Methow Reach (MM-IZ-1)**	MSRF	Outreach and Planning	$0	Design and pre-permitting	$0	Design/Permit	$0	Implement	$750,000	**$750,000**	**$25k- costs secured for 2010; $200k in 2011; $50k in 2012; BOR for design/permit costs=$275,000**	On-going
Methow	Middle Methow		Obstructions	Fish Passage	Barkley Intake canal modification	**RM 49-49.5; Middle Methow Reach (MM-OZ-3)**	MSRF	Outreach and Planning	$0	Design/Permit	$0	Design/Permit	$0	Implement	$400,000	**$400,000**	**$25k- costs secured for 2010; $25k in 2011 ; $25k in 2012; BOR for design/permit costs=$75,000; cost estimates assume piping as preferred option**	On-going
Methow	Middle Methow		Obstructions	Fish Screening	Improve gates and fish return to prevent trapping of juveniles in dry canal	**RM49; Middle Methow Reach (MM-OZ-4)**	MSRF	Outreach /Design/ Permitting	$0	Implement	$35,000		$0		$0	**$35,000**	**$50k -costs secured for 2010**	On-going
Methow	Middle Methow		Obstructions	Fish Passage	Bear Creek Passage	**Methow RM 49.1, confluence with Lower Bear Creek**	MSRF	Planning	$0	Design/Permit	$0	Implement	$150,000		$0	**$150,000**	**$15k- costs secured for 2010; $50k in 2011;. Passage at confluence**	On-going
Methow	Middle Methow		Habitat Diversity and Quantity	Instream	Habitat node placement throughout Upper Half M2	**Upper M2 Reach**	MSRF	Planning and Outreach	$0	Design/Permit	$0	Implement	$250,000		$0	**$250,000**	**$25k- costs secured for 2010; $50k in 2011; Assumes 5 structures**	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	Bird Side Channel Habitat Improvements	**RM 48.6-49; Middle Methow Reach (MM-DOZ-5)**	MSRF	Planning and Outreach	$0	Design/Permit	$0	Implement	$250,000		$0	**$250,000**	**$50k- costs secured for 2010; $50k in 2011;**	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	3R sidechannel habitat complexity	**RM 47.7-47.8; Middle Methow Reach (MM-OZ-7)**	MSRF	Planning and Outreach	$0	Design/Permit	$0	Implement	$150,000		$0	**$150,000**	**$50k- costs secured for 2010; $50k in 2011;**	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Off-Channel Wetlands	Boesle Floodplain restoration	**RM 46.75-47.25; Middle Methow Reach (MM-OZ-10)**	MSRF	Planning and Outreach	$0	Design/Permit	$0	Implement	$250,000		$0	**$250,000**	**$50k- costs secured for 2010; $50k in 2011;**. Assumes instream component	On-going

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Methow	Middle Methow		Habitat Diversity and Quantity	Instream	MVID E Site restoration, monitoring, and adaptive management	**RM 46-46.2; Middle Methow Reach (MM-IZ-4)**	MSRF	Planting, Monitoring, and maintenance	$25,000	monitoring, maintenance	$25,000	Monitoring and Maintenance	$25,000	Monitoring and maintenance	$25,000	**$100,000**	**$100k- costs secured for 2010; $50k in 2011; $50k in 2012; $50k in 2013.** Partial funding has been secured; 25,000 per year	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	Right Bank 1 mile inchannel habitat ,50 acres riparian restoration (O'banion)	**RM 45.5-46.5; Middle Methow Reach (MM-OZ-11)**	MSRF, Reclamation, WDFW	Planning and Outreach	$0	Planning and design	$0	permitting and design	$0	Implement	$600,000	**$600,000**	**$25k- costs secured for 2010; $150k in 2011; $100k in 2012.** scope contingent on acquisition	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Acquisition	**RM 45.7; Middle Methow Reach (MM-DOZ-11)**	MSRF	Planning and Outreach	$0	Acquisition	$250,000		$0		$0	**$250,000**	**$10k- costs secured for 2010.** High priority for acquisition	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	McNae Island Complexity	**RM 45.7-46; Middle Methow Reach (MM-OZ-11)**	MSRF	Planning and Outreach	$0	survey and design	$0	Permitting and implementation	$350,000	Adaptive management and maintenance	$50,000	**$400,000**	**$25k- costs secured for 2010; $100k in 2011.** Implementation dependent on acquisition	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	Plummer Alcove Reconnection	**RM 45.5; Middle Methow Reach (MM-DOZ-11)**	MSRF	Planning and outreach	$0	Planning/ Design	$0	Implement	$250,000		$0	**$250,000**	**$20k- costs secured for 2010; $50k in 2011**	On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	enhance side channel habitat and access, protection	**RM 45.35-44.2; Middle Methow Reach (MM-OZ-14)**	YN	Planning	$0		$0		$0		$0	**$0**		On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Off-Channel Wetlands	Lewisia Rd left bank floodplain	**RM 43.7-44.3; Middle Methow Reach (MM-DOZ-15)**	YN	Planning	$0	Planning/ Design	$50,000	Implement	$150,000		$0	**$200,000**		On-going
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Protection, Purchase, Dike manipulation,	**RM 41.15-40.9; Middle Methow Reach (MM-IZ-8)**	Sugar Dike - Yakama, Methow Conservancy	Implement	$0	Implement	$300,000	Implement	$300,000		$0	**$600,000**	**$150k - costs secured for 2010; $12k - planning costs secured for 2010 and 2011**	On-going
Methow	Middle Methow		Water Quantity	Instream Flow	Water lease and/or in-basin acquisition	**Throughout assessment unit**	TU	Planning and implementing	$0	Planning and Implementing	$400,000	Planning and Implementing	$250,000	Planning and Implementing	$250,000	**$900,000**	**$500k- costs secured for 2010;**	On-going
Methow	Middle Methow	**Yes**	Habitat Diversit	Instream	Reach Assessment	**Winthrop to Wolf Creek**	Reclamation		$0	Assessment	$0		$0		$0	**$0**	**$100k- costs secured for 2011**	Planned

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
			y and Quantity			**RA**												
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Instream	Reach Assessment	**Silver RA**	Reclamation		$0		$0		$0	Assessment	$0	**$0**	**$150k- costs secured for 2013**	Planned
Methow	Middle Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Acquisition and alcove habitat connection	**Haltermann Hole**	MSRF	monitoring and data collection	$0	Acquisition and conservation easement	$400,000	Planning & Design	$0	Implement Alcove project	$180,000	**$580,000**	**$15k- costs secured for 2010; $50k for 2012**	Planned
Methow	Middle Methow					**Murray Parrish**	MSRF	Planning	$47,453	Implementation	$130,000		$0		$0	**$177,453**		
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Off-Channel Wetlands	Bridge over pond outlet	**Heath Middle Pond**	MSRF	Implement	$0		$0		$0		$0	**$0**	**$50k- costs secured for 2010;** Funding through YN Fish Accord to be contracted after permits received	Completed
Methow	Upper Methow		Water Quantity	Instream Flow	Water Lease, drought lease	**Tributaries**	TU	Implement	$0	Planning	$30,000	Planning and/or implementation	$30,000	Planning and Implementing	$30,000	**$90,000**	**$30k- costs secured for 2010**;	
Methow	Upper Methow		Habitat Diversity and Quantity	Instream	Complexity	**Winthrop Confluence**	MSRF	Planning	$0	Implementation	$350,000	Adaptive Mgmt	$0	$ 30,000	$30,000	**$410,000**	**$30k- costs secured for 2010;**	
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Instream	Install complexity and reconnect side channels	**Fender Mill**	YN	Planning	$0	Implementation							**$120k - costs secured for 2010**	Completed
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Cedarosa**	Methow Conservancy, Yakama	Planning	$0	Planning	$0	Planning	$0		$15,000	**$15,000**	**Costs secured for 2010 at $15k, 2011 at $15k, and 2012 at $15k**	Planned
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Cedarosa**	Methow Conservancy, Yakama	Implement	$0	Implement	$0	Implement	$0	Implement	$0	**$0**	**Cost secured at $300k for years 2010 through 2013**	Planned
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Upper Methow, outside of Cedarosa area**	Methow Conservancy	Planning	$6,000	Planning	$1,000	Planning	$6,000	Planning	$1,000	**$14,000**		Planned

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Methow	Upper Methow	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Upper Methow, outside of Cedarosa area**	Methow Conservancy (with SRFB and Trib for 2010)	Implement	$0	Implement	$800,000	Implement	$350,000		$0	**$1,150,000**	**$770k-costs secured for 2010**	Planned
Methow	Lower Methow		Water Quantity	Instream Flow	In-basin Water Acquisition, lease and drought lease	**Throughout assessment unit**	TU	Planning and implementing	$0	Planning and Implementing	$100,000	Planning and Implementing	$100,000	Planning and Implementing	$100,000	**$300,000**	**$35k-costs secured for 2010**	
Methow	Lower Methow		Water Quantity	Instream Flow	irrigation efficiency, in-basin acquisition, and lease	**Tributaries**	TU	Planning and implementing	$0	Planning and Implementing	$75,000	Planning and Implementing	$75,000	Planning and Implementing	$75,000	**$225,000**	**$30k-costs secured for 2010**	
Methow	Twisp	**Yes**	Obstructions	Fish Passage	Passage-culvert replacement	**Poorman**	MSRF	Adaptive Mgmt	$0	Adaptive Mgmt	$0		$0		$0	**$0**	**$5k-Costs secured for 2010, 2011 at $5k**	On-going
Methow	Twisp		Water Quantity	Instream Flow	habitat water intake	**MSRF Pond/intake**	MSRF	Design and Permit	$0	Implement	$0		$0		$0	**$0**	**$30k- costs secured for 2010; $150k for 2012**	On-going
Methow	Twisp		Obstructions	Fish Passage	Culvert replacement	**MSRF Ponds Culvert**	MSRF	Permit and Implement	$0		$0		$0		$0	**$0**	**$50k-costs secured for 2010**	On-going
Methow	Twisp	**Yes**	Water Quantity	Instream Flow	habitat improvement and irrigation efficiency	**MVID West Canal**	MSRF	Data collection and planning	$0	Permitting, Planning and Design	$0	Implement	$2,000,000		$0	**$2,000,000**	**$30k- costs secured for 2010; $200k for 2012**	On-going
Methow	Twisp		Water Quantity	Instream Flow	Irrigation efficiencies	**Buttermilk Ditch**	MSRF	Data collection and planning	$20,000	Implement	$100,000		$0		$0	**$120,000**		On-going
Methow	Twisp		Water Quantity	Instream Flow	Irrigation efficiencies	**Hottell Ditch Conversion**	MSRF	Data collection and planning	$20,000		$0	Implement	$60,000		$0	**$80,000**		On-going
Methow	Twisp		Water Quantity	Instream Flow	Irrigation efficiencies	**Aspen Meadows**	TU	Data collection and planning	$20,000		$0	Implement	$100,000		$0	**$120,000**		On-going
Methow	Twisp		Water Quantity	Instream Flow	Irrigation efficiencies lease, drought lease, and in-basin acquisition, well conversions	**Throughout assessment unit**	TU	Planning and implementing	$0	Planning and Implementing	$150,000	Planning and Implementing	$350,000	Planning and Implementing	$350,000	**$850,000**	**$30k- costs secured for 2010**	On-going

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Methow	Twisp	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Lower Twisp**	Methow Conservancy	Planning	$6,000	Planning	$6,000	Planning	$6,000	Planning	$6,000	**$24,000**		On-going
Methow	Twisp	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Lower Twisp**	Methow Conservancy (with SRFB and Trib for 2010 and 2011)	Implement	$0	Implement	$0	Implement	$200,000	Implement	$350,000	**$550,000**	**$600k -costs secured for 2010 and $220k for 2011**	On-going
Methow	Twisp	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Lower Twisp**	Methow Conservancy		$0	Implement	$400,000		$0		$0	**$400,000**		On-going
Methow	Chewuch	**Yes**	Water Quantity	Instream Flow	water conservation	**Chewuch Piping**	TU	Implement and planning	$0	Implement	$450,000	Implement	$250,000		$0	**$700,000**	**$170k -costs secured for 2010**, 2 phase project, Winthrop to Bear Creek and Pearrygin Lake to County Road	On-going
Methow	Chewuch	**Yes**	Water Quantity	Instream Flow	water conservation	**Little Chewuch piping**	TU	Implement	$0		$0		$0		$0	**$0**	**10k -costs secured for 2010**	On-going
Methow	Chewuch	**Yes**	Water Quantity	Instream Flow	water conservation	**Little Barkley Piping**	TU	Implement	$0		$0		$0		$0	**$0**	**10k -costs secured for 2010**	On-going
Methow	Chewuch	**Yes**	Water Quantity	Instream Flow	water conservation	**Fulton efficiency**	TU	Planning /Design	$0	Planning/ Design	$275,000	Implement	$750,000	Implement	$750,000	**$1,775,000**	**175k -costs secured for 2010**	On-going
Methow	Chewuch	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Protection and Channel reconnection	**Lawrence Reach**	MSRF	Planning	$62,000	Acquisition	$800,000	Implement	$250,000	Acquisition	$400,000	**$1,512,000**	Includes $100K of BOR need	On-going
Methow	Chewuch	**Yes**	Sediment	Sediment Reduction	Road Inventory and resulting projects	**Throughout assessment unit**	USFS	Planning/ Implementation	$0	Planning/ Design	$0		$0		$0	**$0**	**$25k- Costs secured for 2010** Unknown for 2011-2013 - Projects opportunities will result from inventory	On-going
Methow	Chewuch	**Yes**	Sediment	Sediment Reduction	Minimum Roads Analysis	**Throughout assessment unit**	USFS	Planning/ Implementation	$0	Planning/ Design	$0		$0		$0	**$0**	**35k- Costs secured for 2010** Unknown for 2011-2013 - Projects opportunities will result from inventory	On-going

Methow

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Methow	Chewuch		Habitat Diversity	Riparian Fencing	Cattle Exclusion Fencing	**Upper Cub Creek**	USFS	Implementation	$0		$0		$0		$0	**$0**	**25k- Costs secured for 2010**	On-going
Methow	Chewuch		Obstructions	Fish Passage	Road constriction fish passage assessment	**Eightmile Creek** RM 1.7	USFS	Assessment/Planning/Design	$0	Design	$250,000	Implement	$2,000,000	Monitoring	$50,000	**$2,300,000**	**35k- Costs secured for 2010**	On-going
Methow	Chewuch		Obstructions	Fish Passage	Replace undersized culvert	**Whiteface Creek** (Goat Cr trib) RM 0.25	USFS	Planning/Design	$0	Implementation	$160,000		$0		$0	**$160,000**	**15k- Costs secured for 2010**	On-going
Methow	Chewuch	**Yes**	Water Quantity, quality and screening	Instream Flow	Well Conversion	**Eightmile Creek RM**	TU	Planning	$10,000	Planning and Implementing	$120,000		$0	Implement	$130,000	**$260,000**		On-going
Methow	Chewuch	**Yes**	Habitat Diversity and Quantity	Off-Channel Wetlands		**Lower Eightmile Floodplain Restoration**	MSRF	Planning	$10,000	Implementation	$50,000		$0		$0	**$60,000**		On-going
Methow	Chewuch	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Lower Chewuch**	Methow Conservancy (with Yakama for 2010)	Planning	$0		$0		$0	Planning	$3,000	**$3,000**	**3k- Costs secured for 2010**	On-going
Methow	Chewuch	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Lower Chewuch**	Methow Conservancy (with Yakama for 2010)	Implement	$0		$0		$0	Implement	$300,000	**$300,000**	**$170k-costs secured for 2010**	On-going
Methow	Beaver / Bear Creek		Habitat Diversity and Quantity	Instream	Complexity	**Upper Beaver/Batie**	MSRF/BOR?YN	Planning	$0	Planning and Implementation	$0	Implementation	$0	Planning	$50	**$50**	**$785k - costs secured**	
Methow	Beaver / Bear Creek	**Yes**	Water Quantity	Instream Flow	In-basin Water Acquisition	**Beaver Creek**	TU	Planning/ Implementation	$0	Planning and Implementing	$120,000	Planning	$10,000	Planning	$10,000	**$140,000**	**85k- Costs secured for 2010**	
Methow	Beaver / Bear Creek		Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Beaver Creek**	Methow Conservancy	Planning	$3,000	Planning	$3,000		$0	Planning	$3,000	**$9,000**		
Methow	Beaver / Bear Creek		Habitat Diversity and Quantity	Land Protection, Acquisition or Lease	Conservation Easements	**Beaver Creek**	Methow Conservancy		$0	Implement	$155,000		$0	Implement	$350,000	**$505,000**		
Methow	Beaver / Bear Creek		Water Quantity	Instream Flow	Bear Creek Instream Flow Improvement	**Bear Creek**	MSRF/TU	Planning	$0	Planning and design	$100,000	Implement	$750,000		$0	**$850,000**	**$20k -costs secured for 2010**	

Methow																	
Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
									$229,453		$5,985,000		$8,912,000		$5,208,050	$20,364,503		

