

November 16, 2009

Eric Loudenslager, Chair  
Independent Scientific Review Panel  
Northwest Power & Conservation Council  
851 SW 6<sup>th</sup> Avenue  
Suite 1100  
Portland, Oregon 97204

Re: Review of the Yakama Nation's Accord Proposal, Columbia Cascade Province MOA  
Habitat Project (2009-00-300)

Dear Mr. Loudenslager,

Please find attached the Yakama Nation's revised Columbia Cascade Province MOA Habitat Project Proposal (Proposal; Project No. 2009-00-300). This revised Proposal addresses the Independent Scientific Review Panel's (ISRP's) comments regarding the original Proposal (dated September 2009). The ISRP's comments were provided in Memorandum ISRP 2009-42 dated October 16, 2009, from ISRP Chair Eric Loudenslager to Tony Grover, Fish and Wildlife Division Director, Northwest Power and Conservation Council (NPCC).

For your convenience, this letter includes a point-by-point summary of the additional detail incorporated into the revised Proposal in response to your comments of October 16, 2009.

## **ISRP Recommendation**

### ***Response Requested***

**We request a revised proposal that provides sufficient detail for a technical review including:**

- 1. Procedures by which watershed assessments and prioritization of projects will be conducted.**

Appendix E (Draft – Reach Assessment and Project Selection Protocol) of this proposal describes the analytical steps taken to conduct reach assessments and project selections. In

summary, the reach assessment and project selection process begins with a review/collection of existing information throughout a subbasin as well as collection of any necessary habitat data at the stream reach scale. This information is then analyzed to allow the investigators to compartmentalize the stream into individual reaches. Each reach is then characterized according to its unique physical, biological, and geomorphic conditions. The reach assessment culminates in a set of reach-level habitat enhancement objectives. The habitat enhancement objectives are intended to address limitations on natural channel forming processes imposed by existing conditions and land-use. Information from the reach assessments will provide much needed hydraulic and geomorphic analysis for use in improving the identification of limiting factors not available during the development of the most current Implementation Schedule project lists. Specific enhancement opportunities are then evaluated and selected according to the reach objectives. Formulation of opportunities unique to each reach assures that enhancements are appropriate to both reach-level scales as well as subbasin-wide. Opportunities are further prioritized at the subbasin-scale and then advanced to the design and implementation phase. We would like emphasize that project identification will be undertaken with the knowledge and acceptance of the various limiting factors described in the Recovery Plan. The Reach Assessment process is designed to find restoration projects to address those limiting factors, not to question them.

Appendix F (Habitat Restoration Action Selection Process) of the proposal describes in more detail than presented in Appendix E, the local process by which habitat projects are identified for implementation. To summarize, using the Recovery Planning process, local Watershed Action Teams (WATs) are presentation with the reach assessment findings, potential restoration actions are discussed, and habitat action sponsors are assigned. Once habitat action sponsors are assigned to an action, landowner contacts are made and initial habitat action design begins. Habitat action designs are brought before the Upper Columbia Regional Technical Team (UCRTT) and their reviews and comments are used to refine the habitat action design. Once the design is finalized and required permits are obtained, the habitat action is implemented.

**2. Summary data on stock and current habitat status (productivity and capacity estimates of past and current conditions) to provide context for the slate of priority activities identified in the proposal.**

Tables B-1 and B-2 have been added to section B of the proposal under the subheading, *Fisheries Background and History*. The tables summarize abundance, productivity, spatial structure, and diversity thresholds, and current status for Upper Columbia spring Chinook and Upper Columbia steelhead. The tables are taken from Hatchery and Genetic Management Plans (HGMPs) that are being prepared for submission to NOAA. The HGMPs contain the most current information on the status of ESA-listed spring Chinook and steelhead stocks. The most current assessment of habitat status relative to past conditions and the potential to benefit spring Chinook and steelhead abundance, productivity, and life history diversity as a function of altering habitat comes from EDT assessments that were conducted in 2004 as part of subbasin and watershed planning. The EDT results are now included in section B, under the subheading *Descriptions of Subbasins and Current Habitat Conditions*.

The EDT assessments were the basis for establishing subbasin planning recommended habitat actions. The same assessment and subbasin plan recommendations were used in recovery planning, adjusted to contribute to meeting VSP parameters. As described in Appendix F of the project proposal and summarized in #1 above, local WATs, Recovery Plan habitat project lists (Implementation Schedules from Appendix G of the Recovery Plan), and identified limiting factors will drive the selection of habitat actions for this Project. Additional hydraulic and geomorphic analysis from reach assessment, not available during the development of habitat project lists (Appendix G of the Recovery Plan - Implementation Schedules), will be used appropriately and in consultation with WATs, to improve upon the identification of limiting factors. Increased reliability in identified limiting factors will result in the ability to select habitat actions more likely to meet the goal of this Project—to improve habitat for fish resources in the Upper Columbia Region to a degree capable of supporting sustainable populations.

**3. The anticipated effects of habitat improvements on fish and wildlife populations; and the details of a monitoring program that facilitates adaptive learning.**

The Yakama Nation does not propose to implement M&E activities as part of this project. Instead, as available, appropriate, on-going M&E activities (Appendix C of this proposal) will be consulted and relevant conclusions will be reported in support of demonstrating project success. The Yakama Nation plans to work and coordinate closely with the various ongoing and any upcoming M&E efforts in the Entiat, Wenatchee and Methow subbasins to adaptively manage actions identified for implementation under this Project. Section H (*Monitoring and Evaluation*), Table H-1 has been added to the proposal. Table H-1 summarizes current Upper Columbia Region M&E programs and the type of monitoring each M&E program is conducting (status and trend, effectiveness, and project implementation/compliance monitoring).

A specific example of our current coordination with M&E efforts is our work with the Entiat Intensively Monitored Watershed (IMW) program. The IMW design calls for a very intense, one-year (2011) monitoring and evaluation effort in a specific reach of the Entiat River. This restoration effort may include up to 15 major restoration projects being implemented by three different project sponsors. Implementation of habitat restoration projects at this volume and urgency is fairly uncommon and difficult, however the Yakama Nation has and will continue to make strenuous efforts to find, design, permit, and construct a large share of these projects in 2011.