Okanogan

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Okanogan	Lower Okanogan (Mouth to Salmon Creek)		Water Quality	Water Quality Improvement	Decrease waste water flows, ; Implement TMDL		OCD	Implement	$0	Implement	$0	Implement	$0	Implement	$0	**$0**		
Okanogan	Lower Okanogan (Mouth to Salmon Creek)		Habitat Diversity and Quantity	Instream	Reconnect side channel	**Okanogan River**	CCT/City of Okanogan	Planning	$0	Implementation	$0	Implementation	$0	Monitor	$0	**$0**	**$50k for 2010; $300k for 2011; $250k for 2012; $25k for 2013 - costs secured**	
Okanogan	Lower Okanogan (Mouth to Salmon Creek)		Habitat Diversity and Quantity	Riparian Habitat	CREP Livestock BMPs		OCD	Implement	$0	Implement	$75,000	Implement	$75,000	Implement	$100,000	**$250,000**		
Okanogan	Lower Okanogan (Mouth to Salmon Creek)		Obstructions	Fish Screening	Screen Irrigation Diversions		OCD WDFW-CCT	Implement	$0	Implement	$0	Monitor	$0	Monitor	$0	**$0**	**$150k for 2010; $150k for 2011; $50k for 2012; $25k for 2013 - costs secured**	
Okanogan	Lower Okanogan (Mouth to Salmon Creek)		Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection for conservation easement		CCT OVLC WDFW		$0	Planning	$10,000	Implement	$400,000	Implement	$400,000	**$810,000**		
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek		Sediment	Sediment Reduction	Identify and treat sediment sources		OCD	Planning	$0	Implement	$250,000	Implement/Monitor	$200,000	Implement/Monitor	$100,000	**$550,000**		
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek	**Yes**	Temperature	Instream	Reduce Summer Temperatures in main stem to provide cool water refugia; Utilize existing TIR, Ortho and LIDAR information to enhance existing hyporehic and connectivity information.	**Mainstem and lower 1/4 mile of Aeneas Creek**	CCT	Monitor	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**100K-costs secured for 2010-2012**	
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek		Water Quality	Water Quality Improvement	Decrease waste water flows, ; Implement TMDL		OCD	Implement	$0	Implement	$0	Implement	$0	Implement	$0	**$0**		

Okanogan

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection for conservation easement		CCT OVLC WDFW	Implement	$600,000	Implement	$2,000,000	Implement	$1,000,000	Implement	$1,000,000	**$4,500,000**	**$2M for 2010; $500k for 2011; $500k for 2012; $500k for 2013 - costs secured**	
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek		Habitat Diversity and Quantity	Riparian Habitat	Remove non-native elmtrees, selectively plant native vegetation, and protect existing CREP Livestock BMPs	**Property opposite Shellrock Point**	OCD, NRCS	Planning and Implementation	$0	Implement	$0	Maintenance	$0	Maintenance	$0	**$0**	**$67.5k for 2010; $35k for 2011; $14k for 2012; $5.6k for 2013 - costs secured**	
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek		Obstructions	Fish Screening	Inventory		OCD WDFW	Implement	$0	Implement	$0	Monitor	$0	Monitor	$0	**$0**	**$150k for 2010; $20k for 2011; $2k for 2012; $2k for 2013 - costs secured**	
Okanogan	Lower Middle Okanogan Salmon Creek to Siwash Creek		Habitat Diversity and Quantity	Riparian Habitat	Selectively plant native vegetation and protect existing CREP Livestock BMPs		OCD CCT RFEG WDFW	Implement	$0	Implement	$75,000	Implement	$75,000	Implement	$100,000	**$250,000**		
Okanogan	Upper Middle Okanogan, Siwash Creek to Okanogan/ Similkameen Confluence		Sediment	Sediment Reduction	Identify, evaluate and sequence locations		OCD CCT	Planning	$0	Implement	$100,000	Implement	$100,000	Implement	$100,000	**$300,000**	**$25k - costs secured for 2010**	
Okanogan	Upper Middle Okanogan, Siwash Creek to Okanogan/ Similkameen Confluence		Habitat Diversity and Quantity	Riparian Habitat	Selectively plant native vegetation and protect existing CREP Livestock BMPs		OCD CCT RFEG WDFW	Implement	$25,000	Implement	$25,000	Implement	$25,000	Implement	$25,000	**$100,000**		
Okanogan	Upper Middle Okanogan, Siwash Creek to Okanogan/ Similkameen Confluence		Sediment	Sediment Reduction	Identify sediment sources		OCD CCT RFEG WDFW	Planning	$0	Implement	$95,000	Implement	$95,000	Implement	$95,000	**$285,000**	**$15k - costs secured for 2010**	

Okanogan

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Okanogan	Upper Middle Okanogan, Siwash Creek to Okanogan/ Similkameen Confluence		Water Quantity	Instream Flow	Increase Stream Flows to decrease temperature (See Flows)		OCD Douglas County PUD Okanogan County PUD CCT	Planning	$0	Implement	$250,000	Implement	$250,000	Implement	$250,000	**$750,000**	**$50k - costs secured for 2010**	
Okanogan	Upper Okanogan	**Yes**	Temperature	Water Quality Improvement	Increase cold stream flows in the upper Okanogan	**Driscoll Island**	CCT OCD	Planning		Planning	$0	Implement	$200,000	Implement	$50,000	**$250,000**	**$25k - costs secured for 2011**	
Okanogan	Upper Okanogan		Habitat Diversity and Quantity	Riparian Habitat	Selectively plant native vegetation and protect existing CREP Livestock BMPs		OCD NRCS	Implement	$25,000	Implement	$25,000	Implement	$25,000	Implement	$25,000	**$100,000**		
Okanogan	Upper Okanogan		Sediment	Sediment Reduction	Identify sediment sources		OCD	Planning	$25,000	Implement	$50,000	Implement	$75,000	Implement	$75,000	**$225,000**		
Okanogan	Loup-Loup Creek	**Yes**	Water Quantity	Instream Flow	Evaluate and sequence high quality habitat protection/restoration		CCT OCD Okanogan County	Implement	$0	Implement/Monitor	$0	Implement/Monitor	$0	Implement/Monitor	$0	**$0**	**$525k for 2010; $335k for 2011; $185k for 2012; $170k for 2013 - costs secured**	
Okanogan	Loup-Loup Creek	**Yes**	Obstructions	Fish Passage	Evaluate and sequence high quality habitat protection/restoration	**Burdett Street and Highway 97**	CCT	Implement	$0	Implement	$0	Monitor	$0	Monitor	$0	**$0**	**$300k for 2010; $300k for 2011; $50k for 2012; $10k for 2013 - costs secured**	
Okanogan	Loup-Loup Creek		Sediment	Sediment Reduction	Identify sediment sources		OCD	Planning	$15,000	Implement	$45,000	Implement/Monitor	$75,000	Implement/Monitor	$75,000	**$210,000**		
Okanogan	Lower Salmon Creek	**Yes**	Water Quantity	Instream	Implement Irrigation Efficiencies projects	**Middle & Lower Salmon Creek; Pogue Flat irrigators on OID system**	OCD, CCT, BPA	Planning, Implementation	$0	Planning, Implementation	$125,000	Planning, Implementation	$125,000	Planning, Implementation	$125,000	**$375,000**	**$140k - costs secured for 2010**	
Okanogan	Lower Salmon Creek	**Yes**	Water Quantity	Instream	Reconnect the lower 4.3 miles to the lower Okanogan	**RM 4.3 to mouth**	CCT OVLC WDFW	Monitor/Implement	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**$350k for 2010; $350k for 2011; $350k for 2012; $350k for 2013 - costs secured**	
Okanogan	Lower Salmon Creek	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection		CCT	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	**$0**	**$200k for 2010; $200k for 2011; $200k for 2012; $200k for 2013 - costs secured**	

Okanogan

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Okanogan	Lower Salmon Creek		Habitat Diversity and Quantity	Riparian Habitat	design and permit CREP Livestock BMPs Planting		OCD RFEG WDFW	Implement	$0	Implement	$75,000	Implement	$75,000	Implement	$75,000	**$225,000**		
Okanogan	Lower Salmon Creek		Sediment	Sediment Reduction	Identify sediment sources		OCD CCT									**$0**		
Okanogan	Omak and Tributaries		Habitat Diversity and Quantity	Riparian Habitat	Evaluate and sequence high quality habitat protection/restoration		CCT OCD CRCD	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	**$0**	**$300k for 2010; $300k for 2011; $300k for 2012; $300k for 2013 - costs secured**	
Okanogan	Omak and Tributaries		Water Quantity	Instream Flow	Convert from surface diversions to wells that are not contiguous with Omak Creek		CCT	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	Planning/ Implement	$0	**$0**	**$50k for 2010; $50k for 2011; $50k for 2012; $50k for 2013 - costs secured**	
Okanogan	Omak and Tributaries		Obstructions	Fish Passage	Replace identified culverts		CCT	Planning/ Implement	$0	Implement	$0	Monitor	$0	Monitor	$0	**$0**	**$250k for 2010; $250k for 2011; $25k for 2012; $25k for 2013 - costs secured**	
Okanogan	Omak and Tributaries	**Yes**	Obstructions	Fish Passage	Rock plucking/manipulation	**Mission Falls**	CCT	Planning/ Implement	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**$150k for 2010; $25k for 2011; $25k for 2012; $25k for 2013 - costs secured**	
Okanogan	Small Tributary systems		Habitat Diversity and Quantity	Riparian Habitat	Removal of non-native elms and planting native shrubs	**Johnson Creek in Riverside**	City of Riverside, OCD, BPA	Planning and Implementation	$0	Maintenance and Monitoring	$4,500	Maintenance and Monitor	$2,500	Monitor	$1,450	**$8,450**	**$7500 for 2010 - costs secured**	
Okanogan	Small Tributary systems	**Yes**	Water Quantity	Instream Flow	Evaluate and sequence high quality habitat protection/restoration	**Tonasket Creek, Nine Mile, Siwash, Tunk, Aeneas, Bonaparte, Wildhorse Spring**	CCT WDFW	Planning/ Implement	$0	Implement	$750,000	Implement	$750,000	Implement	$750,000	**$2,250,000**	**$1.5M - costs secured for 2010**	
Okanogan	Small Tributary systems	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection/restoration	**Tonasket Creek, Nine Mile, Siwash, Tunk, Aeneas, Bonaparte Wildhorse Spring**	CCT	Planning/ Implement	$0	Implement	$750,000	Implement	$750,000	Implement	$750,000	**$2,250,000**	**$1.5M - costs secured for 2010**	
Okanogan	Small Tributary systems		Obstructions	Fish Passage	Fish screening	**Tonasket Creek, Nine Mile, Siwash, Tunk, Aeneas, Bonaparte Wildhorse Spring**	CCT WDFW	Planning/ Implement	$0	Implement	$25,000	Implement	$75,000	Monitor	$75,000	**$175,000**	**$20k - costs secured for 2010**	

Okanogan

Sub-basin	Assessment Unit	UCRTT Biological Priority?	Limiting Factor	Action Type	Specific Action	Location and Name	Project Sponsor	2010 Scope	2010 Costs Needed	2011 Scope	2011 Costs Needed	2012 Scope	2012 Costs Needed	2013 Scope	2013 Costs Needed	Total Estimated Costs Needed	Comments	Reach Assessment? (Completed, On-going, Planned)
Okanogan	Small Tributary systems	**Yes**	Water Quantity	Instream Flow	Work with water users to sequence high priority water acquisition	**Antoine Creek**	CCT	Implement	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**$5M for 2010; $100k for 2011; $100k for 2012; $40k for 2013 - costs secured**	
Okanogan	Small Tributary systems	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection	**Antoine Creek**	CCT	Implement	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**$5M for 2010; $100k for 2011; $100k for 2012; $12.5k for 2013 - costs secured**	
Okanogan	Small Tributary systems	**Yes**	Obstructions	Fish Passage	Evaluate and implement	**Antoine Creek**	CCT	Implement	$0	Monitor	$0	Monitor	$0	Monitor	$0	**$0**	**$500k for 2010; $50k for 2011; $50k for 2012; $50k for 2013 - costs secured**	
Okanogan	Lower Okanogan (Mouth to Salmon Creek)	**Yes**	Habitat Diversity and Quantity	Instream	Reconnect side channel	**Bonaparte Creek**	OCD, BLM, CCT	Planning/ Implement	$0	Implementation	$0	Implementation	$0	Implementation	$0	**$0**	**$150k for 2010; $150k for 2011; $150k for 2012; $150k for 2013 - costs secured**	
Okanogan	Similkameen		Sediment	Sediment Reduction	Evaluate and implement as appropriate		OCD	Planning	$0	Planning	$75,000	Implement	$75,000	Implement	$75,000	**$275,000**		
Okanogan	Similkameen	**Yes**	Water Quantity /Temperature	Instream	Investigate areas to promote cool water refugia in side channels; Utilize existing TIR, Ortho and LIDAR information to enhance existing hyporehic and connectivity information.		OKPUD /CCT	Planning	$0	Implement	$0	Monitor	$0	Monitor	$0	**$0**	**$500k for 2011; $50k for 2012; $50k for 2013 - costs secured**	
Okanogan	Similkameen	**Yes**	Habitat Diversity and Quantity	Land Protection, Acquisition, or Lease	Evaluate and sequence high quality habitat protection	**Enloe to Confluence with Okanogan**	CCT	Planning	$0	Implement	$0	Implement	$0	Implement	$0	**$0**	**$100k for 2010; $750k for 2011; $750k for 2012; $750k for 2013 - costs secured**	
									$690,000		**$4,804,500**		**$4,447,500**		**$4,246,450**	**$14,138,450**		

APPENDIX F

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Monitoring and Evaluation in the Upper Columbia

Monitoring and Evaluation in the Upper Columbia

The decision making process outlined in Adaptive Management Framework adopted by the Upper Columbia Salmon Recovery Board calls for inputs of detailed, reliable information to provide feedback on the status of salmon populations and their habitats, and progress that has been made by, and effectiveness of, recovery efforts intended to restore salmon and habitat. The information necessary to make adaptive management work in the Upper Columbia is provided by a number of different monitoring programs, run by various agencies and organizations, and funded for various purposes. These monitoring programs are guided, and given a salmon recovery context through a number of key guidance documents. Data produced by these programs are managed by individual agencies and organizations, with assistance and coordination provided by subbasin-level coordinators and an Upper Columbia Data Steward. Evaluation of monitoring data is focused on answering Key Management Questions, and making recommendations for the improvement of salmon recovery implementation in the future.

This document gives a summary overview of the monitoring guidance and planning documents, monitoring programs, data management, evaluation, and reporting in the Upper Columbia.

Monitoring Planning and Guidance

Monitoring Strategy for the Upper Columbia Basin

The *Monitoring Strategy for the Upper Columbia Basin* (Hillman 2006) was written with the intention of reducing redundancy, increasing efficiency, meeting the goals and objectives of the various entities involved in the monitoring and evaluation of salmon and steelhead in the Upper Columbia, and providing a way to assess the recovery of ESA-listed fish species. The document draws from existing strategies to outline an Upper Columbia-specific approach to monitoring that incorporates the many different existing monitoring programs in the Upper Columbia, and is intended to answer the following questions:

1. What are the current habitat conditions and abundance, distribution, life-stage survival, and age-composition of fish in the Upper Columbia Basin (status monitoring)?

2. How do these factors change over time (trend monitoring)?

3. What effects do tributary habitat actions have on fish populations and habitat conditions (effectiveness monitoring)?

The Monitoring Strategy covers: valid statistical designs for status/trend and effectiveness monitoring; issues associated with sampling design, with an emphasis on selecting a samples and how to minimize measurement error; how sampling should occur at different spatial scales; the importance of classification, including a suite of classification variables; biological and physical/environmental indicators for use in the Upper Columbia; and methods for measuring each indicator variable.

Subbasin-specific monitoring plans, in various stages of completion, appear as appendices to the *Monitoring Strategy for the Upper Columbia Basin*:

Appendix A: Wenatchee – the Wenatchee appendix to the monitoring strategy (Nelle and Ward 2009), gives an overview of current monitoring efforts in the Wenatchee subbasin, with a particular focus on the

efforts of the ISEMP. The current version of this appendix has been finalized by the MaDMC, and has been posted to the Upper Columbia Salmon Recovery Board (UCSRB) website (http://www.ucsrb.com/Editor/assets/isemp_impstrat_2009.pdf).

Appendix B: Entiat – The Entiat appendix gives an overview of monitoring in the Entiat Subbasin associated with ISEMP and the Entiat IMW. This appendix is currently under development. It has been added to the MaDMC workplan for 2010, and is review of a draft is expected to begin in June 2010

Appendix C: Methow – A regionally coordinated monitoring plan for the Methow subbasin has not been written. An inventory of monitoring in the Methow Subbasin (Crandall 2009), completed in 2009, conducted a baseline inventory and analysis of current monitoring programs and concluded that even without an extensive effort to coordinate monitoring at both the local and regional level, monitoring in the Methow is addressing many aspects of recovery planning set forth in the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (UCSRB 2007) as well as nearly all of the core indicators recommended by the Monitoring Strategy (Hillman 2006). The Methow Subbasin Monitoring Inventory is being used as the foundation for Appendix C, which is currently under development, and is expected to be presented for review by the MaDMC by the end of 2010.

Appendix D: Okanogan – The Okanogan appendix to the monitoring strategy is in development, using the Wenatchee appendix as a template. A draft is expected for review by the MaDMC by August 2010.

Appendix P: Upper Columbia Spring Chinook Salmon and Steelhead Monitoring and Evaluation Plan

The Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan includes, as Appendix P, a monitoring and evaluation plan. Appendix P has gone through several stages of development, including a revision to make the appendix consistent with monitoring guidance from NOAA (NOAA 2009), and a review by NOAA's Recovery Implementation Science Team (RIST 2009).

Appendix P describes five main questions that are of interest to regulators, funders, and those working to recovery salmon and steelhead in the Upper Columbia:

1) Is the status of the population/ESU/DPS improving?;
2) Are the primary factors limiting the status of the population/ESU/DPS increasing or decreasing?;
3) Are the actions identified in the recovery plan being implemented correctly and according to the implementation schedule?;
4) Which actions are effective and should be continued?; and
5) How will the data be managed and curated?

Each of these questions is followed, in the appendix, with a list of sub-questions related to answering the main question. The whole list, including the main questions and the sub-questions, has been adopted by the Upper Columbia Regional Technical Team (UCRTT) and the UCSRB as a list of ***Key Management Questions***. Answering the Key Management Questions calls for three types of monitoring: 1) status and trend; 2) implementation; and 3) effectiveness monitoring. Appendix P describes objectives, monitoring questions, sampling design, spatial and temporal scale, measured and derived variables, measurement protocols, analysis, possible funding, and coordination needed to answer the Key Management Questions using those three types of monitoring.

Figure 1: Upper Columbia Key Management Questions: Take from the revised Appendix P (Hillman 2008)

1 Is the status of the population/ESU/DPS improving?

1.1 Is the abundance of naturally produced adult fish trending to the recovery criteria for each population?

1.2 Is the population productivity of naturally produced fish trending to the recovery criteria for each population?

1.2.1 Is juvenile productivity of naturally produced fish increasing within each population?

1.3 Is the spatial structure of the populations trending to the recovery criteria for each population?

1.3.1 Does the number and spatial arrangement of spawning areas meet recovery criteria for each population?

1.3.2 Does the spatial extent or range of the population meet recovery criteria for each population?

This question deals with the proportion of the historical range that is currently occupied and the presence of spawners in major spawning areas.

1.3.3 Do the gaps or continuities between spawning areas meet recovery criteria for each population?

This question is concerned with the distance (stream km) between spawning areas.

1.4 Is the phenotypic and genotypic diversity of the population trending to the recovery criteria for each population?

1.4.1 Are all the major life-history strategies that occurred historically still expressed within the population?

1.4.2 Is the morphological, life history, and/or behavioral differentiation within and between populations consistent with the historic condition or a suitable reference condition?

This question deals with the average condition, amount of variability, and presence or absence of phenotypic traits. The focus is on spawn timing, size at age, and fecundity at age. A reference condition for phenotypic variation is needed to determine if this goal is achieved.

1.4.3 Is the genetic differentiation within and between populations consistent with the historical condition or a suitable reference condition?

1.4.4 Is the proportion of natural spawners within the population that is derived from a local (within population) hatchery brood-stock

program, which is using best management practices, trending to the recovery criteria for each population?

1.4.5 Is the proportion of natural spawners within the population that is derived from a local brood-stock program, which is not using best management practices, trending to the recovery criteria for each population?

1.4.6 Is the proportion of natural spawners within the population that is derived from a within-MPG brood-stock program trending to the recovery criteria for each population?

1.4.7 Is the proportion of natural spawners within the population that is made up of exogenous, out-of-MGP strays trending to the recovery criteria for each population?

1.4.8 Is the proportion of natural spawners within the population that is made up of exogenous, out-of-ESU strays trending to the recovery criteria for each population?

1.4.9 Is the distribution of spawners across naturally occurring habitat types within the geographic area of the population trending to the recovery criteria for each population?

1.4.10 Are there ongoing anthropogenic activities that are causing selective mortality or habitat change within or outside the boundaries of the population?

2 **Is the status of habitat improving?**

2.1 Is water quality increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.2 Is habitat access or connectivity increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.3 Is habitat access or connectivity increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.4 Is habitat quality increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.5 Is channel condition increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.6 Is riparian condition increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.7 Are stream flows increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

2.8 Is watershed condition increasing, decreasing, or remaining stable within the distribution of the populations in the Upper Columbia region?

3 **Are the primary factors limiting the status of the population/ESU/DPS increasing or decreasing?**

3.1 Are the limiting factors associated with habitat being ameliorated such that they do not limit the desired status of the population?

3.1.1 Have we done things to address them

3.1.2 Are we planning the right things to address them

3.1.3 Have the habitat conditions changed in response to the actions in a manner that reduces the limitations?

3.2 Are the limiting factors associated with hydropower being ameliorated such that they do not limit the desired status of the population?

3.3 Are the limiting factors associated with harvest being ameliorated such that they do not limit the desired status of the population?

3.4 Are the limiting factors associated with hatcheries being ameliorated such that they do not limit the desired status of the population?

3.5 Are the limiting factors associated with disease and predation being ameliorated such that they do not limit the desired status of the population?

3.6 Are the inadequacies of existing regulatory mechanisms being ameliorated such that they do not limit the desired status of the population?

3.7 What natural factors limit the desired status of the population?

4 Are the actions identified in the recovery plan being implemented correctly and according to the implementation schedule?

4.1 Were actions implemented according to the implementation schedule?

4.1.1 What types of actions were implemented this year? (Types of actions include fish screening, fish passage, instream flow, instream structure, off-channel wetland, riparian sediment reduction, upland agriculture, upland vegetation, upland wetland, water quality improvement, land protection, and nutrient enrichment project types.)

4.1.2 How many actions of each type were implemented this year?

4.1.3 Did the number of actions implemented this year meet the target number identified in the implementation schedule or adaptive management plan (Appendix Q)?

4.1.4 What factors prevented the target number of actions from being implemented?

4.2 Were actions implemented correctly?

4.2.1 Were the actions implemented in the proper locations?

4.2.2 Were the actions implemented according to the design plans?

4.2.3 What was the total area or stream length affected by the action?

5 Which actions are effective and should be continued?

5.1 Which actions should be most important to managers and funding entities?

5.2 What exactly do managers and funding entities need to know?

5.2.1 Did the project type affect the environmental parameters (physical/chemical variables) that were the target of the action?

5.2.2 Did the project type affect environmental and biological parameters at a reach or habitat scale?

5.2.3 Did the project type affect the biological parameters at a population scale?

5.2.4 Did multiple action types affect the biological parameters at a population scale?

Appendix Q: Habitat Adaptive Management Framework for the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan

The Habitat Adaptive Management Framework for the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (Hillman, et al. 2008) was written as a catalyst for further long-term development of a formal adaptive management plan. Until a formal adaptive management plan is completed, the adaptive management framework guides implementation of the Recovery Plan and provides near-term support for sponsors of recovery actions and those responsible for making recovery decisions in the Upper Columbia region by:

- Creating an adaptive, decision-making structure with benchmarks and timelines.
- Supporting the salmon, steelhead, and bull trout delisting framework outlined in the Recovery Plan (Section 4) by providing data on Viable Salmonid Population (VSP) parameters and the status of listing factors.
- Providing for the design and implement monitoring, research, and evaluation that test the critical uncertainties associated with recovery objectives, strategies, and actions.

Decision Making, Benchmarks, and Timelines –The aim of the adaptive management framework is to foster a process that increases the quality, effectiveness, and efficiency of decisions by fostering a process that supports a web of information sharing and participatory decision-making based on consensus-building and coordination among salmon recovery stakeholders.

Goals for recovery actions within the adaptive management framework are identified primarily in terms of directional ("who, what, where, and when") rather than target (e.g. how much effort will be needed and how much improvement occurs as a result of each action) outcomes to address uncertainties in the magnitude of effect of any given action and the effort required to achieve a given improvement. The directional approach was chosen because of the difficulty of using target outcomes without adequate information to accurately define magnitudes of effort and specific conditions that will achieve biological recovery objectives. With more and better information, salmon recovery entities in the Upper Columbia region will develop specific performance targets that will be evaluated at specified intervals, referred to as "checkpoints".

Support of the Recovery Plan Delisting Framework – One purpose of the adaptive management framework is to provide for the implementation of recovery actions together with necessary monitoring in order to support the needs of NOAA to determine the status of Upper Columbia populations (See Figure 1).

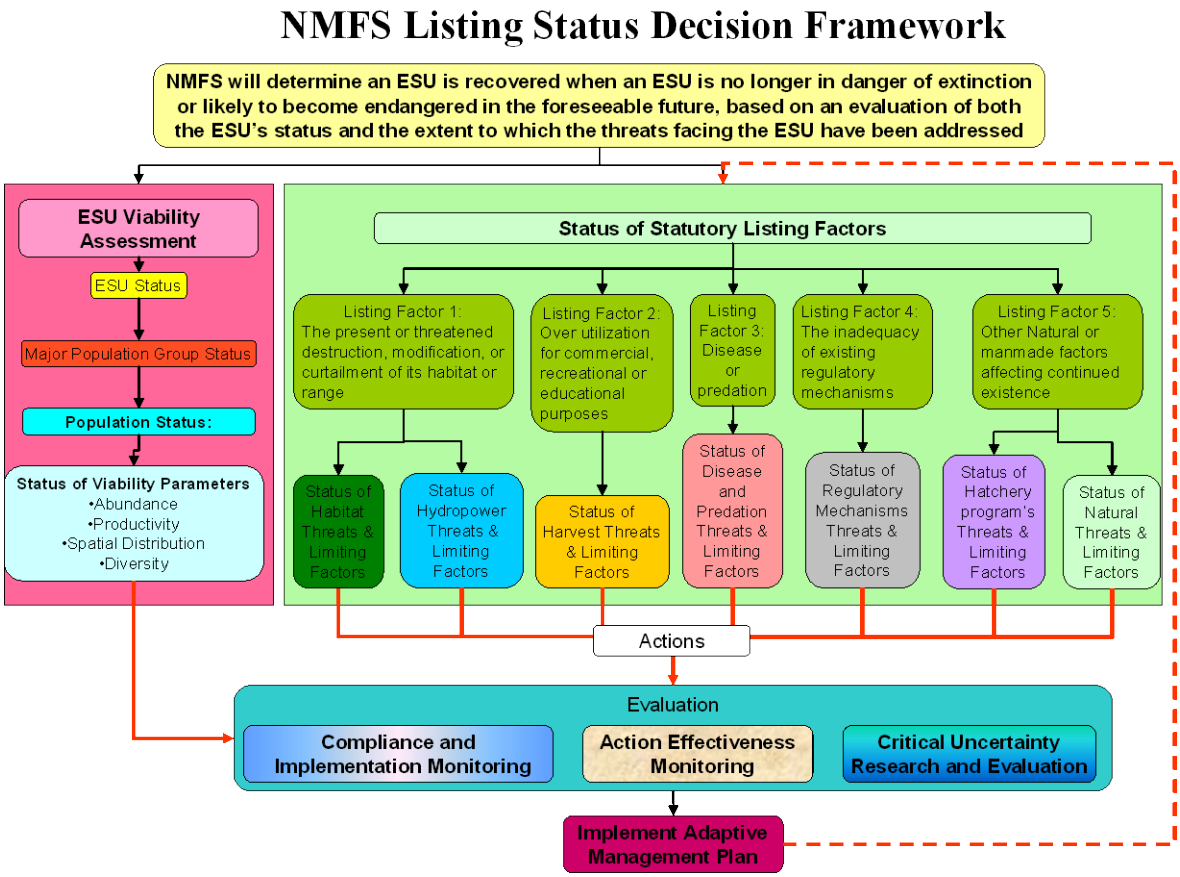

Figure 2. Flow diagram outlining the decision framework used by NOAA Fisheries to assess the status of biological viability criteria and limiting factors criteria. This information is needed to determine if an ESU/DPS is recovered and no longer in danger of extinction.

Design and Implementation of Monitoring – The adaptive management framework puts the rich monitoring that is conducted in the Upper Columbia into the context of a responsive decision-making process. Analyses of Upper Columbia monitoring data are used as the basis for recommendations, made

through a process of periodic Regional Technical Team Analysis Workshops, Adaptive Management Workshops, and Adaptive Management Science Synthesis Papers, that may lead to modifications to the way actions are implemented, or even to changes to the Recovery Plan.

The monitoring section of the framework identifies measures of success, measures of progress, and collection of information for: implementation monitoring, effectiveness monitoring, status and trend monitoring, change in habitat status, and critical uncertainties research monitoring.

Monitoring Efforts

Population Status and Trends

Monitoring of population status is needed in order to determine whether the desired outcome of establishing long-term persistence of viable populations of naturally produced spring Chinook, steelhead and bull trout distributed across their native range, has been achieved. The status of a population is determined by measuring metrics related to Viable Salmonid Population (population abundance, productivity, spatial structure, and genetic diversity, described in Section 4 of the Recovery Plan). The status of these metrics is compared to population-specific recovery criteria identified in Section 4.4 of the Recovery Plan to arrive at an overall conclusion on the status of the population/ESU/DPS.

Entiat – Extensive fish population monitoring is occurring throughout the watershed and at the population level. Population status and trends monitoring is conducted by the Integrated Status and Effectiveness Monitoring Program (ISEMP), U.S. Fish and Wildlife Service (USFWS), and others at GRTS-based random sites throughout the Entiat River Subbasin with funding provided by Bonneville Power Administration (BPA) (BPA Project #2003-017-00). Additional population information is collected at sites associated with implementation of habitat restoration actions as part of the Entiat IMW. ISEMP population monitoring in the Entiat basin follows the design and implementation protocols outlined in the Recovery Plan monitoring strategy sampling regime and includes the indicators in Table 1 (Nelle and Ward 2009).

Table 1. A list of general population characteristics and specific indicators monitored in the Entiat subbasin as part of ISEMP and related monitoring programs.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Adults- not currently monitored in the Entiat River subbasin but USFWS discussing partial weir at ENFH	Escapement/Number	Not currently monitored	Annual	Decades	Subbasin
	Age structure	Not currently monitored	Annual	Decades	Subbasin
	Size	Not currently monitored	Annual	Decades	Subbasin
	Sex ratio	Not currently monitored	Annual	Decades	Subbasin
	Origin	Not currently monitored	Annual	Decades	Subbasin
	Genetics	Not currently monitored	Annual	Decades	Subbasin
	Fecundity	Not currently monitored	Annual	Decades	Subbasin
Redds	Number	USFWS for Chinook; ISEMP and USFWS for steelhead	Annual	Decades	Subbasin
	Distribution	USFWS for Chinook; ISEMP and USFWS for steelhead	Annual	Decades	Subbasin
Parr/Juveniles	Abundance	ISEMP	Annual	5 to 20 years	Subbasin

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Distribution	ISEMP	Annual	5 to 20 years	Subbasin
	Size	ISEMP	Annual	5 to 20 years	Subbasin
Smolts	Number	ISEMP and USFWS	Annual	10 to 20 years	Subbasin
	Size	ISEMP and USFWS	Annual	10 to 20 years	Subbasin
	Genetics	ISEMP and USFWS	Annual	10 to 20 years	Subbasin
Macroinverte-brates	Composition	ISEMP	Annual	at least 5 years	Subbasin
	Transport from Headwaters	ISEMP	Annual	completed in 2008	Subbasin

Methow – In the Methow subbasin, over 12 organizations (including agencies, tribes and non-governmental entities) are monitoring the status and trends of salmonid populations through a multiple monitoring programs. The Methow Restoration Council (MRC), which includes representatives from local, state, tribal, federal and non-profit groups are working to help coordinate monitoring in the Methow, along with planning and implementing restoration and protection projects. The combined monitoring effort in the Methow subbasin is broad in geographic scope and encompasses numerous status and trend and effectiveness monitoring programs. See Tables 2 and 3 for a list of general characteristics and specific indicators for Steelhead and Spring Chinook that are monitored as part of the Methow's population monitoring programs.

Table 2. Biological indicator variables currently monitored for steelhead in the Methow River Basin, modified from Hillman, 2006. A list of general habitat characteristics and specific indicators monitored as part of OBMEP and related monitoring programs in the Okanogan.