**ISRP Comments:**

***1. Technical Justification, Program Significance and Consistency, and Project Relationships (sections B-D)***

- 1. Sections B-E of the narrative re-state general justifications, significance, and project relations found in subbasin and other plans, but relatively few specific actions are provided with respect to this proposed project. There is some ambiguity in the proposal about how confident the Yakama Nation Fisheries Resource Management (YNFRM) are that limiting factors have been correctly identified in previous planning and assessment efforts, because much of the initial work outlined in this project's description involves reach surveys to locate sites for restoration efforts. If these reach surveys are designed to test if restoration strategies can improve survival, this suggests at the very least that YNFRM wants to take a hard look at priority reaches of the Wenatchee, Entiat, and Methow subbasins to determine if limiting factor assessments were likely correct. The ISRP**

**agrees that detailed reach surveys to be initiated in 2009 are a good idea, since decision support models such as EDT ought to be supported and calibrated with local data wherever possible.**

The initial proposal did not include mention of limiting factors and how they are incorporated in the identification of habitat actions. Limiting factors were identified during the Upper Columbia regional recovery planning process and are included in a table listing habitat projects by subbasin (Appendix G of the Upper Columbia Recovery Plan). We would like to make it clear that the five stages for selecting habitat projects described in Appendix F of this proposal are undertaken with the knowledge and acceptance of the various limiting factors identified in the Recovery Plan. The reach assessment process described in Appendix E of this proposal is designed to find restoration projects to address those limiting factors and to calibrate professional knowledge with empirical data, not to question them.

- 2. There are good examples of such assessments and implementations, yet the specific actions (e.g., carcass analog placement, reduction of negative species interactions, log additions) lack scientific justification and seem to lack an effective monitoring program that truly encompasses adaptive management. Some existing assessments and implementation plans are incomplete. The inclusion of Intensively Monitored Watersheds is promising, but a clear definition of which response variables will be tracked and how they will be measured is missing.**

As stated in our response to #3 above, the Yakama Nation does not propose to implement M&E activities as part of this project. Instead, as available, appropriate, ongoing M&E activities (Appendix C of this proposal) will be consulted and relevant conclusions will be reported in support of demonstrating project success. The Yakama Nation plans to work and coordinate closely with the various ongoing and any upcoming M&E efforts in the Entiat, Wenatchee, and Methow subbasins to adaptively manage actions identified for implementation under this Project.

- 3. In addition, we were provided no background on population status, productivity, and capacity, nor any indication on how the proposed actions will improve these demographic properties. Issues related to the effects of regional human population growth and climate change on habitat restoration success are not mentioned, and should be included if relevant.**

Information on population status, productivity, and capacity is now provided in the proposal in Tables B-1 and B-2 in section B, under the subheading *Fisheries Background and History*. The tables summarize abundance, productivity, spatial structure, and diversity thresholds, and current status for Upper Columbia spring Chinook and

steelhead. The most current assessment of habitat status relative to past conditions and the potential to benefit spring Chinook and steelhead abundance, productivity, and life history diversity as a function of altering habitat are now included in section B, under the subheading, *Descriptions of Subbasins and Current Habitat Conditions*. This information is from the 2004 EDT assessments conducted as part of subbasin and watershed planning. Aside from the EDT assessments and reach assessments, we are not aware of any efforts related to evaluating further the effects of human population growth on habitat restoration. We are not aware of any evaluation of the effects of climate change on the success of habitat restoration success but will coordinate closely with any M&E effort in the region that may address this issue in the future. As stated above, the Yakama Nation does not propose to conduct monitoring and evaluation as part of this proposal.

- 4. Likewise, the extent of supplementation and the possibility that infusions of hatchery fish will confound the interpretation of results, as well as the effect of other watershed restoration actions, should be covered. A treatment/control watershed-scale restoration approach should be considered that provides the opportunity to employ adaptive (i.e., experimental) management as it was originally envisioned.**

As stated above, the Yakama Nation does not propose to conduct M&E as part of this proposal. However, Table H-1 provides a summary of current Upper Columbia Region M&E programs and the type of monitoring each M&E program is conducting (status and trend, effectiveness, and project implementation/compliance monitoring).

## ***2. Objectives, Work Elements, and Methods (Section G)***

- 1. Because the proposal did not go into detail regarding specific projects but instead was process-oriented, the ISRP is unable to comment on the scientific basis for project selection, the methods of implementation, or the monitoring and evaluation of project effectiveness until specific projects have been identified.**

The scientific basis for habitat project selection is described in Appendix E (Draft – Reach Assessment and Project Selection Protocol) and Appendix F (Habitat Restoration Action Selection Process) of the proposal and summarized in #1 above (under the subheading *Response Requested*). The habitat restoration action selection method is predicated on physical, biological, and geomorphic conditions at a reach scale assessed at a subbasin scale. Selected habitat actions will address limitations on natural channel forming processes imposed by existing conditions and land use. Habitat actions will be developed

on an action-by-action basis as contracts are awarded. Tasks will be identified for implementation based on the action's ability to address limiting factors. Using the Recovery Planning process, local WATs will be presented with reach assessment findings, potential restoration actions will be discussed, and habitat action sponsors assigned. Once habitat action sponsors are assigned to an action, landowner contacts are made and initial habitat action design begins. Habitat action designs will be brought before the UCRTT and their reviews and comments used to refine the habitat action design. Once the design is finalized and required permits are obtained, the habitat action is implemented. The Yakama Nation does not propose to conduct monitoring and evaluation as part of this proposal. However, Table H-1 provides a summary of current Upper Columbia Region M&E programs and the type of monitoring each M&E program is conducting (status and trend, effectiveness, and project implementation/compliance monitoring).

### ***3. M&E (section H)***

- 1. It is not possible for the ISRP to determine whether monitoring and evaluation techniques employed by the partners will be adequate to evaluate the efficacy of actions executed under this proposal. More detail with respect to how these various, ongoing, M&E efforts will be coordinated to include the projects generated by this proposal is needed. Hillman (2006) and Appendix C are referenced as the M&E plan, yet these documents seem to be primarily in draft and largely a list of contacts.**

The Yakama Nation does not propose to implement or coordinate M&E activities as part of this project. Instead, as available, appropriate, on-going M&E activities (described in Appendix C of this proposal) will be consulted and relevant conclusions will be reported in support of demonstrating project success. It is important to note that no single, ongoing M&E effort encompasses all the M&E needs (status and trend monitoring, effectiveness monitoring, and implementation and compliance monitoring) for all the Upper Columbia Region subbasins. Table H-1 summarizes, by subbasin, the M&E programs and the type of monitoring currently being implemented in the Upper Columbia Region. Note that there are no current monitoring efforts focused on project implementation/compliance monitoring.

In response to the ISRP's comment that Appendix C is referenced as an M&E plan and in draft form, Appendix C of this proposal (*Ongoing Monitoring and Evaluation Programs in the Upper Columbia Region*) is a final product but only contains brief descriptions of ongoing monitoring programs in the Upper Columbia Region. It is not a monitoring plan.

Hillman (2006), developed between 2003 and 2006 by the UCRTT and BioAnalysts, is also not a monitoring plan. Rather, the document draws from existing monitoring and evaluation strategies and outlines an approach specific to the Upper Columbia Region for assessing the effectiveness of restoration projects and management actions on tributary habitat and fish populations. The plan provides recommended monitoring protocols and metrics to address fish and habitat monitoring and evaluation questions, and at the same time, to eliminate duplication of work, reduce costs, and increase monitoring efficiency. Considered a "working document," the August 1, 2006, draft referenced in this proposal is expected to be revised in 2010. The revised Upper Columbia Monitoring Strategy will update recommended monitoring protocols and metrics based on the results from observing and evaluating side-by-side monitoring protocols and metrics from various M&E programs over the past five years.

Hillman (2006) contains appendices which are subbasin-specific plans for implementing monitoring strategies in the respective subbasins (Nelle and Ward 2009 [final, Wenatchee], Nelle et al. 2009 [draft, Entiat]). However, these documents are also not comprehensive M&E plans. The Wenatchee and Methow monitoring strategies are being implemented under the Bonneville Power Administration (BPA) Integrated Status and Effectiveness Monitoring Program (BPA Project #2003-017-00; ISEMP) and do not cover other monitoring efforts that are ongoing in the subbasins. The Methow subbasin monitoring strategy is still being developed and a draft has not yet been developed. The Okanogan subbasin monitoring strategy has not been presented but will essentially be the Colville Confederated Tribes (CCT) Okanogan Basin Monitoring and Evaluation Program (OBMEP, <http://nrd.colvilletribes.com/obmep/default.htm>).

Finally, NMFS has produced a draft monitoring and evaluation plan for the UC Recovery Plan (NMFS 2008c). Again, NMFS (2008c) is not a regional monitoring plan. It is a framework for developing a monitoring strategy to help agencies determine if the



Recovery Plan is working. Success is measured by whether ESA-listed populations/ESU/DPS are meeting recovery criteria and can be removed from ESA listing. NMFS (2008c) has been reviewed by the UCRTT and is currently under review by the RIST. Prior to being incorporated into the Recovery Plan, NMFS (2008c) must be adopted by the UCSRB.

- 2. Restoration actions generated by the project should be treated as experiments and incorporated into an adaptive management program. The proposed workshop could be utilized to begin to define the structure of such a program and assign roles and responsibilities among the entities currently engaged in M&E efforts in the region.**

The Yakama Nation does not propose to implement or coordinate monitoring and evaluation activities as part of this project. The workshop mentioned in the proposal is an UCSRB and UCRTT effort to assess the contribution towards improving VSP parameters for ESA-listed salmon and steelhead from the implementation of habitat projects. The results of this assessment will be presented at the workshop planned for January 2010. As applicable, results and conclusions that emerge from this UCRTT analysis will be reported in support of demonstrating success of habitat actions implemented under this proposal.

The Yakama Nation hopes you find our detailed response to your October 16, 2009 project proposal review helpful.

Sincerely,

Brandon Rogers  
Yakama Nation

**Programmatic Proposal for  
Columbia Cascade Province Habitat Projects  
Identified in the 2008 Columbia Basin Fish Accords MOA**

**Section 10. Narrative**

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**Project ID:** XXXX

**Title:** Columbia Cascade Province MOA Habitat Projects  
**Project Number** 200900300  
**Proposer** Yakama Nation Fisheries Resource Management  
**Short Description** Upper Columbia Habitat Restoration Project  
**Province(s)** Columbia Cascade  
**Subbasin(s)** Wenatchee, Entiat & Methow  
**Contact Name** Brandon Rogers  
**Contact email** [brandonr@yakama.com](mailto:brandonr@yakama.com)  
**Contact Phone** 509-949-4109

**A. Abstract**

The goal of the Upper Columbia Habitat Restoration Project (Project) is to improve habitat for fish resources in the Upper Columbia Wenatchee, Entiat, and Methow subbasins to a degree capable of supporting sustainable populations. Towards achieving this goal, the Yakama Nation began implementing habitat protection and assessment actions in 2009 in Upper Columbia subbasins consistent with actions identified in Appendix B of the 2008 Fish Accord (The Accord). Habitat actions implemented under this Project will address limiting factors for ESA-listed fish as directed in the Accord and consistent with the Upper Columbia River Spring Chinook Salmon and Steelhead Recovery Plan (Recovery Plan). The Recovery Plan was adopted by NOAA on October 9, 2007 (Federal Register Notice, Vol. 72 No. 194) and is aligned with subbasin plans, PUD HCPs, tribal recovery plans, and hydroelectric project relicensing agreements. This Project is specifically designed to restore ecological functions to stream habitat in the three identified subbasins, contributing to the recovery of spring Chinook and steelhead. The outcome of this project will not only benefit listed fish, but is holistic in nature and will improve habitat for other fish and aquatic and terrestrial species present in these areas.

In support of restoring ecological functions in identified subbasins, Yakama Nation staff has been actively involved in habitat protection and restoration planning in the region, including serving as board member on the UCSRB, serving on the UCRTT, and on PUD HCP technical and policy-level committees, and providing assistance and review in recovery planning and in the development of regional monitoring and evaluation strategies. Yakama Nation staff has also worked with stakeholders to identify restoration projects that are ready to implement. The Yakama Nation plans to contribute project staff and consultants to implement restoration actions and to maintain connections to concurrent planning and restoration efforts in the region. We will also assist other entities with their restoration work by offering cost share opportunities.

## **B. Technical and/or scientific background**

### *Location*

The geographic region addressed by this project is located in north-central Washington in the Columbia Cascade Province within the Columbia River Basin (Figure 1). The geology of this area is volcanically and glacially driven, and the climate exhibits wide fluctuations in temperatures and precipitation, including large amounts of snow and runoff, which drives the hydrologic regime (UCSRB 2007). Within the Columbia Cascade Province, consistent with the Accord, habitat actions will be considered for implementation within the Wenatchee, Entiat, and Methow subbasins.

### *Fisheries Background and History*

In past decades, the Wenatchee, Entiat, and Methow subbasins have experienced many ecological perturbations leading to the decline of habitat quality and quantity for fish and wildlife (UCSRB 2007). Although habitat within many of the upper reaches of these subbasins is in relatively pristine condition, habitat in other portions of these subbasins has undergone extensive alteration caused by forest management practices and recreational, agricultural, municipal, and residential development. Human activities that have affected habitat conditions include water diversions, agricultural activities, stream channelization and diking, road and railway construction, timber harvest, and urban and rural development (Mullen et al. 1992; Chapman et al. 1994a, 1994b, 1995a, 1995b; Andonaegui 1999, 2000, 2001; NPCC 2004a, 2004b, 2004c; UCRTT 2008). These activities have reduced habitat complexity, connectivity, water quantity and quality, and riparian function in many stream reaches in the Upper Columbia subbasins. Loss of habitat complexity and floodplain connectivity have reduced spawning and rearing habitat for spring Chinook and steelhead in the larger, mainstem rivers (e.g., Wenatchee, Entiat, Methow, and Okanogan rivers) and in their tributaries. Fish management, including past introductions and persistence of non-native (exotic) fish species, continues to affect survival for listed species.