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Adults WDFW collects adult steelhead data through the broodstock collection program (includes rearing) at Wells Dam. Collection occurs Aug-Oct. Escapement also informed by redd counts. Status and trend.	Escapement/Number 1. WDFW Broodstock Program 2. WDFW Redd Surveys -Total spawners (1) -Spawners per tributary (2)
	Age structure 1. WDFW Broodstock Program -Scale analysis
	Size 1. WDFW Broodstock Program -Morphometrics
	Sex ratio 1. WDFW Broodstock Program -Male:Female ratio

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
	Origin (hatchery or wild) 1. WDFW Broodstock Program -% wild/%hatchery -Stray rate
	Genetics 1. WDFW Broodstock Program -Olympia lab analysis
	Fecundity 1. WDFW Broodstock Program -Female fecundity
Redds WDFW conducts steelhead redd counts using the Index Expansion Method in Methow, Chewuch, Twisp Rivers and Beaver and Little Bridge Creeks and rotating panel of smaller tributaries. Protocol uses ratio of visible/non-visible redds from index reach in each subbasin to extrapolate to entire basin during 1x/year sampling during mid Mar-May. Status and trend. Included is the adult spawning surveys WDFW conducts in the restoration site in Hancock Springs for Yakama Nation. Status, trend, and effectiveness monitoring.	**Number** 1. WDFW Redd Surveys -Index count
	Distribution 1. WDFW Redd Surveys -Location of redds
Parr/Juveniles USGS Lower Tributary Effectiveness Monitoring in Beaver, Gold and Libby Creeks (Completed 2007, but portions on-going). USGS Middle Methow Effectiveness Monitoring (middle Methow (Twisp-Winthrop), upper Methow, Chewuch River and Wolf and Eightmile Creeks) began in 2008. Reach and population scale effectiveness monitoring. SRFB has juvenile snorkel surveys in eight 500m reaches (Above and below both Fulton and Chewuch dams, four in two locations in mainstem Methow). Chinook specific, but may also encounter steelhead. Reach scale effectiveness monitoring (led by Tetra Tech Consulting). USFS conducts snorkel surveys as a portion of its Stream Inventory. Ten year rotating panel in fish-bearing HUC 5 and 6 watersheds. Status and trend. <u>Note</u>: WDFW implants PIT tags in all wild steelhead and spring Chinook juveniles captured during smolt trapping. Additionally, WDFW captures and PIT tags wild steelhead and spring Chinook juveniles via angling and may expand this effort to include other capture methods.	**Abundance** 1. USGS Lower Tributary Effectiveness Monitoring 2. USGS Middle Methow Effectiveness Monitoring 3. SRFB Effectiveness Monitoring – passage, habitat -juveniles/m/habitat type (1,2) -juveniles/m2 (3)
	Distribution 1. USGS Lower Tributary Effectiveness Monitoring 2. USGS Middle Methow Effectiveness Monitoring 3. USFS Stream Inventory -Location via PIT tag interrogators, traps, etc. (1,2) -fish/m/habitat type (1,2) -Presence/absence (3)
	Size 1. USGS Lower Tributary Effectiveness Monitoring 2. USGS Middle Methow Effectiveness Monitoring 3. USFS Stream Inventory 4. SRFB Effectiveness Monitoring – passage, habitat -Length, weight, FCF (1,2) -Length estimates (3,4)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Smolts WDFW steelhead smolt trapping occurs in the Methow R. at McFarland Creek and in the lower Twisp R to determine how many smolt migrated per brood year (smolt/redd). Monitoring generally occurs from mid-Feb-Nov. Each year, captured transitional parr are added into smolt production estimates for that year. Status and trend.	Number 1. WDFW smolt trapping -Production estimates/CPUE -Timing of emigration -Egg to smolt survival
	Size 1. WDFW smolt trapping -Length/weight at emigration
	Genetics 1. WDFW smolt trapping -WDFW Olympia lab analysis
Macroinvertebrates SRFB Habitat Protection Effectiveness Monitoring program has one site on the Methow River near Fawn Creek. Reach scale effectiveness monitoring (led by Tetra Tech). PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Ck. Integrator, DMA and Sentinel sites. Effectiveness monitoring. AREMP Reach-based Effectiveness Monitoring monitors three sites (Gold Ck, SF Lost R., lower Lost R.). Protocol changed in 2007. Multiple reaches within HUC6 watersheds. Effectiveness and status and trend monitoring. Yakama Nation monitors BMI community in Hancock Springs and an adjacent site in Methow R. Two year (2006 and 2007) effectiveness monitoring, possibly on-going. Yakama Nation Nutrient Monitoring monitors six transects in the Twisp River. Ongoing statistics dictate sampling regime.	Transport Composition 1. SRFB Habitat Protection Monitoring - protection 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. Yakama Nation Hancock Springs Monitoring Program 5. Yakama Nation Nutrient Monitoring Program - BMI Community Metrics

Table 3. Biological indicator variables currently monitored for Spring Chinook in the Methow River Basin, modified from Hillman, 2006. A list of general habitat characteristics and specific indicators monitored as part of OBMEP and related monitoring programs in the Okanogan.

General characteristics	Specific indicators Entity program -Variables (project #, no # = all projects) * = not a core variable
Adults WDFW tracks all redds on a weekly basis from Aug-Sep. Methow (to Ballard CG), Chewuch (to 30 mile Ck.), Twisp (to Roads End CG), and Lost (to Eureka Ck) Rivers, and Wolf, Beaver, Early Winters, Gold Creeks. Carcass collection occurs to address several indicators. Status and trend. WDFW conducts broodstock activities at Wells Dam that includes escapement, age, sex, size, origin. Status and trend. WDFW also collects fecundity data from fish spawned at WDFW facilities (Methow Hatchery – spring Chinook, Wells Hatchery – steelhead). Status and trend. SRFB Effectiveness Monitoring conducts spawner and carcass surveys in four 500m reaches of the Chewuch River (above and below both Fulton and Chewuch diversion dams). Reach scale effectiveness monitoring (led by Tetra Tech Consulting).	Escapement/Number 1. WDFW Broodstock Program (basin) 2. WDFW Basinwide Redd Counts (tributaries) 3. SRFB Effectiveness Monitoring (reach) -Total spawners (1,3) -Spawners/tributary (2) -Spawn timing (2)
	Age structure 1. WDFW Basinwide Redd Counts (Carcass) 2. WDFW Broodstock Program -Scale analysis
	Size 1. WDFW Basinwide Redd Counts (Carcass) 2. WDFW Broodstock program -Morphometrics
	Sex ratio 1. WDFW Basinwide Redd Counts (Carcass) 2. WDFW Broodstock Program -Male:Female ratio
	Origin (hatchery or wild) 1. WDFW Basinwide Redd Counts (Carcass) 2. WDFW Broodstock Program -Tags/fin clips -Stray rates (1)
	Genetics 1. WDFW Basinwide Redd Counts (Carcass) 2. WDFW Broodstock Program -WDFW Olympia lab analysis
	Fecundity 1. WDFW Broodstock Program 2. WDFW Basinwide Redd Counts (Carcass) -Female fecundity (1) -Egg voidance/retention (2)
Redds WDFW tracks all redds on a weekly basis from Aug-Sep. Methow (to Ballard CG), Chewuch (to Lake Ck.), Twisp (to Roads End CG) Rivers, also Lost, Wolf, Beaver, Early Winters, Gold Creeks. Status and trend.	Number 1. WDFW Basinwide Redd Counts 2. SRFB Effectiveness Monitoring – fish passage -Total count (1) -Reach count (2)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all projects) * = not a core variable
SRFB Effectiveness Monitoring conducts redd surveys in four 500m reaches (Above and below both Fulton and Chewuch dams). Reach scale effectiveness monitoring (led by Tetra Tech Consulting).	Distribution 1. WDFW Basinwide Redd Counts -Location of redds
Parr/Juveniles SRFB Effectiveness Monitoring has juvenile snorkel surveys in eight 500m reaches (above and below both Fulton and Chewuch dams, four in two locations in mainstem Methow). Reach scale effectiveness monitoring (led by Tetra Tech Consulting). USGS began Middle Methow Effectiveness Monitoring (middle Methow (Twisp-Winthrop), upper Methow, lower Twisp and lower Chewuch, Wolf and Eightmile Creeks) in 2008 that will likely to encounter Chinook juveniles. USGS also conducts juvenile work in Beaver, Gold and Libby Creeks that was completed 2007 but portions on-going and not Chinook specific. Reach/population scale effectiveness monitoring. USFS conducts snorkel surveys as a portion of its Stream Inventory. Ten year rotating panel in fish-bearing HUC 5 and 6 watersheds. Status and trend.	Abundance 1. SRFB Effectiveness Monitoring – fish passage, habitat 2. USGS Middle Methow Effectiveness Monitoring -juveniles/m2 (1) -fish/m/habitat (2)
	Distribution 1. USGS Middle Methow Effectiveness Monitoring 2. USFS Stream Inventory -Location via PIT tag interrogators, traps, etc. (1) -Presence/absence (2)
	Size 1. USGS Middle Methow Effectiveness Monitoring 2. USFS Stream Inventory 3. SRFB Effectiveness Monitoring – fish passage, habitat -Length, weight (1) -Length estimates (2,3)
Smolts WDFW smolt trapping occurs in the Methow R. at McFarland Creek and in the lower Twisp R. to determine how many, and when, smolt migrated per brood year. Monitoring generally occurs from mid-Feb-Nov. Transitional parr collected during Fall emigration and are combined with the Spring smolt count for total brood emigration rate.	Number 1. WDFW Smolt Trapping -Production estimates/CPUE -Smolts/redd
	Size 1. WDFW Smolt Trapping -Length, weight, FCF, age
	Genetics 1. WDFW Smolt Trapping -WDFW Olympia lab analysis
Macroinvertebrates SRFB Habitat Protection Effectiveness Monitoring program has one site on the Methow River near Fawn Creek. Reach scale effectiveness monitoring (led by Tetra Tech Consulting). PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Creeks. Integrator, DMA and	Transport
	Composition 1. SRFB Effectiveness Monitoring - protection 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. Yakama Nation Nutrient Monitoring Program -BMI Community Metrics

General characteristics	Specific indicators Entity program -Variables (project #, no # = all projects) * = not a core variable
Sentinel sites. PACFISH/INFISH effectiveness monitoring. AREMP Reach-based Effectiveness Monitoring monitors three sites (Gold Ck, SF Lost R., lower Lost R.). Protocol changed in 2007. Multiple reaches within HUC6 watersheds. Forest Plan effectiveness and status and trend monitoring. Yakama Nation Nutrient Monitoring monitors six locations in the Twisp River. Ongoing statistics dictate sampling regime.	

Okanogan – Population status and trends in the Okanogan subbasin are being monitored and evaluated through funding provided by the Bonneville Power Administration (BPA) Okanogan Basin Monitoring and Evaluation Program (BPA Project #2003-022-00; OBMEP). Monitoring efforts within the OBMEP framework are being coordinated by the Colville Tribes, Okanogan Nation Alliance, Bio-analyst, Washington Department of Fish and Wildlife (WDFW), WDOE, USGS, Environment Canada and the Upper Columbia UCRTT which includes representatives from WDFW, Yakama Nation, USFWS, U.S. Forest Service (USFS), WDOE, Douglas PUD, Chelan Co PUD, Grant PUD and private consultants.

OBMEP in the Okanogan basin follows the design and implementation of specific standardized protocols posted on the OBMEP web site: http://nrd.colvilletribes.com/obmep/Reports.htm. For population status and trends these protocols include: Rotary Screw Trapping (Rayton and Wagner 2006), Snorkel Survey (Arterburn and Kistler 2007), Redd survey (Arterburn et al. 2007), and Underwater video enumeration (Nass 2007). Specific population related metrics monitored are listed in Table 4.

Extensive summer steelhead population monitoring in the Okanogan subbasin is occurring throughout the watershed and at the population level through OBMEP. Summer Chinook monitoring is mainly occurring through the Public Utility Districts Habitat Conservation Plans most directly through hatchery monitoring carried out by Chelan and Douglas PUD's. Annual reports of these efforts carried out by Bio Analyst since 2004 are posted to the OBMEP web site at: http://nrd.colvilletribes.com/obmep/Reports.htm. Sockeye populations are mainly monitored in Canada through funding arrangements with Douglas PUD. Existing summer Chinook and sockeye population data are augmented with additional fish monitoring by OBMEP.

Table 4. A list of general habitat characteristics and specific indicators monitored as part of OBMEP and related monitoring programs in the Okanogan.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Adults	Escapement/Number	WDFW, OBMEP,Bio-analyst, ONA, DFO and other Colville Tribal programs	Annual	Decades	Subbasin
	Age structure	WDFW,Bio-analyst, DFO and other Colville Tribal programs	Annual	Decades	Subbasin
	Size	WDFW, OBMEP,Bio-analyst, ONA, DFO and other Colville Tribal programs WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Sex ratio	WDFW, OBMEP,Bio-analyst, ONA, DFO and other Colville Tribal programs	Annual	Decades	Subbasin
	Origin	WDFW, OBMEP,Bio-analyst, ONA, DFO and other Colville Tribal programs	Annual	Decades	Subbasin
	Genetics	WDFW/CRITFC Pedigree Study for Summer Steelhead and kelts in Omak Creek	Annual	Decades	Subbasin
	Fecundity	WDFW, Bio-analyst, DFO and other Colville Tribal programs	Annual	Decades	Subbasin
Redds	Number	OBMEP for steelhead, CCPUD for Chinook; *ONA and DFO* for sockeye	Annual	Decades	Subbasin
	Distribution	OBMEP for steelhead, CCPUD for Chinook; *ONA and DFO* for sockeye	Annual	Decades	Subbasin
Parr/Juveniles	Abundance	OBMEP	Annual	5 to 20 years	Subbasin
	Distribution	OBMEP	Annual	5 to 20 years	Subbasin
	Size	OBMEP	Annual	5 to 20 years	Subbasin
Smolts	Number	OBMEP, DFO for Sockeye	Annual	10 to 20 years	Subbasin
	Size	OBMEP, DFO for Sockeye	Annual	10 to 20 years	Subbasin
	Genetics	WDFW/CRITFC Pedigree Study for Summer Steelhead and kelts in Omak Creek	Annual	10 to 20 years	Subbasin

Wenatchee – Extensive fish population monitoring is occurring throughout the watershed and at the population level. Population status and trends monitoring in the Wenatchee subbasin occurs through the efforts of the Public Utility Districts through their Habitat Conservation Plan commitments, and augmented with additional fish monitoring funded by the BPA through the Integrated Status and Effectiveness Monitoring Program (BPA Project #2003-017-00; ISEMP), and the Yakama Nation, USFWS, and others.

ISEMP population monitoring in the Wenatchee basin follows the design and implementation protocols outlined in the Recovery Plan monitoring strategy sampling regime and includes the indicators in Table 5 (Nelle and Ward 2009).

Table 5. A list of general population characteristics and specific indicators monitored in the Wenatchee subbasin as part of ISEMP and related monitoring programs.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Adults	Escapement/Number	WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Age structure	WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Size	WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Sex ratio	WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Origin	WDFW/USFWS/YN Programs	Annual	Decades	Subbasin
	Genetics	WDFW/NOAA Pedigree Study for spring Chinook; CCPUD M&E study	Annual	Decades	Subbasin
	Fecundity	WDFW	Annual	Decades	Subbasin
Redds	Number	WDFW and CCPUD for Chinook; ISEMP and WDFW for steelhead; YN for coho; WDFW for sockeye	Annual	Decades	Subbasin
	Distribution	WDFW and CCPUD for Chinook; ISEMP and WDFW for steelhead; YN for coho; WDFW for sockeye	Annual	Decades	Subbasin
Parr/Juveniles	Abundance	ISEMP	Annual	5 to 20 years	Subbasin
	Distribution	ISEMP	Annual	5 to 20 years	Subbasin
	Size	ISEMP	Annual	5 to 20 years	Subbasin
Smolts	Number	ISEMP and WDFW/USFWS/YN Programs	Annual	10 to 20 years	Subbasin
	Size	ISEMP and WDFW/USFWS/YN Programs	Annual	10 to 20 years	Subbasin
	Genetics	ISEMP; WDFW/NOAA Pedigree Study for spring Chinook; CCPUD M&E study for spring Chinook and steelhead	Annual	10 to 20 years	Subbasin
Macroinverte-brates	Composition	ISEMP	Annual	at least 5 years	Subbasin
	Transport from Headwaters	ISEMP	Annual	completed in 2008	Subbasin

Habitat Status and Trends

The Upper Columbia Adaptive Management Framework recognizes that limiting factors associated with degradation of stream habitat conditions play an important role in the viability of Upper Columbia salmon and steelhead, and that these conditions are controlled by factors that operate at different spatial and temporal scales. Therefore, the monitoring of habitat status and trends in the Upper Columbia focuses on measuring those stream habitat characteristics thought to most closely relate to viability of salmon populations.

Entiat – Habitat status and trends monitoring is conducted by the ISEMP, at GRTS-based random sites throughout the Entiat River Subbasin, with funding provided by BPA (BPA Project #2003-017-00). Additional habitat information is collected at sites associated with implementation of habitat restoration actions as part of the Entiat IMW. ISEMP habitat monitoring in the Entiat basin follows the design and implementation protocols outlined in the Recovery Plan monitoring strategy sampling regime and includes the indicators in Table 6 (Nelle and Ward 2009).