Upper Columbia Chinook and steelhead populations within the subbasins are also influenced by hydroelectric project operations, artificial supplementation programs, and harvest activities occurring both within and outside of the Columbia Cascade Province. The construction and operation of nine hydroelectric facilities on the Columbia River continue to have an effect on Upper Columbia salmonid populations. Presently, Chief Joseph Dam, constructed without fish passage in 1961, represents the most upstream extent of anadromous migration in the Columbia River basin. The Grand Coulee dam, 52 miles upstream of Chief Joseph Dam, has blocked access to over 1,000 miles of upstream habitat in the upper Columbia River basin since its construction in 1934 (Figure 2). Hatchery programs have been implemented in the Upper Columbia region since construction of Grand Coulee Dam to offset the loss of anadromous salmonid production due to the federally-built hydroelectric projects. With construction of the privately owned Mid-Columbia PUD hydroelectric projects, additional production/hatchery facilities were developed in the Columbia Cascade Province. Ocean harvest and Columbia River harvest continues to affect Upper Columbia (UC) salmon and steelhead stocks although harvest has been greatly reduced and is closely managed by fisheries co-managers. In spite of hatchery mitigation efforts, changes in operations and construction of hydroelectric facilities, and

curtailment of fish harvest spring Chinook and steelhead populations in the Upper Columbia region continue to decline.

Since 1991, several species of anadromous salmonid populations inhabiting the Columbia Basin have been listed as “threatened” or “endangered” under the Endangered Species Act (ESA). In the upper Columbia River region, the UC 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 NMFS. The UC spring Chinook Evolutionarily Significant Unit (ESU) was listed as endangered on March 24, 1999.

The Interior Columbia Basin Technical Recovery Team (ICBTRT) defines three independent populations of endangered spring Chinook within the UC Spring Chinook ESU (Wenatchee, Entiat, and Methow populations) and five endangered steelhead populations (Wenatchee, Entiat, Methow, Okanogan, and Crab Creek populations) within the UC DPS (ICBTRT 2003). As described in the Recovery Plan, recovery of ESA-listed salmon and steelhead populations in the Upper Columbia region is dependent on the contribution of habitat restoration and protection actions identified in the Recovery Plan. This project will implement habitat actions in the Wenatchee, Entiat, and Methow subbasins consistent with and in support of the Recovery Plan, benefitting ESA-listed UC spring Chinook populations and UC steelhead populations in these three subbasins. Tables B-1 and B-2 describe the status of listed UC steelhead and UC spring Chinook populations relative to the viable population thresholds for abundance, productivity, spatial structure, and diversity (ICBTRT 2008; UCSRB 2007).

Table B-1. Viability assessments for Upper Columbia steelhead populations (HCP HC 2009).

	Population level: abundance and productivity <sup>a</sup>					Population Level: 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	1,172	1,000	0.825 (0.87)	1.20	High	Low	High	High	High Risk
Entiat River	79	500	0.48 (0.82)	1.35	High	Low	High	High	High Risk
Methow River	281	1,000	0.28 (0.49)	1.20	High	Low	High	High	High Risk

Table note:

a - 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.

Table B-2. Viability assessments for Upper Columbia spring Chinook salmon populations (HCP HC 2009).

Population	Population level: abundance and productivity					Population Level: Spatial Structure and Diversity			Population Level: Overall Viability Rating
	Abundance		Productivity		Overall A/P	Goal A	Goal B	Overall SS/D	
	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	650	2,000	0.53	1.62	High	Low	High	High	High Risk
Entiat River	59	500	0.72	1.76	High	Moderate	High	High	High Risk
Methow River	180	2,000	0.80	1.62	High	Low	High	High	High Risk

*Description of Subbasins and Current Habitat Status*

Extensive hatchery, harvest, habitat, and hydropower (all-H) assessment and planning efforts, conducted in the Upper Columbia Region and discussed in the Recovery Plan, have identified the necessity of habitat protection and restoration actions to recovering and maintaining viable populations of spring Chinook and steelhead in the region. To estimate the contribution of habitat actions towards improving the viability of spring Chinook and steelhead populations, the Ecosystem and Treatment Diagnosis Methodology (EDT) was applied in the Wenatchee (NPPC 2004c), Entiat (Mobrand Biometrics, Inc. 2003), and Methow (NPPC 2004b) subbasins, using current knowledge of habitat conditions. When available, empirical information was used to determine threats to salmonid populations, but in cases where empirical information was lacking, preliminary analysis, local knowledge or professional judgment, and modeling were used to identify threats. Limiting factors were then identified based on the identified threats.

The Recovery Plan recognizes that limiting factors may not be fully understood within each subbasin and anticipates using an adaptive management approach to refine the identification of limiting factors based on new information. In 2008, the U.S. Bureau of Reclamation (Reclamation) initiated tributary and reach assessments (Lyon et al. 2008; USBR 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. Reclamation is conducting these assessments as partial fulfillment of their Federal Columbia River Power System (FCRPS) Biological Opinion obligations (NMFS 2008b). The assessments are contributing to the ability to prioritize stream reaches within subbasins and to the ability to identify specific habitat actions within the prioritized stream reaches. Figure 3 illustrates the process by which reach assessments and subbasin plans will be used to identify site-specific actions for implementation. Reclamation’s project identification process is integrated into the Recovery Planning process, providing much needed hydraulic and geomorphic analyses and evaluation that was not available at the time of recovery planning. Since Reclamation is limited in its ability to conduct these assessments, the Yakama Nation intends to assist in conducting reach assessments beginning in 2009, consistent with Reclamation’s methodologies. This information will help to close the existing data gaps on documenting limiting factors for each Upper Columbia Region subbasin.

The habitat actions implemented under this Project will be consistent with the goals and objectives of the Northwest Power and Conservation Council (NPCC) 2009 Columbia Basin Fish and Wildlife Program (Fish and Wildlife Program) and the objectives in the Accord. Identified actions consistent with the Accord will be designed and implemented to benefit abundance, productivity, population spatial structure, and life history diversity parameters for fish species at the population scale consistent with the Recovery Plan and the UCRTT Biological Strategy.

Following is a summary, by subbasin, of the current habitat status. The summary includes a description of the relative benefit to Viable Salmonid Population (VSP) parameters as a result of implementing habitat actions, based on the EDT assessments. Additional discussion of objectives, tasks, and methods are provided in section G below.

#### Wenatchee subbasin

The Wenatchee subbasin, the second largest of the three subbasins considered in this project (854,000 acres), consists of nine primary watersheds: Mission, Peshastin, Chumstick, Icicle, Chiwaukum, and Nason creeks, the Chiwawa, White, and Little Wenatchee rivers and two mainstem Wenatchee River “watersheds:” the lower and upper Wenatchee River (upper river includes Lake Wenatchee) (Figure 4). ESA-listed spring Chinook and steelhead spawn and rear in the subbasin (UCSRB 2007) along with bull trout and non-listed anadromous salmonid species.

State highways, railroads, and housing development have substantially diminished the overall habitat function of the stream channel and floodplains of the Wenatchee River and some of its major tributaries (e.g., Peshastin Creek and Nason Creek). This has impaired stream complexity, wood and gravel recruitment, floodwater retention, late summer flows, and water quality. The highest priority for habitat actions within the Wenatchee subbasin is the protection of highly functioning habitat in the watersheds of the upper Wenatchee subbasin, specifically the White River, Chiwawa River, and the upper and middle mainstem Wenatchee River (including Lake Wenatchee). Additional priorities are to increase and restore the functionality of watersheds such as Nason, Peshastin, and Icicle creeks, and the Lower Wenatchee River, by restoring and enhancing the natural capacity for channel-shaping events and habitat-maintaining activities, thereby contributing to abundance and productivity (e.g., reconnecting side channels; enhancing instream large woody debris [LWD]; restoring floodplain access; restoring mature, accessible, riparian habitat) (UCRTT 2008).

The Wenatchee EDT assessment predicted that relative abundance of the Wenatchee spring Chinook population would increase by about 69 percent with the most intense restoration modeled, with productivity increases of up to 12 percent (NPPC 2004c). For steelhead, EDT predicted that highly intense habitat actions would increase relative steelhead abundance in the Wenatchee subbasin by up to 102 percent and productivity would increase by up to 16 percent (NPPC 2004c).

#### Entiat subbasin

The Entiat subbasin is the smallest of the three subbasins considered in this project (298,000 acres), containing two primary watersheds: Entiat and Mad rivers (Figure 5). ESA-listed spring

Chinook and steelhead spawn and rear in the Entiat subbasin (UCSRB 2007) along with bull trout and non-listed anadromous salmonids.

The Entiat River has been affected by upland management activities throughout the subbasin and construction of flood control dikes in the lower mainstem. Upland erosion is a chronic problem in the Entiat subbasin. Reduced stream channel complexity is the primary limitation to productivity of salmonids on the lower 20 kilometers (km) of the mainstem Entiat River. Stream sinuosity is low, with very few point bars for gravel accumulation. Instream habitat diversity is also low, with few pools, glides, pocket waters or LWD accumulations. As a result, there are few resting and rearing areas for both adult and juvenile salmon in the lower mainstem Entiat River. Efforts to improve stream sinuosity and channel forming processes in the lower reach should be continued.

Based on the Entiat Watershed Plan (2004) and the Recovery Plan, the most feasible means to restore habitat in the lower Entiat River is structure placement as an immediate improvement, and floodplain restoration as the long-term solution. This short-term/long-term approach is the most pragmatic restoration practice available for the lower Entiat River. Initially, managers should actively enhance the lower Entiat River by increasing stream habitat complexity and encouraging thalweg development and deposition of spawning gravels. The long-term approach should be to restore riparian and floodplain habitat in the lower Entiat River. Such measures would also be feasible in the lower Mad River. The lower Entiat River is one of the few areas in the Upper Columbia Region where active manipulation of the stream channel is appropriate, and it should only be done with a strategy in place to restore floodplain function on a permanent basis (UCRTT 2008).

The most pressing needs on the lower Entiat River are to enhance 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 (Appendix G of the Recovery Plan). This is due to the natural characteristics of the watershed, upland slope condition, irrigation water withdrawals, and stream channel modifications in the lower Entiat River. Actions that increase late summer flows in the lower Entiat River should be a subbasin priority.

The EDT assessment for Entiat spring Chinook predicted that at the highest modeled intensity of habitat restoration, the relative increase in fish abundance would be approximately 36 percent (Mobrand Biometrics 2003; estimates for productivity were not provided). In addition, the modeled intense habitat actions would result in minimum criteria being met for spatial structure and diversity. The EDT assessment was not performed for Entiat steelhead.

#### Methow subbasin

The largest of these three subbasins is the Methow subbasin, which covers approximately 1,167,764 acres and consists of ten primary watersheds: Early Winters Creek, Upper Methow, Lost, Middle Methow, Chewuch, Twisp, Beaver Creek, Gold Creek, Libby Creek, and the Lower Methow rivers (Figure 6). ESA-listed spring Chinook and steelhead spawn and rear in the Methow subbasin (UCSRB 2007) along with bull trout and non-listed anadromous salmonids.

The Methow River has a high proportion of pristine habitat in the upper portions of major tributaries. The middle and lower mainstem and lower portions of major tributaries have been impacted by state highways, county roads, and housing and agricultural development that have diminished the overall function of the stream channel and floodplain (UCRTT 2008). This development has impaired stream complexity, wood and gravel recruitment, floodwater retention, and water quality. Additionally, late summer and winter instream flow conditions often reduce migration, spawning, and rearing habitat for native salmonids. This problem is partly natural (a result of watershed-specific weather and geologic conditions), but it is exacerbated by irrigation withdrawals.

The highest priority within the Methow subbasin is the protection of habitat that supports salmonid communities so that the populations can increase in abundance and can expand their range to adjacent drainages. Priority watersheds for protection actions 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 impaired watersheds such as the Twisp, Chewuch, and Mainstem Methow Rivers, including important subwatersheds such as Wolf, Gold, Libby, and Beaver creeks. In the Methow, these watersheds offer the highest potential to increase abundance and productivity through restoration efforts (UCRTT 2008).

The Methow EDT assessment predicted that under a very high intensity of habitat actions, relative spring Chinook abundance would increase 124 percent, while productivity would increase 53 percent (NPPC 2004b). For Methow steelhead, relative steelhead abundance under highly intense habitat actions would increase about 136 percent, with increases of up to 48 percent in productivity. The assessment concluded that relatively large improvements can be realized for the Methow steelhead population by restoring and protecting habitat in the Methow subbasin. In addition, habitat actions taken would meet spatial structure and diversity criteria.

### **C. Rationale and significance to regional programs**

Both habitat protection and habitat restoration actions will be implemented under this project for streams that currently support or are capable of supporting ESA-listed spring Chinook salmon and steelhead in the Upper Columbia Region. Habitat restoration is defined as a process that involves management decisions and actions that enhance the rate of recovery of habitat conditions (Davis et al. 1984). The goal is to re-establish the ability of the ecosystem to maintain its function and organization without continued human intervention. Habitat protection will include the use of management decisions and actions to safeguard ecosystem function and required habitat features of listed species.