Table 6. A list of general habitat characteristics and specific indicators monitored in the Entiat subbasin as part of ISEMP and related monitoring programs.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Water Quality	MWMT and MDMT	ISEMP, USFS-ERD	Continuous	at least 5 years	
	Turbidity	Not currently monitored	Continuous	at least 5 years	
	Conductivity	ISEMP and USFS-PNRS	Continuous	at least 5 years	
	pH	ISEMP and USFS	Continuous	at least 5 years	
	Dissolved oxygen	ISEMP and USFS	Continuous	at least 5 years	
	Nitrogen	Not currently monitored	Monthly	at least 5 years	
	Phosphorus	Not currently monitored	Monthly	at least 5 years	
Habitat Access	Road crossings	ISEMP	2006	1 year	Subbasin
	Diversion dams	WDFW	2006	1 year	Subbasin
	Fishways	WDFW	2006	1 year	Subbasin
Habitat Quality	Dominant substrate	ISEMP	Annual	10 to 20 years	Subbasin
	Embeddedness	ISEMP	Annual	10 to 20 years	Subbasin
	Depth fines	USFS-ERD	Periodic	unknown	Subbasin
	LWD (pieces/km)	ISEMP	Annual	10 to 20 years	Subbasin
	Pools (pools/km)	ISEMP	Annual	10 to 20 years	Subbasin
	Residual pool depth	ISEMP	Annual	10 to 20 years	Subbasin
	Fish cover	ISEMP	Annual	10 to 20 years	Subbasin
	Side channels/backwaters	ISEMP	Annual	10 to 20 years	Subbasin
Channel Condition	Stream gradient	ISEMP	Annual	10 to 20 years	Subbasin
	Width/depth ratio	ISEMP	Annual	10 to 20 years	Subbasin
	Wetted width	ISEMP	Annual	10 to 20 years	Subbasin
	Bankfull width	ISEMP	Annual	10 to 20 years	Subbasin
	Bank stability	ISEMP	Annual	10 to 20 years	Subbasin
Riparian Condition	Riparian structure	ISEMP	Annual	10 to 20 years	Subbasin
	Riparian disturbance	ISEMP	Annual	10 to 20 years	Subbasin
	Canopy cover	ISEMP	Annual	10 to 20 years	Subbasin
Flows and Hydrology	Streamflow	ISEMP	Annual	Decades	Subbasin
Ecoregion Classification	Bailey classification	ISEMP	Once, or as science advances	--	Regional setting

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Omernik classification	ISEMP	Once, or as science advances	--	Regional setting
Physiography Classification	Province	ISEMP	Once, or as science advances	--	Regional setting
Geology Classification	Geologic districts	ISEMP	Once, or as science advances	--	Regional setting
Geomorphic Feature Classification	Basin area	ISEMP	Once, or as science advances	--	Drainage basin
	Basin relief	ISEMP	Once, or as science advances	--	Regional setting
	Drainage density	ISEMP	Once, or as science advances	--	Regional setting
	Stream order	ISEMP	Once, or as science advances	--	Regional setting
Valley Segment Classification	Valley bottom type	ISEMP	Once, or as science advances	--	Valley segment
	Valley bottom width	ISEMP	Once, or as science advances	--	Valley segment
	Valley bottom gradient	ISEMP	Once, or as science advances	--	Valley segment
	Valley containment	ISEMP	Once, or as science advances	--	Valley segment
Channel Segment Classification	Elevation	ISEMP	Decadal	10 to 20 years	Channel segment
	Channel type (Rosgen)	ISEMP	Decadal	10 to 20 years	Channel segment
	Bed-form type	ISEMP	Decadal	10 to 20 years	Channel segment
	Channel gradient	ISEMP	Decadal	10 to 20 years	Channel segment
Riparian Classification	Primary vegetation type	ISEMP	every 5 years	10 to 20 years	Channel segment
Watershed Condition	Watershed road density	ISEMP	every 5 years	10 to 20 years	Subbasin
	Riparian-road index	ISEMP	every 5 years	10 to 20 years	Subbasin
	Land ownership	ISEMP	every 5 years	10 to 20 years	Subbasin

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Land use	ISEMP	every 5 years	10 to 20 years	Subbasin

Methow – The USFS has historically conducted physical habitat monitoring on Federal lands, but there has not been a watershed wide effort to monitor the status and trends of habitat in the Methow. The PacFish-Infish Biological Opinion (PIBO) effort led by the USFS also includes a suite of habitat and water quality monitoring metrics collected at randomly selected sites. Unfortunately that effort is also only on Federal lands and therefore is not representative of the whole Methow watershed. A subbasin level habitat status and trend monitoring program has been proposed for the Methow through the basin wide collaborative M&E effort to meet a BiOp RPA requirement. It is expected that this project will bring the Methow to a similar level of habitat status and trend monitoring as is ongoing in the Wenatchee. See Table 7 for a list of general characteristics and specific indicators monitored as part of the Methow's habitat monitoring programs.

Table 7. A list of physical/environmental indicator variables currently monitored in the Methow Subbasin, modified from Hillman (2006).

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Water Quality DOE conducts WQ monitoring at four sites (Chewuch R., Twisp R., Methow R. at Winthrop and Pateros) through its Environmental Monitoring and Trends Program. Monthly (bi-monthly for metals) status and trend. USGS conducts WQ monitoring in Andrews Ck. through the Hydrologic Benchmark Program. Also monitors metals, chloride, silica, sulfate, hardness and carbon. Biannual status and trend monitoring. USGS also sporadically monitors temperature at five gauging stations and through the Methow Effectiveness Monitoring program (upper and lower locations in Gold, Libby, Beaver, Wolf, Eightmile Creeks). Status and trend. USFS monitors hourly temperature from Jun-Sep at mouths of selected (20+/-) HUC 5 and 6 watersheds associated with stream inventories and in conjunction with Reclamation, and other, projects. Status and trend. Yakama Nation monitors WQ in Hancock Springs every two	MWMT and MDMT 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. USGS Streamflow (locations vary) 4. USGS Effectiveness Monitoring (Methow and Tributary) 5. Yakama Nation- Hancock Springs and Twisp River 6. USFS Temperature Monitoring 7. Reclamation Reach-based Ecosystem Indicators 8. PIBO Reach-based Effectiveness Monitoring 9. AREMP Reach-based Effectiveness Monitoring -Temperature, hourly -Max/M7AT (5) - M7DM (5,6,7,8) Turbidity 1. DOE Environmental Monitoring and Trends 2. Reclamation Reach-based Ecosystem Indicators -NTU -TSS (1)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
weeks May-Sep. Also monitors alkalinity. In 2006 and 2007 had adjacent reference site in Methow R. Effectiveness monitoring. YN also monitors several WQ indicators in six locations in the Twisp River as a portion of its status and trend Nutrient Monitoring Program. PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Ck. Integrator, DMA and Sentinel sites. Effectiveness monitoring. AREMP Reach-based Effectiveness Monitoring monitors WQ in three sites (Gold Ck, SF Lost R., lower Lost R.). Protocol changed in 2007. Multiple reaches within HUC6 watersheds. Effectiveness and status and trend monitoring. Reclamation Reach-based Ecosystem Indicators will monitor WQ through reach-based assessments and in partnership with several entities. Effectiveness monitoring.	Conductivity 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. Yakama Nation - Hancock Springs 4. PIBO Reach-based Effectiveness Monitoring 5. AREMP Reach-based Effectiveness Monitoring 6. Reclamation Reach-based Ecosystem Indicators -Specific Conductance
	pH 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. Yakama Nation- Hancock Springs 4. Reclamation Reach-based Ecosystem Indicators 5. PIBO Reach-based Effectiveness Monitoring 6. AREMP Reach-based Effectiveness Monitoring (2002-2006) -pH (1,2,3,4,6)
	Dissolved oxygen 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. Yakama Nation- Hancock Springs 4. Reclamation Reach-based Ecosystem Indicators 5. AREMP Reach-based Effectiveness Monitoring -mg/L
	Nitrogen 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. Yakama Nation- Hancock Springs and Twisp River 4. Reclamation Reach-based Ecosystem Indicators -Total Nitrogen -Nitrate/Nitrite -Ammonia (1,3)
	Phosphorus 1. DOE Environmental Monitoring and Trends 2. Yakama Nation- Hancock Springs and Twisp River 3. Reclamation Reach-based Ecosystem Indicators -Total Phosphorous -Orthophosphorous (1) -Soluble and Reactive Phosphorous (2)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
	Metals* 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek -Ca, Mg, K, Na, C
	Other WQ Parameters* 1. DOE Environmental Monitoring and Trends 2. USGS Hydrologic Benchmark - Andrews Creek 3. Yakama Nation- Hancock Springs and Twisp River 4. Reclamation Reach-based Ecosystem Indicators 5. PIBO Reach-based Effectiveness Monitoring 6. AREMP Reach-based Effectiveness Monitoring (2002-2006) -Alkalinity -Total P (5) -Hardness/Chloride/Silica (2)
Habitat Access Reclamation is conducting habitat assessments in selected reaches through the Reach-based Ecosystem Indicators (REI) program. Effectiveness monitoring. Partnership with USFS. USFS Stream Inventory monitors habitat in selected fish-bearing HUC 5 and 6 watersheds on a 10-year rotating panel and as needed for specific projects. Status and trend and effectiveness monitoring.	Road crossings 1. Reclamation Reach-based Ecosystem Indicators 2. USFS Stream Inventory -Type -Number -Distribution -Description
	Diversion dams 1. Reclamation Reach-based Ecosystem Indicators 2. USFS Stream Inventory -Type -Number -Distribution -Description
	Fishways Not applicable to Methow.
	Culverts* 1. Reclamation Reach-based Ecosystem Indicators 2. USFS Stream Inventory -Type -Number -Distribution -Description

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Habitat Quality Reclamation is conducting habitat assessments in selected reaches through the Reach-based Ecosystem Indicators (REI) program. Effectiveness monitoring. Partnership with USFS. PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Creeks. Integrator, DMA and Sentinel sites. Effectiveness monitoring. AREMP Reach-based Effectiveness Monitoring monitors habitat in three sites (Gold Ck, SF Lost R., lower Lost R.). Protocol changed slightly in 2007. Multiple reaches within HUC6 watersheds. Effectiveness and status and trend monitoring. USFS Stream Inventory monitors habitat in selected fish-bearing HUC6 watersheds on a 10-year rotating panel and as needed for specific projects. Status and trend and effectiveness monitoring. USFS, in partnership with WCC, conducts McNeil core sampling in four sites (three samples per site) in both the Twisp and Chewuch rivers. Status and trend monitoring. SRFB has habitat surveys in four 500m reaches (four in two locations in mainstem Methow). Reach (project) scale effectiveness monitoring (led by Tetra Tech Consulting). SRFB also monitors habitat protection effectiveness at one site on the Methow River. Reach scale effectiveness monitoring (led by Tetra Tech Consulting).	Dominant substrate 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. USFS Sediment Surveys -Wolman pebble counts (1,2,3,4) -McNeil core samples (1,5) Embeddedness 1. Reclamation Reach-based Ecosystem Indicators 2. USFS Stream Inventory 3. SRFB Effectiveness Monitoring – protection -Embeddedness Depth fines 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Sediment Surveys -Depth via McNeil core samples (1,4) -Pooltail % fine sediments (2,3) LWD (pieces/km) 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring – passage, habitat -Size -Location --LWD/mile by reach (1,2,3,4,5) -Distribution (1) -Recruitment potential (1) -Complexes/mile (1)/reach (2,3,4) -Stability (1)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
	Pools (pools/km) 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring – passage, habitat -frequency -pool length (2,3) -riffle/pool ratio (1) -pools >5'/mile (1) --Pool crest depth (4) -Type/formation (1,2,4,5)
	Residual pool depth 1.Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring – passage, habitat -Average residual pool depth -Average max pool depth (1,4)
	Fish cover
	Side channels and backwaters 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring – passage, habitat Side Channel: -Wetted length -Wetted area -Depth Floodplain: -Wetted area (1) -Potential wetted area (1) -Percent wetted area (1) Physical Barriers: -Type (1,4) -Location (1,4) -Distribution (1,4) -Discharges that access side channels (1) -Significant geomorphic/biologic discharges (1)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Channel condition Reclamation is conducting habitat assessments in selected reaches through the Reach-based Ecosystem Indicators (REI) program. Effectiveness monitoring. Partnership with USFS. PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Creeks. Integrator, DMA and Sentinel sites. Effectiveness monitoring. AREMP Reach-based Effectiveness Monitoring monitors habitat in three sites (Gold Ck, SF Lost R, lower Lost R.). Protocol changed in 2007. Multiple reaches within HUC6 watersheds. Effectiveness and status and trend monitoring. USFS Stream Inventory monitors habitat in selected fish-bearing HUC6 watersheds on a 10-year rotating panel and as needed for specific projects. Status and trend and effectiveness monitoring. SRFB has habitat surveys in two 500m reaches (Fender Mill site in Methow R.). Reach scale effectiveness monitoring (led by Tetra Tech Consulting). SRFB also monitors channel condition at one site in the Methow R. as a portion of habitat protection monitoring. Reach scale effectiveness monitoring (led by Tetra Tech Consulting). Yakama Nation conducts thalweg surveys, via Reclamation, in the restored channel at Hancock Springs. Status and trend.	Stream gradient 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring - passage, habitat -Percent Wetted width 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring – passage,habitat -Meters Bankfull width 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring 4. USFS Stream Inventory 5. SRFB Effectiveness Monitoring - passage, habitat -Meters Width/depth ratio 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. AREMP Reach-based Effectiveness Monitoring -Width:depth ratio Bank stability 1. Reclamation Reach-based Ecosystem Indicators 2. PIBO Reach-based Effectiveness Monitoring 3. USFS Stream Inventory 4. SRFB Effectiveness Monitoring - habitat protection -Erosion length/mile (1) -% eroding banks (1,4) -Length unstable (3) -Bank protection (1) -Bank angle (2) -Type (2) -Material (2) -Undercut (2) -Stability (2)

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
	Sinuosity* 1. PIBO Reach-based Effectiveness Monitoring 2. AREMP Reach-based Effectiveness Monitoring 3. USFS Stream Inventory -Sinuosity
	Entrenchment* 1. PIBO Reach-based Effectiveness Monitoring 2. AREMP Reach-based Effectiveness Monitoring 3. USFS Stream Inventory -Entrenchment
	Thalweg Profile* 1. SRFB Effectiveness Monitoring 2. Yakama Nation – Hancock Springs -Thalweg profile
Riparian Condition Reclamation is conducting habitat assessments in selected reaches through the Reach-based Ecosystem Indicators (REI) program. Effectiveness monitoring. Partnership with USFS. USFS Stream Inventory monitors habitat in selected fish-bearing HUC 5 and 6 watersheds on a 10-year rotating panel and as needed for specific projects. Status and trend and effectiveness monitoring. SRFB has habitat surveys in two 500m reaches (Fender Mill site in Methow R.). Reach (project) scale effectiveness monitoring (led via Tetra Tech Consulting). PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Creeks. Integrator, DMA and Sentinel sites. Effectiveness monitoring.	Riparian structure 1. Reclamation Reach-based Ecosystem Indicators 2. USFS Stream Inventory 3. SRFB Effectiveness Monitoring – habitat, protection 4. PIBO Reach-based Effectiveness Monitoring -Type (1,2,4) -Abundance -% Cover (canopy, understory, ground)
	Riparian disturbance 1. Reclamation Reach-based Ecosystem Indicators -% disturbance -Road density -Human influences
	Canopy cover 1. Reclamation Reach-based Ecosystem Indicators 2. SRFB Effectiveness Monitoring – habitat, protection -% mature/large trees (1) -% shading

General characteristics	Specific indicators Entity program -Variables (project #, no # = all programs) * = not a core variable
Flows and Hydrology USGS monitors daily discharge and gauge height at seven stations (Andrews Ck., Twisp R., Chewuch R., Methow R. at Goat Ck., Winthrop, Twisp and Pateros). Status and trend. USFS Stream Inventory monitors habitat in selected fish-bearing HUC6 watersheds on a 10-year rotating panel and as needed for specific projects. Status and trend and effectiveness monitoring. USFS also measures flow above and below diversions on Early Winters, Wolf and Little Bridge Creeks (former USGS gauging stations).	Streamflow 1. USGS Streamflow 2. USGS Hydrologic Benchmark Program 3. USFS Stream Inventory 4. USFS Diversion Flow Measurements -Daily discharge (1,2) -Gauge height (1,2) -Instantaneous discharge (3,4)
Watershed Condition Reclamation is conducting habitat assessments in selected reaches through the Reach-based Ecosystem Indicators (REI) program. Effectiveness monitoring. Partnership with USFS. AREMP Reach-based Effectiveness Monitoring monitors habitat conditions in three sites (Gold Ck., SF Lost R., lower Lost R.). Protocol changed in 2007. Multiple reaches within HUC6 watersheds. Effectiveness and status and trend monitoring. Developed a Reach and Watershed (HUC6) condition model. PIBO Reach-based Effectiveness Monitoring has 14 reaches in a 5-year rotating panel including NF Boulder (2), Pebble, 30-mile (2), 20-mile (2) SF Beaver (2), Jack, Frazer, Benson (2) and Andrews (Sentinel) Creeks. Integrator, DMA and Sentinel sites. Effectiveness monitoring. Pacific Biodiversity Institute completed a basinwide watershed roads and land use study in 2004. Data is available from that project, but monitoring is not on-going. Okanogan County compiles data on land ownership, but this project is not specifically related to fish or habitat monitoring.	Watershed road density 1. Reclamation Reach-based Ecosystem Indicators 2. AREMP Reach-based Effectiveness Monitoring 3. PIBO Reach-based Effectiveness Monitoring 4. Pacific Biodiversity Institute -Location -Length -Density Riparian-road index 1. Reclamation Reach-based Ecosystem Indicators 2. AREMP Reach-based Effectiveness Monitoring 3. PIBO Reach-based Effectiveness Monitoring 4. Pacific Biodiversity Institute -Location -Length -Density Land ownership 1. Okanogan County Land use 1. Pacific Biodiversity Institute

Okanogan – Habitat status and trends, and the effectiveness of habitat restoration actions, are monitored and evaluated in the Okanogan subbasin through by OBMEP. Additional efforts to monitor habitat metrics in the Okanogan are being conducted by Environment Canada (water quality, water quantity), WDOE (water quality, water quantity), and the U.S. Geological Survey (USGS, water quantity). Habitat status and

trend protocols followed by OBMEP in the Okanogan basin include: Physical Habitat (Arterburn et al. 2006), Water Quality (Arterburn et al. 2005), and Macro invertebrate (Hayslip 2007). These protocols are posted on the OBMEP web site: http://nrd.colvilletribes.com/obmep/Reports.htm. Specific habitat related metrics monitored are listed in Table 8.