The vision of the Fish and Wildlife Program is “a Columbia River ecosystem that sustains an abundant, productive, and diverse community of fish and wildlife, mitigating across the basin for the adverse effects to fish and wildlife caused by the development and operation of the hydrosystem” (p. 9, draft Fish and Wildlife Program, Sept. 2008). This vision is consistent with the vision for the Recovery Plan which is to “develop and maintain a healthy ecosystem that contributes to the rebuilding of key fish populations by providing abundant, productive, and diverse populations of aquatic species that support the social, cultural, and economic well being of the communities both within and outside the recovery region” (The Recovery Plan, pg. 12). The Recovery Plan vision is consistent with the visions and goals stated in the Methow,



Wenatchee, and Entiat subbasin plans and watershed plans, and aligns with the goal of the Yakama Nation Fisheries Program, which is to restore steelhead and salmon to harvestable levels in the Upper Columbia region of the Columbia Cascade Province and elsewhere in our ceded area.

In the Upper Columbia Region, the Recovery Plan represents the most comprehensive and programmatically integrated strategy for identifying and prioritizing habitat restoration actions with the goal of recovery of spring Chinook salmon and steelhead populations. Completed in August 2007 and incorporated by NMFS into the federal recovery plan on October 9, 2007 (Federal Register Notice Vol. 72, No. 194, RIN 0648-XD02, Endangered and Threatened Species; Recovery Plans), the Recovery Plan is derived from subbasin plans, tribal recovery plans, watershed plans, and the Biological Strategy (UCRTT 2008). The Recovery Plan was also developed to be consistent with the requirements of the Douglas County PUD and Chelan County PUD Anadromous Fish Agreement and HCPs, the Grant PUD Salmon and Steelhead Settlement Agreement (GPUD 2005), and other related hydroelectric relicensing agreements and license requirements.

The objectives and recommended actions in the Recovery Plan are linked directly to “primary” limiting factors/threats identified in subbasin plans, watershed plans, and the UCRTT Biological Strategy. Limiting factors may not be fully understood within each subbasin; therefore, the Recovery Plan relies on monitoring and adaptive management to assist in the identification of limiting factors and to assess effects of habitat actions. Information used in the development of these documents included limiting factors assessments, EDT, empirical and derived data, and local knowledge and professional judgment. Adaptive management will not only be based on the evaluation of monitoring results but will also be based on tributary and reach assessments as they are completed within the subbasins. The objectives in the Recovery Plan (p. 194 of the Recovery Plan,) were provided at both the regional scale and the subbasin assessment unit (AU) scale (Table 5.9, p. 236 and Appendix G of the Recovery Plan).

In 2008, the “Federal Action Agencies” (the Bonneville Power Administration [BPA], the U.S. Army Corps of Engineers [Corps], and Reclamation) and the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, and the Columbia River Inter-Tribal Fish Commission (CRITFC) signed the Columbia Basin Fish Accords Memorandum of Agreement (MOA) between the Three Treaty Tribes and FCRPS Action Agencies (The Accord). The goal for this Accord was to address direct and indirect effects of construction, inundation, operation, and maintenance of the FCRPS and Reclamation’s Upper Snake River Projects on fish resources of the Columbia River Basin. The Accord includes requirements that funded habitat actions be linked to biological benefits based on limiting factors for ESA-listed fish, and that actions be consistent with recovery plans and subbasin plans.

With the Recovery Plan vision and the funding provided by the Accord in mind, the Yakama Nation is in a position to play a vital role in the implementation of habitat protection and restoration actions that are set forth in the Recovery Plan and that were derived from the limiting factors found in the subbasin plan. The AU summaries in the subbasin plans led to the implementation plan laid out in the Recovery Plan, and subsequently the habitat actions in the

Recovery Plan were added into the Accord. Thus, the Accord has become the means for implementing the recommendations given in the AU summaries. The actions discussed under this proposal are therefore consistent with the Recovery Plan and subbasin plan actions, which were directly linked to the anticipated survival benefits identified in the Accord. Proposed action types can be found in Attachment B of the Accord

Consistent with the Independent Scientific Review Panel's (ISRP's) guidance for this section, the Yakama Nation provides the following information regarding the relationship of this project to regional programs, specifically to the objectives of the Accord, the Fish and Wildlife Program, the subbasin plans, and the Recovery Plan:

- The actions will align with those listed in Attachment B of the Accord or as modified in accordance with section III.E of the Accord.
- The actions will agree with the Fish and Wildlife Program, which incorporated the 2004 subbasin plans into the Fish and Wildlife Program as approved by the ISRP and adopted by the NPCC in the 2004 amendment process. Actions will address habitat limiting factors by protecting functioning habitat and restoring degraded ecosystem functions or processes consistent with the following subbasin plan sections: Key Findings (Section 6.2), Hypothesis Statements (Section 6.3), and Near Term Opportunities for Habitat Needs (Section 6.5), as presented in the Entiat Subbasin Plan; Assessment Unit Summaries (Section 5.5) as presented in the Methow Subbasin Plan; and Key Findings and Hypothesis Statements (Section 6.4) as presented in the Wenatchee Subbasin Plan. Identified projects will be designed and implemented to benefit abundance, productivity, population spatial structure, and life history diversity parameters for fish species at the population scale. Projects will be consistent with fish habitat objectives (USFWS 1999) and desired future conditions, strategies, and near-term opportunities provided in Section 7.6 of the Entiat Subbasin Plan, Section 5.5 of the Methow Subbasin Plan, and Section 7.8 of the Wenatchee Subbasin Plan.
- Given that most of the Accord actions were taken directly from the 2007 Recovery Plan, actions will utilize the suites of potential habitat actions for each habitat action class identified in the Recovery Plan (Table 5.9, p. 236 of the Recovery Plan) as appropriate or as modified in accordance with section III.E of the Accord. The Recovery Plan identifies “classes” of restoration actions (Habitat Action Class)—for example, riparian restoration, side channel reconnection, or obstruction restoration—and links these Habitat Action Classes to “primary” limiting factors and application to the VSP parameters (Table 5.9, p. 236 of the Recovery Plan). A suite of potential habitat actions for each habitat action class is also provided. Restoration classes were identified through a collaborative process that included federal, state, and local governments, tribes, and local stakeholder participation. The Recovery Plan identified suites of actions for each restoration class (Potential Habitat Actions). It does *not*, at this time, identify which of those specific actions will be implemented within each assessment unit, nor does it identify specific locations within the assessment unit where an action will be implemented. Rather, the Recovery Plan provides a short list of specific actions that *could* be implemented within each restoration class (Table 5.9). The Recovery Plan does identify the appropriate restoration classes that are needed to address the primary limiting factors and threats within assessment units (Appendix G, Habitat Matrices, of the Recovery Plan). The tables in Appendix G are organized by subbasin (a different table for each subbasin)

and by geographic assessment unit. Each table identifies the primary limiting factor(s) by assessment unit, the primary causal factors or threats, the management objectives, appropriate restoration classes (from Table 5.9), specific restoration actions (from Table 5.9), species affected by the action (spring Chinook, steelhead, or bull trout), contribution of the action to VSP (A/P or SS/D), and effect time. Assessment units were also ranked according to their importance to recovery. At this time, the tables do not reflect the feasibility of implementing habitat actions.

As habitat actions are identified, they will be implemented according to the framework for sequencing or prioritizing actions described in Section 8.4 of the Recovery Plan. On January 9, 2009, the UCSRB adopted the most recent versions of the Implementation Plans for recovery planning. These Implementation Plans provide the most current and specific scheduled list of habitat actions for implementation in the Wenatchee, Entiat, and Methow subbasins, among the other subbasins in the Columbia Cascade Province.

#### **D. Relationships to other Planning Processes**

This project will provide the funding to implement habitat actions designed to achieve clearly identified and measurable objectives by addressing limiting factors identified in the subbasin plans. Ongoing monitoring and evaluation programs in the Upper Columbia Region (described in Section H below and in Appendix C of this proposal) will support adaptively managing habitat actions implemented under this project to achieve desired future conditions. These funded actions will be consistent with the Accord and with actions listed in Attachment B of the Accord.

Additionally, there are a number of conservation efforts, including the Recovery Plan, in varying stages of development and implementation that directly or indirectly protect or improve the viability of naturally produced spring Chinook and steelhead in the Upper Columbia Region. Applicable conservation and recovery planning efforts in the Upper Columbia Region are described in Appendix A of this proposal, including their relationship to this Project. The diagram in Figure 7 illustrates this relationship. Project actions will complement these ongoing, overlapping conservation efforts.

As co-managers of the fisheries resources in Washington State, the Yakama Nation has been actively involved in the conservation and recovery planning efforts in the Upper Columbia Region. Along with Douglas, Chelan, and Okanogan County commissioners and the Colville Confederated Tribes, the Yakama Nation serves as a board member on the UCSRB. The Yakama Nation also serves on the UCRTT, the PUD HCP technical and policy-level committees, and provides assistance and review in the development of regional monitoring and evaluation strategies. We have also worked with stakeholders to identify actions that are ready to implement in 2009 working with Watershed Action Teams (WATs) as described in the Recovery Plan. WATs are local groups of residents from each watershed who work with the UCSRB to coordinate funding, project implementation schedules, monitoring, and adaptive management of the Recovery Plan.

## **E. Relationships to other Projects**

Habitat protection and restoration actions and reach assessments will be complementary to and coordinated with past and ongoing projects funded under the Fish and Wildlife Program. These actions will be designed to be consistent with the Recovery Plan and subbasin plans. Actions will have clearly defined, measureable habitat objectives (provided in USFWS 1999) that are consistent with the Monitoring Strategy for the Upper Columbia Basin (Hillman 2006; see Section H of this proposal). Actions will be selected, designed, and implemented to address limiting factors and support the working hypotheses as identified in the appropriate subbasin plan. Given that subbasin plans in the Columbia Cascade Province are integrated into the Recovery Plan, all actions will be consistent with the efforts to recover salmonids.

To provide some context of the types of projects ongoing in the Wenatchee, Entiat, and Methow subbasins at this time, Appendix B summarizes key information for recent habitat projects funded in 2007–2008. These projects represent collaborative efforts by some of the following: the Yakama Nation, state and federal agencies, and local project sponsors<sup>1</sup>, with the contribution of interested stakeholders and landowners. Each of these projects has furthered the objectives in the Recovery Plan, subbasin plans, watershed plans, and the Fish and Wildlife Program.

## **F. Project history (for ongoing projects)**

Actions implemented under this project will continue to support the Fish and Wildlife Program's goals and objectives in the Columbia Cascade Province. As such, this programmatic habitat project proposal is a continuation and expansion of Fish and Wildlife Program efforts previously implemented and currently underway in the Province.

## **G. Proposal biological/physical objectives, work elements, methods, and metrics**

### *Objective*

The objective of this project is to improve spawning, rearing, and migration habitat for salmonids in the Wenatchee, Entiat, and Methow subbasins capable of supporting sustainable salmon and steelhead populations. Habitat actions implemented will be identified and designed to address limiting factors and aimed at achieving concise, measurable habitat objectives consistent with subbasin plans.

### *Work Elements (tasks), methods, and metrics*

The sections and page numbers within the subbasin plans where key findings of current habitat conditions are listed and described is summarized in Table G-1. Limiting factors, working hypotheses, management strategies and objectives (work elements), and near-term opportunities and measurable objectives (metrics) are provided, by watershed assessment unit, to address key findings. Monitoring and evaluation metrics and protocols were researched and compared and recommended M&E metrics and protocols for use in the Upper Columbia Region are described in A Monitoring Strategy for the Upper Columbia Basin (Hillman 2006).

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<sup>1</sup> The three project sponsors in these subbasins are the Chelan County Natural Resources Department (CCNRD), Cascadia Conservation District (CCD), and the Methow Salmon Recovery Foundation (MSRF).

Table G-1. Sections and page numbers for listings of limiting factors, working hypotheses, management strategies and objectives, and near-term opportunities for habitat actions in the Wenatchee, Entiat, and Methow subbasins.

	<b>Habitat Actions</b>	<b>Habitat objectives and desired future conditions<sup>b</sup></b>	<b>Management strategies, objectives, and near-term opportunities</b>
Wenatchee subbasin <sup>a</sup>	Wenatchee Subbasin Plan, Section 6.4, pp. 182–217).	Wenatchee Subbasin Plan, Section 7.8, pp. 257–260	Wenatchee Subbasin Plan, Section 7.8.3 – 7.8.14, pp. 260–303.
Entiat subbasin <sup>a</sup>	Entiat Subbasin Plan, Section 6.4.2, pp. 145–154.	Entiat Subbasin Plan, Section 7.6, pp. 171–174.	Entiat Subbasin Plan section 6.4.5, pp. 159–164; Section 7.6.3, pp. 174–185; Section 7.7.2, pp. 188–199.
Methow subbasin	Methow Subbasin Plan Section 5.5, pp. 301–353.	Methow Subbasin Plan, Section 5.5, pp. 301–353.	Methow Subbasin Plan, Section 5.5, pp. 301–353.

Table notes:

a – As indicated in the Wenatchee and Entiat Subbasin Plans, the lists of near-term opportunities by assessment unit are not intended to be comprehensive, nor to provide the basis for prioritization. Rather, they are actions that could be accomplished within a 10-year time frame and would significantly contribute to achievement of long-term objectives and desired future conditions related to salmon recovery.

b – Desired future conditions come primarily from USFWS 1999.