Table 8. A list of general habitat characteristics and specific indicators monitored as part of OBMEP and related monitoring programs in the Okanogan.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Macroinverte-brates	Composition	OBMEP	Annual	at least 5 years	Subbasin
	Transport from Headwaters	OBMEP	Annual	completed in 2008	Subbasin
Water Quality	MWMT and MDMT	OBMEP, WDOE, USGS in US and ONA, Environment Canada in Canada	Continuous	at least 5 years	Subbasin
	Turbidity	OBMEP and WDOE Programs	Continuous	at least 5 years	Subbasin
	Conductivity	OBMEP and WDOE Programs	Continuous	at least 5 years	Subbasin
	pH	OBMEP and WDOE Programs	Continuous	at least 5 years	Subbasin
	Dissolved oxygen	OBMEP and WDOE Programs	Continuous	at least 5 years	Subbasin
	Nitrogen	OBMEP and WDOE Programs	Monthly	at least 5 years	Subbasin
	Phosphorus	OBMEP and WDOE Programs	Monthly	at least 5 years	Subbasin
Habitat Access	Road crossings	OBMEP	2006	1 year	Subbasin
	Diversion dams	OBMEP	2006	1 year	Subbasin
	Fishways	OBMEP	2006	1 year	Subbasin
Habitat Quality	Dominant substrate	OBMEP	Annual	10 to 20 years	Subbasin
	Embeddedness	OBMEP	Annual	10 to 20 years	Subbasin
	Depth fines	OBMEP	Periodic	unknown	Subbasin
	LWD (pieces/km)	OBMEP	Annual	10 to 20 years	Subbasin
	Pools (pools/km)	OBMEP	Annual	10 to 20 years	Subbasin
	Residual pool depth	OBMEP	Annual	10 to 20 years	Subbasin
	Fish cover	OBMEP	Annual	10 to 20 years	Subbasin
	Side channels/backwaters	OBMEP	Annual	10 to 20 years	Subbasin
Channel Condition	Stream gradient	OBMEP	Annual	10 to 20 years	Subbasin
	Width/depth ratio	OBMEP	Annual	10 to 20 years	Subbasin
	Wetted width	OBMEP	Annual	10 to 20 years	Subbasin
	Bankfull width	OBMEP	Annual	10 to 20 years	Subbasin
	Bank stability	OBMEP	Annual	10 to 20 years	Subbasin
Riparian Condition	Riparian structure	OBMEP	Annual	10 to 20 years	Subbasin
	Riparian disturbance	OBMEP	Annual	10 to 20 years	Subbasin
	Canopy cover	OBMEP	Annual	10 to 20 years	Subbasin
Flows and Hydrology	Streamflow	OBMEP	Annual	Decades	Subbasin
Ecoregion Classification	Bailey classification	OBMEP	Once, or as science advances	--	Regional setting

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Omernik classification	OBMEP	Once, or as science advances	--	Regional setting
Physiography Classification	Province	OBMEP	Once, or as science advances	--	Regional setting
Geology Classification	Geologic districts	OBMEP	Once, or as science advances	--	Regional setting
Geomorphic Feature Classification	Basin area	OBMEP	Once, or as science advances	--	Drainage basin
	Basin relief	OBMEP	Once, or as science advances	--	Regional setting
	Drainage density	OBMEP	Once, or as science advances	--	Regional setting
	Stream order	OBMEP	Once, or as science advances	--	Regional setting
Valley Segment Classification	Valley bottom type	OBMEP	Once, or as science advances	--	Valley segment
	Valley bottom width	OBMEP	Once, or as science advances	--	Valley segment
	Valley bottom gradient	OBMEP	Once, or as science advances	--	Valley segment
	Valley containment	OBMEP	Once, or as science advances	--	Valley segment
Channel Segment Classification	Elevation	OBMEP	Decadal	10 to 20 years	Channel segment
	Channel type (Rosgen)	OBMEP	Decadal	10 to 20 years	Channel segment
	Bed-form type	OBMEP	Decadal	10 to 20 years	Channel segment
	Channel gradient	OBMEP	Decadal	10 to 20 years	Channel segment
Riparian Classification	Primary vegetation type	OBMEP	every 5 years	10 to 20 years	Channel segment
Watershed Condition	Watershed road density	OBMEP	every 5 years	10 to 20 years	Subbasin
	Riparian-road index	OBMEP	every 5 years	10 to 20 years	Subbasin
	Land ownership	OBMEP	every 5 years	10 to 20 years	Subbasin

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Land use	OBMEP	every 5 years	10 to 20 years	Subbasin

Wenatchee – Habitat monitoring efforts in the Wenatchee subbasin are conducted within the ISEMP framework, and are being coordinated by the UCRTT and Terraqua, Inc. and implemented by various entities including WDFW, Yakama Nation, USFWS, (physical habitat, temperature), WDOE (water quality, water quantity), Cascadia Conservation District, Chelan Co PUD, USGS (water quantity), and private consultants. ISEMP habitat monitoring in the Wenatchee basin follows the design and implementation protocols outlined in the Recovery Plan monitoring strategy sampling regime and includes the indicators in Table 9 (Nelle and Ward 2009).

Table 9. A list of general population characteristics and specific indicators monitored in the Wenatchee subbasin as part of ISEMP and related monitoring programs.

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Water Quality	MWMT and MDMT	ISEMP and WDOE TMDL Programs	Continuous	at least 5 years	
	Turbidity	ISEMP and WDOE TMDL Programs	Continuous	at least 5 years	
	Conductivity	ISEMP and WDOE TMDL Programs	Continuous	at least 5 years	
	pH	ISEMP and WDOE TMDL Programs	Continuous	at least 5 years	
	Dissolved oxygen	ISEMP and WDOE TMDL Programs	Continuous	at least 5 years	
	Nitrogen	ISEMP and WDOE TMDL Programs	Monthly	at least 5 years	
	Phosphorus	ISEMP and WDOE TMDL Programs	Monthly	at least 5 years	
Habitat Access	Road crossings	ISEMP	2006	1 year	Subbasin
	Diversion dams	WDFW	2006	1 year	Subbasin
	Fishways	WDFW	2006	1 year	Subbasin
Habitat Quality	Dominant substrate	ISEMP	Annual	10 to 20 years	Subbasin
	Embeddedness	ISEMP	Annual	10 to 20 years	Subbasin
	Depth fines	USFS	Periodic	unknown	Subbasin
	LWD (pieces/km)	ISEMP	Annual	10 to 20 years	Subbasin
	Pools (pools/km)	ISEMP	Annual	10 to 20 years	Subbasin
	Residual pool depth	ISEMP	Annual	10 to 20 years	Subbasin
	Fish cover	ISEMP	Annual	10 to 20 years	Subbasin
	Side channels/backwaters	ISEMP	Annual	10 to 20 years	Subbasin
Channel Condition	Stream gradient	ISEMP	Annual	10 to 20 years	Subbasin
	Width/depth ratio	ISEMP	Annual	10 to 20 years	Subbasin
	Wetted width	ISEMP	Annual	10 to 20 years	Subbasin
	Bankfull width	ISEMP	Annual	10 to 20 years	Subbasin
	Bank stability	ISEMP	Annual	10 to 20 years	Subbasin
Riparian Condition	Riparian structure	ISEMP	Annual	10 to 20 years	Subbasin
	Riparian disturbance	ISEMP	Annual	10 to 20 years	Subbasin

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
	Canopy cover	ISEMP	Annual	10 to 20 years	Subbasin
Flows and Hydrology	Streamflow	ISEMP	Annual	Decades	Subbasin
Ecoregion Classification	Bailey classification	ISEMP	Once, or as science advances	--	Regional setting
	Omernik classification	ISEMP	Once, or as science advances	--	Regional setting
Physiography Classification	Province	ISEMP	Once, or as science advances	--	Regional setting
Geology Classification	Geologic districts	ISEMP	Once, or as science advances	--	Regional setting
Geomorphic Feature Classification	Basin area	ISEMP	Once, or as science advances	--	Drainage basin
	Basin relief	ISEMP	Once, or as science advances	--	Regional setting
	Drainage density	ISEMP	Once, or as science advances	--	Regional setting
	Stream order	ISEMP	Once, or as science advances	--	Regional setting
Valley Segment Classification	Valley bottom type	ISEMP	Once, or as science advances	--	Valley segment
	Valley bottom width	ISEMP	Once, or as science advances	--	Valley segment
	Valley bottom gradient	ISEMP	Once, or as science advances	--	Valley segment
	Valley containment	ISEMP	Once, or as science advances	--	Valley segment
Channel Segment Classification	Elevation	ISEMP	Decadal	10 to 20 years	Channel segment
	Channel type (Rosgen)	ISEMP	Decadal	10 to 20 years	Channel segment
	Bed-form type	ISEMP	Decadal	10 to 20 years	Channel segment
	Channel gradient	ISEMP	Decadal	10 to 20 years	Channel segment
Riparian Classification	Primary vegetation type	ISEMP	every 5 years	10 to 20 years	Channel segment

General characteristics	Specific indicators	Name of Monitoring Program(s) Examining the Specific Indicator	Sampling frequency	Expected Duration of Monitoring	Spatial Scale
Watershed Condition	Watershed road density	ISEMP	every 5 years	10 to 20 years	Subbasin
	Riparian-road index	ISEMP	every 5 years	10 to 20 years	Subbasin
	Land ownership	ISEMP	every 5 years	10 to 20 years	Subbasin
	Land use	ISEMP	every 5 years	10 to 20 years	Subbasin

Effectiveness Monitoring

In the context of habitat restoration for salmon recovery, effectiveness monitoring evaluates whether restoration actions achieved their intended effects or objectives. Restoration actions often must be implemented in the face of multiple uncertainties. Because it provides feedback on the outcomes of those actions, effectiveness monitoring helps to maintain accountability, and is an important tool to assist in making adaptive management decisions (NOAA 2009).

In spite of its potential usefulness, effectiveness monitoring can be very complex because of the potential to look at restoration at many different spatial scales, and because of the many different ways in which the success of actions can be evaluated. Success can be measured in a number of different ways (Hillman 2005). There are several effectiveness monitoring programs in the Upper Columbia. Each of these programs is important to the adaptive management of salmon recovery in the Upper Columbia, with each program seeking to a answer different aspects of effectiveness by examining restoration actions at different scales, and in different ways, and from different perspectives.

Entiat IMW – The Entiat subbasin has a strong history of rigorous restoration and recovery planning and as a result the ISEMP initiated an effectiveness monitoring pilot project in 2005. Monitoring and evaluation in the Entiat subbasin follow the same ISEMP protocols for habitat and population status and trend that were adopted for the Wenatchee subbasin; however, it was recognized there was an opportunity to implement an effectiveness monitoring program that more intensively evaluated the effectiveness of habitat actions at the reach and subbasin/population scale. The Entiat River subbasin was identified as an IMW under the directions of the 2008 Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) (RPA 57.1). Additionally, the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (UCSRB 2007) calls for effectiveness monitoring, coupled with adaptive management, to: assist in the identification of limiting factors, assess the effects of habitat actions, and recover the listed species in the Entiat River subbasin.

After several years of data collection under a Before-After-Control-Design, a power analysis revealed the need to re-structure both the implementation of actions and the monitoring design. By 2009, a plan had been developed and vetted with the UCRTT and the watershed groups to implement an Intensively Monitored Watershed (IMW) in the Entiat River subbasin (Nelle et al. 2009). Under an IMW approach, salmonid population responses to watershed scale restoration actions are evaluated in an experimental fashion, where implementation and monitoring are tightly coordinated to maximize the ability to detect fish responses to changes in their habitat. Such an approach seeks to maximize contrast and reduce noise to increase the ability to detect an effect.

ISEMP has designed a robust and flexible implementation and monitoring strategy that will: 1) implement the full suite of restoration actions in the lower 26 miles of the Entiat River in a 10-year time period, 2) maximizes the resolution of effects from different action types and reveal multi-scale mechanisms (e.g., effects of action types, geomorphic reaches, land use), and 3) detect a response at a lower resolution (i.e., watershed scale) if a higher resolution is not possible due to, for example, implementation of restoration actions outside the experimental design.

The IMW will answer the following questions:

- Did habitat restoration improve freshwater productivity at the watershed scale?
- What was the impact of the varying restoration types? (This question directly supports the UCSRB's Adaptive Management Framework).
- What were the mechanisms by which physical habitat changes improved freshwater productivity?
- Can we transfer the knowledge to other locations? i.e., were actions deployed within an experimental design that enables statistically valid inference beyond the local scale? (This question also supports the UCSRB's Adaptive Management Framework).

The Entiat IMW will follow a hybrid of a stairstep and hierarchical approach to implementing habitat actions. Restoration actions will be implemented in a spatially and temporally explicit way to provide contrast to non-treated areas in space and time. The U.S. Bureau of Reclamation's (Reclamation) 2009 Tributary Assessment identified three geomorphologically distinct valley segments in the lower 26 miles of the Entiat River. Within each valley segment they also identified geomorphically distinct reaches, shown on the map as 1A through 3F. The hybrid experimental design uses these geomorphic reaches as the units of restoration actions. The mainstem Entiat will be divided into 10 monitoring units with one unit as a permanent control (i.e., 1G) and the rest as treatments and temporary controls. Treatments will target geomorphic reaches to provide a large enough pulse to local populations to increase the power of the monitoring design. These areas will be compared to areas not treated (i.e., controls). Controls will eventually be treated (staircase element) to cause an overall larger response to the watershed (hierarchical element) but they will be spaced in time from the previous paired treatments to best evaluate local effects. Actions will be implemented on a 3-year time frame, with implementation starting upstream in 2011 (i.e. Preston Reach of the Stillwater area), then downstream in 2014 (i.e. Lower Entiat RM 2-10), upstream in 2017, and finishing in downstream in 2020. The ISEMP will also be monitoring the response of spring Chinook salmon and steelhead to restoration actions across the entire lower 26 miles of the Entiat River, beginning in 2010. Protocol development for capture methods and to determine sample size is underway in 2009. Monitoring will collect data on productivity, juvenile fish abundance, and growth and survival.

Upper Beaver Creek and Methow M2 – An extensive habitat action effectiveness project in the Methow subbasin was implemented by the USGS in conjunction with the barrier restoration work on Beaver Creek (Martens and Connolly 2008). This study focused on fish response to increases in access to Upper Beaver Creek and the effectiveness of rock weirs used as irrigation diversion structures. This project offers insight as to the effectiveness of a suite of passage actions in a watershed as well as responses to individual structures.

A significant restoration and monitoring effort that seeks to monitor the effects of reach scale restoration activities is referred to as M2 and is located in the Middle Methow River, within the highest priority reach in the Methow subbasin (UCRTT 2009). Similar to the Entiat's IMW monitoring effort, the monitoring

component of M2 is a reach-scale effectiveness monitoring. This substantial effort aims to assess reach level effects of several restoration actions slated to occur on the mainstem. M2 has been implemented to specifically address (on the reach scale) the status and trend of the six limiting factors identified for the Methow: habitat diversity and quantity, excessive artificial channel stability, water quantity, water quality, obstructions and sediment.

The outcome of the M2 monitoring will be a better understanding of fish productivity in response to a suite of actions when an entire reach is treated. This effort will inform the funding agencies of the effectiveness of the actions they paid for and will provide guidance to future efforts that intend to use similar methods of habitat restoration. Several years of baseline data will be collected prior to the implementation of several restoration actions within the Middle Methow reach after which several more years post-project data will be collected. The monitoring uses reference sites in the Chewuch and upper Methow and will incorporate other monitoring efforts (i.e. WDFW smolt trapping, USGS Streamflow) in its analyses (Crandall 2009). The pre-treatment monitoring phase of M2 began in 2008 and will continue through 2012. Implementation of restoration projects will take place in 2012 and 2013, followed by post-treatment monitoring through 2014.

Okanogan – In the Okanogan, OBMEP is focused primarily on monitoring the status and trend of habitat conditions. There will be a subbasin level evaluation of effectiveness to determine if the improved habitat conditions are affecting fish populations, with the expected outcome of a better understanding of fish productivity in response to a suite of actions when each project, reach, and the sum of all areas within the population are treated.

Restoration actions in the Okanogan subbasin are not implemented within an experimental framework within the Okanogan River subbasin, which presents challenges from an effectiveness monitoring standpoint. However, there are plans to use habitat and population status and trends monitoring data to periodically examine look for aggregate responses at the population level to the implementation of habitat restoration in the Okanogan River subbasin.

Wenatchee – In the Wenatchee subbasin, restoration actions are not implemented within an experimental framework within the Wenatchee River subbasin, which presents challenges from an effectiveness monitoring standpoint; however, ISEMP is specifically designed to use an observational-studies approach to overcome these challenges (Jordan 2003). In the Wenatchee River subbasin ISEMP will integrate status, trend and effectiveness monitoring to assess the aggregate impact of all habitat restoration projects (ongoing or recently completed) in target watersheds within the Wenatchee River subbasin. There will be a subbasin level evaluation to determine if the improved habitat conditions are affecting fish populations. Thus, the status monitoring program overlaps significantly with the effectiveness monitoring program, and as such, both programs are being implemented concurrently in the Wenatchee River subbasin.

SRFB Effectiveness Monitoring – The Washington State Salmon Recovery Funding Board (SRFB) began its Reach-scale Effectiveness Monitoring Program in 2004 in response to a need at the state level for a coordinated effectiveness monitoring program to independently evaluate the success of restoration projects funded by the SRFB, with the goals of providing accountability, and helping to determine the cost effectiveness of action types.

The Reach-scale Effectiveness Monitoring Program, administered by Tertra Tech EC, currently monitors nine action categories at sites across Washington State. The nine action categories include: fish passage, in-stream habitat, riparian planting, livestock exclusion, constrained channel, channel connectivity, spawning gravel, diversion screening, and habitat protection. All of the action categories except diversion screening and habitat protection are monitored using a Before After Control Impact, or BACI, design. (Tetra Tech EC Inc 2009)

The SRFB's Reach-scale Effectiveness Monitoring Program provides important feedback for the implementation of salmon recovery at the Washington State level. However, the program currently includes only 10 action sites in the Upper Columbia, which limits the usefulness of the SRFB monitoring results in making conclusions about Upper Columbia-specific issues. This issue was recognized during UCRTT deliberations on results of the January 2010 UCRTT Analysis Workshop.

A draft recommendation from the UCRTT Analysis Workshop deliberations calls for an increase of SRFB effectiveness monitoring sample size in the Upper Columbia. As a result of that recommendation, the UCSRB is working with the BPA and Tetra Tech EC to develop a project (RMECAT-00143) for submission during the Phase II Fast-track portion of the Northwest Power and Conservation Council's RM&E Categorical Review process, to increase the number of site monitored by Tetra Tech EC in the Upper Columbia as part of the Reach-scale Effectiveness Monitoring Program. These new action effectiveness sites would focus specifically on the in-stream habitat, channel connectivity, and constrained channel action categories.

The participation of regional recovery boards in the effectiveness monitoring program is foreseen by the SRFB's Draft Monitoring and Evaluation Strategy for Habitat Restoration and Acquisition Projects (SRFB 2003), which discusses requirements for Lead Entities, Salmon Recovery Regions and others that desire to conduct their own monitoring of restoration actions as part of the SRFB's monitoring program. The SRFB "Required Elements for Locally Monitored Projects" include:

- Comply with and utilize SRFB "Sampling Procedures, Designs, and Projected Costs" manuals.
- Utilize applicable SRFB "Sampling Protocols".
- Submit a written monitoring plan detailing the timelines, costs, responsible organization, and plans for pre and post project monitoring.
- Report data in a timely manner to the PRISM database using required flat file format and metadata standards.
- Participate in QA/QC audits.
- Meet all reporting deadlines.

Implementation and Compliance Monitoring

Recommendation 19 from the Executive Summary of the 2009 NOAA *Draft Guidance for Monitoring Recovery of Pacific Northwest Salmon and Steelhead* says that "…all regional and local restoration efforts in the Pacific Northwest should be capable of being reported and correlated with habitat limiting factors… so that the cumulative effects of restoration actions can be tracked and given proper credit by population, MPG, and ESU/DPS." An important component of such reporting is adequate implementation monitoring for all restoration projects.

Implementation and compliance monitoring is conducted at the action level, and is responsible for documenting details of actions that are necessary to track progress that has been made in protecting key habitats, and addressing primary habitat "limiting factors," measure the magnitude and quality of modifications made to salmon habitat, determine whether the actions were implemented correctly, and ensure compliance to the requirements of permits and applicable regulations. Another important role of implementation monitoring is providing near-term feedback on whether actions and their designs continue to function, and adequately stand the tests of time, nature, and human effects. Implementation monitoring is based on design plans and/or action proposals, and relies primarily on visual inspection, photo monitoring, and field notes (Hillman 2005).

Action Sponsors – Habitat features that are constructed based on engineering designs are inspected to ensure that design specifications have been met. Action sponsors provide on-site inspectors during construction, and coordinate any on-the-ground deviations with permitting agencies, and require as-built drawings upon completion.

Action sponsors also record information in Pisces and the Habitat Work Schedule (http://uc.ekosystem.us) related to action-specific reporting requirements, including project descriptions and location, budget, and planned and actual metrics.

Reclamation Monitoring – Many habitat actions in the Upper Columbia are implemented with assistance from the Reclamation through a cooperative agreement. In addition to design and other assistance, the Reclamation performs detailed post-implementation monitoring for those habitat actions.

SRFB Monitoring – Tetra Tech EC collects detailed post-implementation data for actions included in the SRFB effectiveness monitoring program. There are currently 10 SRFB effectiveness monitoring sites in the Upper Columbia.

UCSRB Post-Implementation Monitoring – Sponsors of recovery actions in Upper Columbia have done an excellent job to date, on an action-by-action basis, of recording information related to their activities. When this information is looked at in the aggregate for the entire Upper Columbia, however, it is inconsistent, fairly basic, and is often missing critical pieces such as the location of the action. Very detailed, consistent, and well-maintained implementation data exist for projects covered by Reclamation and SRFB monitoring programs, but these programs cover just a fraction of the total number of recovery actions implemented each year in the Upper Columbia, and to date the data that they generate have not been compiled together into one place.

The importance of better, more detailed, and more consistent information for reporting on the implementation of salmon recovery and progress in addressing limiting factors was emphasized during the Implementation, Limiting Factors, and Threats session of the January 2010 Upper Columbia UCRTT Analysis Workshop, and during related deliberations of the UCRTT in recent months. As a result of the workshop and discussions, the UCRTT made a draft recommendation to conduct systematic post-implementation monitoring for all recovery actions in the Upper Columbia.

Understanding the value of detailed, consistent, and reliable implementation data to the adaptive management of the Recovery Plan, and for reporting, the UCSRB is committed to taking the following three actions to improve the quality and availability of project implementation data in the Upper Columbia:

1. Coordination with the sponsors of restoration actions to move toward better standardization of the information that is reported about each action (We are already making progress in this standardization);

2. Work with the SRFB and the Reclamation to incorporate into a single dataset all of the implementation-related data that is collected by their monitoring programs (There is no reason to duplicate the intense efforts of those two organizations); and

3. Providing pre- and post-implementation monitoring for all actions that are not already covered by SRFB or Reclamation monitoring.

Standardization Information Reported by Action Sponsors – The UCSRB is, together with the Lead Entity coordinators in the Upper Columbia, developing a guidance document for the entry of project information into the Habitat Work Schedule. The document describes required attributes that must be recorded for each action, as well as best practices for the entry of such things as projects IDs, and location information.

Compile Reclamation and SRFB Implementation Data – The UCSRB has begun discussion with the USRB and with Tetra Tech about the integration into the Upper Columbia implementation monitoring data set of post-implementation data collected by those two programs. The hope is be able to report on post-implementation data for all actions implemented in the Upper Columbia from one data set.

New UCSRB Implementation Funding – The UCSRB is working with BPA to develop a project (RMECAT-00143) for submission during the Phase II Fast-track portion of the Northwest Power and Conservation Council's Research, Monitoring, and Evaluation (RM&E) Categorical Review process, for implementation monitoring of all recovery actions implemented in the Upper Columbia that are not covered already covered by Reclamation or SRFB monitoring.

The UCSRB implementation monitoring will provide verification of action metrics report in Pisces by sponsors of actions funded by BPA. Additionally, Implementation monitoring metrics will be collected by UCSRB staff for restoration actions not covered by SRFB or Reclamation monitoring. Metrics from Table 10 appropriate to the action type will be collected at each action site, at the frequency and intervals indicated in the table. The continued functioning of habitat actions will be tracked through time to provide feedback on the efficacy of designs and to identify conditions that may warrant remediation. Where necessary, protocols for the measurement of site attributes will be adapted from those that are already in use by ISEMP, OBMEP, Reclamation, and the SRFB.

Table 10: The following draft list of Upper Columbia implementation monitoring metrics is based on a list of metrics provided by BPA. This list is subject to change as the result of coordination with BPA, Reclamation and Tetra Tech EC.

Fish Screening

Habitat Action	Compliance Metric	Frequency	Duration
Fish Screen Installation, Fish Screen Removal, Fish Screen Replacement	Does the screen meet NOAA specs?	Years 1, 2, 5	5 years
	Flow rate at the screen diversion allowed by the water right in cubic-feet per second (cfs)	Years 1, 2, 5	5 years
	Is the screen New or a Replacement?	Each event	once
	Quantity of water protected by screening in acre-feet/year as determined by water rights or calculated base flow rate.	Years 1, 2, 5	5 years
	Measure of whether the screened diversion meets engineering design criteria.	Years 1, 2, 5	5 years
	Measure of whether the screen is constructed at the point of diversion with the screen face generally parallel to river flow (where feasible).	Years 1, 2, 5	5 years
	Measure of whether approach velocity exceeds 0.40 ft/s for active screens, or 0.20 ft/s for passive screens.	Years 1, 2, 5	5 years
	Determine if the screen design provides for nearly uniform flow distribution over the screen surface, thereby minimizing approach velocity over the entire screen face	Years 1, 2, 5	5 years
	Determine if screens longer than 6 feet are angled and have sweeping velocity greater than the approach velocity.	Years 1, 2, 5	5 years
	For screens longer than 6 feet, determine if sweeping velocity decreases along the length of the screen.	Years 1, 2, 5	5 years
	Circular Screens-screen face openings must not exceed 3/32 inch in diameter. Perforated plate must be smooth to the touch with openings punched through in the direction of approaching flow.	Years 1, 2, 5	5 years
	Slotted Screens-screen face openings must not exceed 1/16 inch in the narrow direction.	Years 1, 2, 5	5 years
	Square Screens-screen face openings must not exceed 3/32 inch on a diagonal.	Years 1, 2, 5	5 years

Fish Screening

Habitat Action	Compliance Metric	Frequency	Duration
	Determine if the screen material is corrosion resistant and sufficiently durable to maintain a smooth uniform surface with long term use.	Years 1, 2, 5	5 years
	Determine if other components of the screen facility (such as seals) include gaps greater than the maximum screen opening defined above.	Years 1, 2, 5	5 years
	Determine if site conditions are appropriate for a passive screen (only for diversion rate of <3 cfs), versus an active screening structure.	Years 1, 2, 5	5 years
	Determine if structural features are provided to protect the integrity of the fish screens from large debris and to protect the facility from damage if overtopped by flood flows (trash rack, log boom, sediment sluice, and other measures may be required).	Years 1, 2, 5	5 years
	Determine if end of pipe screens are submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and natural or constructed features.	Years 1, 2, 5	5 years
	Determine if protective structures are maintained and kept free of debris such that they do not become clogged and disfunctional	Years 1, 2, 5	5 years

Fish Passage

Habitat Action	Compliance Metric	Frequency	Duration
Fish Ladder Improvement, Fish Ladder Installation, Fishways, Barriers, Diversion Dam, Road Crossings, Culvert Improvements, Culvert Installation, Channel Reconfiguration, Culvert Removal, Weirs	# of barriers addressed by type [bridge improved, culvert full passage, culvert partial passage, culvert improved, fish ladder natural full dam, natural partial dam, road crossing, rock ford, tidegate full, tidegate partial, tidegate improved weir partial, weir full, weir improved, fishway chutes improved, zero full passage, zerp partial passage, Other]	Each event	once
	# of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range	Each event	once
	Does the structure remove or replace a fish passage barrier?	Each event	once

Fish Passage

Habitat Action	Compliance Metric	Frequency	Duration
	If installing a ladder, does the ladder meet NOAA specifications for attraction flow, pool dimensions, jump height, etc?	Years 1, 2, 5	5 years
	The number of hydropower and diversion dam full passage barriers	Years 1, 3, 5, 10	10 years
	The number of hydropower and diversion dam partial passage barriers	Years 1, 3, 5, 10	10 years
	The number of small scale push-up or diversion dam full passage barriers	Years 1, 3, 5, 10	10 years
	The number of small scale push-up or diversion dam partial passage barriers	Years 1, 3, 5, 10	10 years
	# of miles of habitat accessed to the next upstream barrier(s) or likely limit of habitable range	Years 1, 3, 5, 10	10 years

Instream Flow

Habitat Action	Compliance Metric	Frequency	Duration
Acquire Water Instream	Amount of water secured in acre-feet/year	Years 1, 2, 5	5 years
	End day and month for water instream	Years 1, 2, 5	5 years
	End year of returned flow	Years 1, 2, 5	5 years
	Flow of water returned to the stream as prescribed in the water acquisition in cubic-feet per second (cfs)	Years 1, 2, 5	5 years
	Start day and month for water instream	Years 1, 2, 5	5 years
	Start year of returned flow	Years 1, 2, 5	5 years
Install Flow Measuring Device	Is the measuring device portable or fixed?	Each event	once
	Type of metering device used	Each event	once
	Is the device functional?	Years 1, 2, 5	5 years
	At what range of flows does the device function?	Years 1, 2, 5	5 years
Develop Alternative Water Source	# of alternate water sources by type [Ditches, Ponds, Springs, Wells, Other] installed	Each event	once
	Amount of water withdrawn from sources in acre feet/year	Years 1, 2, 5	5 years

Instream Flow

Habitat Action	Compliance Metric	Frequency	Duration
Irrigation Practice Improvement	# of miles of primary stream reach improvement	Each event	once
	# of miles of total stream reach improvement	Each event	once
	Amount of unprotected water flow returned to the stream by conservation in acre-feet/year	Years 1, 2, 5	5 years
	Amount of unprotected water flow returned to the stream by conservation in cubic-feet per second (cfs)	Years 1, 2, 5	5 years
	# of acres of land affected by improved irrigation	Each event	once
Remove/Install Diversion	# of screens installed	Each event	once
	water flow (cfs) diverted (-) or refturned (+)	Years 1, 2, 5	5 years
	Water flow diverted (-) or returned (+) as a percent of baseflows of river or stream	Years 1, 2, 5	5 years
	water flow (acre feet) diverted (-) or refturned (+)	Years 1, 2, 5	5 years

Instream

Habitat Action	Compliance Metric	Frequency	Duration
Streambank Stabilization	# of structures by type [log anchored, logs unanchored, boulders anchored, boulders unanchored, gabions, deflectors/barbs, logjams, revetment/riprap, rock weirs, root wads] installed only for stabilization	Year 1	1 year
	# of structures by type [log anchored, logs unanchored, boulders anchored, boulders unanchored, gabions, deflectors/barbs, logjams, revetment/riprap, rock weirs, root wads] remaining	Years 1, 3, 5, 10	10 years
Increase Instream Habitat Complexity and Stabilization	# of miles of stream with improved complexity	Years 1, 3, 5, 10	10 years
	End latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	End longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	GPS location of each installed structure (to track movement)	Years 1, 3, 5, 10	10 years
	Documentation of each placed log or boulder with unique numerical identifier (tags) to track movement of each structure	Years 1, 3, 5, 10	10 years

Instream

Habitat Action	Compliance Metric	Frequency	Duration
	Percent of instream structures installed as compared to plans of proposals	Years 1, 3, 5, 10	10 years
	# of logs by size class	Years 1, 3, 5, 10	10 years
	# of boulders by size class	Years 1, 3, 5, 10	10 years
	Number of pools created	Years 1, 3, 5, 10	10 years
	Miles of spawning gravel added	Years 1, 3, 5, 10	10 years
	Did structures remain in place?	Years 1, 3, 5, 10	10 years
	# of beavers introduced	Each event	Uknown
Realign, Connect, and/or Create Channel	# of acres of channel/side-channel habitat reconnected or added	Each event	once
	# of miles of channel created	Each event	once
	End latitude of treated stream reach	Years 1, 2, 5	5 years
	End longitude of treated stream reach	Years 1, 2, 5	5 years
	Start latitude of treated stream reach	Years 1, 2, 5	5 years
	Start longitude of treated stream reach	Years 1, 2, 5	5 years
Remove Vegetation	% of acres treated remaining functional	Years 2 and 5	4 years
	# of miles of streambank treated	Each event	once
	Year of treatment	Each event	once
	Type of plant removal conducted (controlled burn, biological, herbicide, mechanical, other)	Each event	once
Spawing Gravel Placement	aerial extent of gravel present after placement	Years 1, 3, 5, 10	10 years
Beaver Introduction or Removal	# of animals introduced/removed	Each event	once
	Means used to remove/relocate animals	Each event	once
Enhance Floodplain/Remove, Modify, Breach Dike	# of barriers removed in the estuarine zone	Years 1	1 year
	% of barriers in estuarine zone that remain free	Years 3, 5, 10	7 years
	# of barriers removed in the freshwater zone	Years 1	1 year
	% of barriers in freshwater zone that remain free	Years 3, 5, 10	7 years
	# of acres of new floodplain habitat created	Years 1	1 year

Instream

Habitat Action	Compliance Metric	Frequency	Duration
	% of acres of new floodplain habitat that remain functional	Years 3, 5, 10	7 years
	# of acres of floodplain habitat reconnected	Years 1	1 year
	% of barriers that remain functional and prevent connection	Years 3, 5, 10	7 years
	Dike breached (y/n)	Years 1, 3, 5, 10	10 years
	Dike height reduction	Years 1, 3, 5, 10	10 years
	Dike Setback distance	Years 1, 3, 5, 10	10 years
	Full Dike Removal (y/n)	Each event	once
	Length of Dike Removed	Each event	once
	Partial Dike Removal (y/n)	Each event	once
	Mean bankfull width in the treated reach	Years 1, 3, 5, 10	10 years
	Channel capacity reduction (square meters)	Years 1, 3, 5, 10	10 years
	Increase in floodprone width	Years 1, 3, 5, 10	10 years
	Design flow for floodplain connection	Years 1, 3, 5, 10	10 years
	Model data for frequency and duration of inundation (e.g. days per year that habitat can be used by fish as compared to design)	Years 1, 3, 5, 10	10 years
	Model data for area of inundation at various flow stages as compared to design	Years 1, 3, 5, 10	10 years

Off-Chanel and Upland Wetlands

Habitat Action	Compliance Metric	Frequency	Duration
Create, Restore, and/or Enhance Wetland	# of acres of habitat created	Year 1	once
	% of acres of habitat created remaining	Years 3, 5, 10	7 years
	# of acres of habitat rehabilitated/enhanced	Year 1	once
	% of acres of habitat rehabilitated/enhanced remaining	Years 3, 5, 10	7 years
	# of acres of habitat restored/re-established	Year 1	once
	% of acres of habitat restored/re-established remaining	Years 3, 5, 10	7 years

Off-Chanel and Upland Wetlands

Habitat Action	Compliance Metric	Frequency	Duration
Wetland Invasive Species Removal	% of acres treated remaining functional	Years 2 and 5	4 years
	# of acres of wetland treated	Each event	once
	Year of treatment	Each event	once
	Type of plant removal conducted (controlled burn, biological, herbicide, mechanical, other)	Each event	once
Wetland Vegetation Planting	# of riparian wetland acres treated	Each event	once
	# and type/species of plants installed as compared to planting plan or proposal	Year 0, 1, 3, 5, 10	10 years
	# of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	% of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	# of acres of weeds or invasive plants treated	Year 0, 1, 3, 5, 10	10 years
	Type(s) of weed control measures employed	Year 0, 1, 3, 5, 10	10 years
	Photo documentation of plantings	Year 0, 1, 3, 5, 10	10 years

Riparian Habitat

Habitat Action	Compliance Metric	Frequency	Duration
Install Fence	# of acres of non-wetland habitat protected	Years 1, 3, 5, 10	10 years
	Type of non-wetland habitat affected	Years 1, 3, 5, 10	10 years
	# of acres of wetland habitat protected	Years 1, 3, 5, 10	10 years
	Type of wetland habitat affected	Years 1, 3, 5, 10	10 years
	# of miles of fence installed	Each event	once
	# of miles of streambank protected	Each event	once
	Did the fence remain functional?	Years 1, 3, 5, 10	10 years
	Photo documentation of fence issues or evidence of livestock presence of wildlife damage	Years 1, 3, 5, 10	10 years
	Measure of whether the livestock exclusion fencing meets the design criteria in the proposal (location, size, fencing intact and functional)	Years 1, 3, 5, 10	10 years

Riparian Habitat

Habitat Action	Compliance Metric	Frequency	Duration
	# of Water Gaps	Each event	once
	# of Cattle Guards	Each event	once
	# of Other Exclusion Structures	Each event	once
	Average buffer width	Years 1, 3, 5, 10	10 years
	End date of lease	Years 1, 3, 5, 10	10 years
	End latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	End longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start date of lease	Years 1, 3, 5, 10	10 years
	Start latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Type of lease [New Lease, Renewed Lease]	Each event	once
Plant Vegetation	# of acres of habitat planted	Year 0, 1, 3, 5, 10	10 years
	# of riparian non-wetland stream miles treated	Each event	once
	# of riparian wetland acres treated	Each event	once
	# and type/species of plants installed as compared to planting plan or proposal	Year 0, 1, 3, 5, 10	10 years
	# of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	% of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	# of acres of weeds or invasive plants treated	Year 0, 1, 3, 5, 10	10 years
	Type(s) of weed control measures employed	Year 0, 1, 3, 5, 10	10 years
	Photo documentation of plantings	Year 0, 1, 3, 5, 10	10 years
Weed Control	# of acres of habitat treated	Year 1	1 year
	% of acres treated remaining functional	Years 2 and 5	4 years
	# of miles of streambank treated	Each event	once
	Year of treatment	Each event	once
	Type of plant removal conducted (controlled burn, biological, herbicide, mechanical, other)	Each event	once

Sediment Reduction

Habitat Action	Compliance Metric	Frequency	Duration
Decommission Road/Relocate Road	average width of treatment	Year 1	once
	# of miles of new road created in upland or riparian area	Year 1	once
	Net change in # of Miles of road (total)	Years 1, 2, 5	5 years
	# Miles of road or trail treated	Each event	once
	Type of treatment (blocking, recountouring, scarified/ripping, other)	Each event	once
	End latitude of created road or trail segment	Years 1, 2, 5	5 years
	End latitude of treated road or trail segment	Years 1, 2, 5	5 years
	End longitude of created road or trail segment	Years 1, 2, 5	5 years
	End longitude of treated road or trail segment	Years 1, 2, 5	5 years
	Start latitude of created road or trail segment	Years 1, 2, 5	5 years
	Start latitude of treated road or trail segment	Years 1, 2, 5	5 years
	Start longitude of created road or trail segment	Years 1, 2, 5	5 years
	Start longitude of treated road or trail segment	Years 1, 2, 5	5 years
	# of direct sediment entry points eliminated	Each event	once
Improve Road	# of miles of road or trail improved	Each event	once
	Type of habitat affected (estuarine, riparian, upland)	Each event	once
	average width of treatment	Years 1, 2, 5	5 years
	# of Water Bars	Each event	once
	# of Ditch Relief Culverts/ Cross Drains	Each event	once
	# of Improved Road Crowns	Each event	once
	# of Road Stream Crossing Improvements (Rocked Ford)	Each event	once
	# of Slope Regradation or Terracing Treatments	Each event	once
	# of Other sediment control measures	Each event	once
	Type of improvement [resurface, drainage, enhanced maintenance]	Each event	once
Upland Erosion and Sedimentation Control	# of acres of estuarine habitat treated by type [estuarine, freshwater, riparian, upland]	Years 1	1 year

Sediment Reduction

Habitat Action	Compliance Metric	Frequency	Duration
	% of acres of estuarine habitat remaining	Years 2 and 5	4 years
	# of erosion control structures; % remaining	Years 1	1 year
	% of erosion control structures remaining	Years 2 and 5	4 years
	types and amounts of erosion control measures employed as compared to plans or proposals	Year 1	1 year
	photo documentation of erosion control measures	Years 1, 3, 5, 10	10 years

Upland Agriculture

Habitat Action	Compliance Metric	Frequency	Duration
Livestock Management	in development	Years 1, 3, 5, 10	10 years
Agriculture Management (BMPs)	in development	Years 1, 3, 5, 10	10 years
Install Fence	# of acres of non-wetland habitat protected	Years 1, 3, 5, 10	10 years
	Type of non-wetland habitat affected	Years 1, 3, 5, 10	10 years
	# of acres of wetland habitat protected	Years 1, 3, 5, 10	10 years
	Type of wetland habitat affected	Years 1, 3, 5, 10	10 years
	# of miles of fence installed	Each event	once
	# of miles of streambank protected	Each event	once
	Did the fence remain functional?	Years 1, 3, 5, 10	10 years
	Photo documentation of fence issues or evidence of livestock presence of wildlife damage	Years 1, 3, 5, 10	10 years
	Measure of whether the livestock exclusion fencing meets the design criteria in the proposal (location, size, fencing intact and functional)	Years 1, 3, 5, 10	10 years
	# of Water Gaps	Each event	once
	# of Cattle Guards	Each event	once
	# of Other Exclusion Structures	Each event	once
	Average buffer width	Years 1, 3, 5, 10	10 years

Upland Agriculture

Habitat Action	Compliance Metric	Frequency	Duration
	End date of lease	Years 1, 3, 5, 10	10 years
	End latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	End longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start date of lease	Years 1, 3, 5, 10	10 years
	Start latitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Start longitude of treated stream reach	Years 1, 3, 5, 10	10 years
	Type of lease [New Lease, Renewed Lease]	Each event	once
Water Development	in development	Years 1, 3, 5, 10	10 years

Upland Vegetation

Habitat Action	Compliance Metric	Frequency	Duration
Planting	# of acres of habitat planted	Year 0, 1, 3, 5, 10	10 years
	# and type/species of plants installed as compared to planting plan or proposal	Year 0, 1, 3, 5, 10	10 years
	# of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	% of plants surviving after installation	Year 0, 1, 3, 5, 10	10 years
	Type(s) of weed control measures employed	Year 0, 1, 3, 5, 10	10 years
	Photo documentation of plantings	Year 0, 1, 3, 5, 10	10 years
Invasive Plant Control	# of acres of weeds or invasive plants treated	Year 1	1 year
	Year of treatment	Each event	once
	Type of plant removal conducted (controlled burn, biological, herbicide, mechanical, other)	Each event	once
Vegetation or Stand Management	in development	Years 1, 3, 5, 10	10 years
Slope Stabilization	in development	Years 1, 3, 5, 10	10 years

Water Quality Improvement

Habitat Action	Compliance Metric	Frequency	Duration
Return Flow Cooling	in development	Years 1, 3, 5, 10	10 years
Reduce Use of or Control Runoff of Pesticides, Road Chemicals, Fertilizers	in development	Years 1, 3, 5, 10	10 years
Refuse Removal	in development	Years 1, 3, 5, 10	10 years
Sewage Clean-Up	in development	Years 1, 3, 5, 10	10 years
Toxic Clean-Up	in development	Years 1, 3, 5, 10	10 years

Land Protection, Acquisition, or Lease

Habitat Action	Compliance Metric	Frequency	Duration
Land Purchase	# of acres of habitat protected by type [freshwater non-wetland, freshwater wetland, riparian non-wetland, riparian wetland, upland non-wetland, upland wetland]	Years 1, 4, 8, 12	12 years
	# of miles of stream protected in a riparian non-wetland area	Years 1, 4, 8, 12	12 years
	# of miles of stream protected in a riparian wetland area	Years 1, 4, 8, 12	12 years
	# of minimum estimated HUs protected for wildlife	Years 1, 4, 8, 12	12 years
	# of stream kilometers credited for resident fish	Years 1, 4, 8, 12	12 years
	Amount of water secured in acre-feet/year	Years 1, 4, 8, 12	12 years
	End date of easement	Each event	once
	End latitude of protected stream reach	Years 1, 4, 8, 12	12 years
	End longitude of protected stream reach	Years 1, 4, 8, 12	12 years
	Flow of water returned to the stream as prescribed in the water acquisition in cubic-feet per second (cfs)	Years 1, 4, 8, 12	12 years
	Start date of easement	Each event	once
	Start date of the purchase	Each event	once
	Start latitude of protected stream reach	Years 1, 4, 8, 12	12 years
	Start longitude of protected stream reach	Years 1, 4, 8, 12	12 years

Land Protection, Acquisition, or Lease

Habitat Action	Compliance Metric	Frequency	Duration
	Type of acquisition [Fee Title, New Easement, Renewed Easement, Exchange, Mix]	Each event	once
	Determine whether the property is still in protected status after 5, 10 , 20 years	Years 1, 5, 10, 20	20 years
Lease Land	# of acres of habitat protected by type [efreshwater non-weltand, freshwater wetland, riparian non-wetland, riparian wetland, upland non-wetland, upland wetland]	Years 1, 4, 8, 12	12 years
	Amount of water secured in acre-feet/year	Years 1, 4, 8, 12	12 years
	End date of lease	Each event	once
	End latitude of protected stream reach	Years 1, 4, 8, 12	12 years
	End longitude of protected stream reach	Years 1, 4, 8, 12	12 years
	Flow of water returned to the stream as prescribed in the water acquisition in cubic-feet per second (cfs)	Years 1, 4, 8, 12	12 years
	Length of streambank protected	Years 1, 4, 8, 12	12 years
	Start date of lease	Each event	once
	Start latitude of protected stream reach	Years 1, 4, 8, 12	12 years
	Start longitude of protected stream reach	Years 1, 4, 8, 12	12 years
	Type of lease [New Lease, Renewed Lease]	Each event	once
	Determine whether the property is still in protected status after 5, 10 , 20 years	Years 1, 5, 10, 20	20 years

Nutrient Enrichment

Habitat Action	Compliance Metric	Frequency	Duration
Enhance Nutrients Instream	# of miles of stream treated with nutrients	Each event	once
	average width of treatment	Years 1, 2, 5	5 years
	# of pounds of nutrients added to stream	Each event	once
	type of nutrients added to stream [carcasses, nutrient blocks, other]	Each event	once

Reduce or Eliminate Negative Species Interactions

Habitat Action	Compliance Metric	Frequency	Duration
Reduce or Eliminate Brook Trout	in development	Years 1, 3, 5, 10	10 years
Reduce or Eliminate Non-Native Predators	in development	Years 1, 3, 5, 10	10 years
Reduce or Re-distribute Native Predators	in development	Years 1, 3, 5, 10	10 years

Project Maintenance

Habitat Action	Compliance Metric	Frequency	Duration
Operate and Maintain Habitat/Passage/Structure	# of miles of streambank protected by fence maintenance	Each event	once
Operate and Maintain Habitat/Passage/Structure	# of acres protected by fence maintenance	Each event	once

Data Management

Status and trends, and effectiveness monitoring data in the Upper Columbia are managed by the agencies and programs that produce them, with assistance and coordination from the Upper Columbia Data Steward. Subbasin-level coordinators, associated with ISEMP in the Wenatchee and Entiat subbasins, OBMEP in the Okanogan Subbasin, and the Methow Restoration Council in the Methow Subbasin, work with individual data producers and the Data Steward.

The ISEMP and OBMEP programs have led data management efforts in the Upper Columbia, with desktop database tools designed to assist with data entry, and initial data storage. Both programs will submit final data sets to the Status, Trends, and Effectiveness Monitoring (STEM) Databank, developed and managed by NOAA's Northwest Fisheries Science Center. ISEMP data management staff have worked during the first half of 2010 on the development of a tool to export ISEMP data to STEM. Development of a similar tool for OBMEP will begin during fall 2010.

The development of coordinated data management in the Methow subbasin has been slower than efforts in the other subbasins. However, with the completion of the Methow monitoring assessment, and the expected addition of a Methow data steward under the direction of the Methow monitoring coordinator, plans exist for either processing of Methow data and submission to STEM, or the development of a Methow data network, starting in the second half of 2010.

Action implementation data for restoration actions implemented in the Upper Columbia are stored in the Pisces system for projects funded by the BPA, and in the Habitat Work Schedule (http://uc.ekosystem.us) system for all other actions. Data entry of action implementation data is coordinated between Lead Entity coordinators, action sponsors, and UCSRB. Future work will incorporate action data collected by monitoring programs conducted by the SRFB and the Reclamation.

Evaluation

Evaluation of monitoring data in the Upper Columbia, for the purposes of implementing the Recovery Plan, is focused around answering the Key Management Questions taken from Appendix P. Appendix P gives recommendations for derived metrics and analyses for each of the Key Management Questions. UCSRB works with recovery partners in the Upper Columbia to coordinate analysis of monitoring data to answer Key Management Questions and support adaptive management.

The Recovery Plan, and the Adaptive Management Framework identify periodic UCRTT Analysis Workshops as the venue for the presentation of analysis intended to answer all or part of Key Management Questions. Status and Trend summaries, reports on the status of restoration implementation, and effectiveness monitoring results will all be presented to help in the evaluation of progress in implementing the Recovery Plan, and in the formulation of recommendations for adaptations to current plans and strategies to improve the quality of restoration actions in the future. The vehicle for those recommendations is an adaptive management synthesis paper that summarizes the most current results of Upper Columbia status and trends, effectiveness results, and recommendations.

The UCRTT hosted the first analysis workshop in January 2010. Presentations from that workshop and the results of deliberations of the UCRTT are being compiled into an edited synthesis report, which will be

presented to the Upper Columbia WATs during summer 2010, and to a broader audience of adaptive management stakeholders at an Adaptive Management Science Conference in November 2010.

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