Under this Project, work elements (tasks) will be developed on an action-by-action basis as contracts are awarded. Tasks will be identified for implementation based on the action’s ability to address primary limiting factors identified in the Appendix G of the Recovery Plan. Table G-2 provides as an example, a list of habitat actions currently being implemented or identified for implementation through 2011, including the limiting factor to be addressed by each action. Where specific habitat actions have already been identified in subbasin plans or in Attachment B of the Accord, these actions will be implemented consistent with Adaptive Management as described in the MOA (see Section H of this proposal).

To aid in the identification of site-specific habitat actions, in 2009 as part of this Project, the Yakama Nation began conducting reach assessments in reaches within nine tributaries using Reclamation’s reach assessment protocols (Appendix E of this proposal). The tributaries selected are Peshastin Creek, Upper Wenatchee, Nason Creek, Lower Twisp River, Lower Chewuch River, Gold Creek, Libby Creek, and the Entiat River Stillwaters reach. The priority reaches will be used by the WATs in developing their implementation schedule. Actions will be identified and selected through a habitat restoration action selection process being used by Reclamation and described in Appendix F of this proposal, to achieve measureable objectives.

Table G-2. Currently planned habitat actions and limiting factors addressed.

Funding Year (FY)	Project Name	Subbasin/Assessment Unit	Tributary/Reach	Restoration Class (taken from Appendix G of the Recovery Plan)	Primary Limiting Factor Addressed (limiting factors were taken from Appendix G of the Recovery Plan)
FY 2009	Wolf Creek Rd. Bank Stabilization	Methow/Upper Mainstem	Wolf Creek/Hancock Creek	LWD Restoration	Habitat Diversity and Quantity
	Peshastin Creek Assessment	Wenatchee/Peshastin Creek	Peshastin Creek	N/A	Will address all limiting factors
	Lower Chewuch and Twisp Reach Assessments	Methow/Twisp and Chewuch	Lower Twisp and Lower Chewuch rivers	N/A	Will address all limiting factors
FY2010	Keystone Canyon	Entiat/Lower Entiat	Entiat River	LWD Restoration	Habitat Diversity and Quantity
	Goodfellow Sidechannel	Wenatchee/Lower Wenatchee	Wenatchee River	Sidechannel Reconnection; LWD Restoration	Habitat Diversity and Quantity
	Fender Mill Sidechannel	Methow/Upper Mainstem	Wolf Creek/Hancock Creek	Floodplain Restoration; LWD Restoration	Excessive Artificial Channel Stability; Habitat Diversity and Quantity
	Upper Wenatchee Reach Assessment	Wenatchee/Upper Wenatchee	Wenatchee River	N/A	Will address all limiting factors
	Upper Beaver Creek Relocation	Methow/Middle Mainstem	Beaver/Bear Creek	LWD Restoration; Riparian Restoration; Floodplain Restoration	Habitat Diversity and Quantity; Excessive Artificial Channel Stability
FY2011	Entiat D-3 Sidechannel Reconnection	Entiat/Middle Entiat	Entiat River	LWD Restoration; Sidechannel Reconnection	Habitat Diversity
	Entiat D-3 Habitat Enhancement	Entiat/Middle Entiat	Entiat River	LWD Restoration	Habitat Diversity
	KIZ 1	Wenatchee/Nason	Nason Creek	LWD Restoration	Habitat Diversity; Channel Stability
	KIZ 2	Wenatchee/Nason	Nason Creek	LWD Restoration	Habitat Diversity; Channel Stability
	KIZ 3	Wenatchee/Nason	Nason Creek	LWD Restoration	Habitat Diversity; Channel Stability

Sequencing or prioritizing habitat actions will occur according to the framework for sequencing recovery actions described in the Implementation Plan (Section 8.4 of the Recovery Plan). The Implementation Plan framework was adopted by the UCSRB on January 9, 2009. The Implementation Plans provide the most current, scheduled list of habitat projects for implementation in the Wenatchee, Entiat, and Methow subbasins, based on existing information. Results from Reclamation and Yakama Nation reach assessments will be used in an adaptive

management context to identify habitat projects for implementation as appropriate. Projects that address primary limiting factors, have high biological benefit, are relatively inexpensive, and are feasible to implement will receive highest funding priority. Projects that are expensive, have low biological benefit to listed fish species, and have relatively low feasibility will receive lowest funding priority. The Recovery Plan Implementation Schedules are by subbasin and in Appendix M of the Recovery Plan.

## H. Monitoring and Evaluation

It is expected that implementing habitat assessment, restoration, and protection actions in the Wenatchee, Entiat, and Methow subbasins will measurably improve ecosystem functions and habitat conditions for salmonids. However, the Yakama Nation does not propose to implement M&E activities as part of this project. Instead, as available, appropriate, on-going M&E activities (Appendix C of this proposal) will be consulted and relevant conclusions will be reported in support of demonstrating project success. It is important to note that no single, on-going M&E effort encompasses all the M&E needs (status and trend monitoring, effectiveness monitoring, and implementation and compliance monitoring) for all the Upper Columbia Region subbasins. Table H-1 lists, by subbasin, the M&E programs and the type of monitoring currently being implemented by in the Upper Columbia Region. Note that there are no current monitoring efforts focused on project implementation/compliance monitoring.

Table H-1: Current Upper Columbia Region M&E programs and types of monitoring

Sub-basin	M&E Program	Status and Trend Monitoring	Effectiveness Monitoring	Implementation / Compliance Monitoring
Wenatchee	Chelan County PUD Hatchery M&E Program	X	X	
Methow	Douglas County PUD Hatchery M&E Program	X	X	
Wenatchee	Grant County PUD Hatchery M&E Program	X		
Entiat	USFWS Hatchery M&E Program	X		
Wenatchee, Entiat	Integrated Status and Monitoring Program (ISEMP; NOAA Fisheries and BPA)	X	X	
Okanogan	Colville Tribes Okanogan Basin M&E Program (OBMEP)	X		
Methow	(in prep) USGS for Reclamation	X (habitat)	X	
Methow	(in prep) Wild Fish Conservancy	X (habitat)		
Methow, Okanogan, Wenatchee, Entiat	USFS PACFISH/INFISH Biological Opinion Effectiveness Monitoring (PIBO)	X (habitat)		
Any basins with projects	Salmon Recovery Funding Board		X	

We would like to be clear that we do not anticipate conducting or coordinating any M&E through the Upper Columbia Habitat Restoration Project. We do however plan to work and coordinate closely with the various ongoing and upcoming M&E efforts in the Entiat, Wenatchee and Methow subbasins to adaptively manage actions identified for implementation under this Project. A summary of each on-going M&E program is provided in Appendix C, including how this project will benefit from each of these efforts. Specifically, the project will incorporate

programs from the following entities: NMFS (Upper Columbia Monitoring and Evaluation Plan [Appendix P of the Recovery Plan]); Reclamation (USGS Effectiveness Monitoring); NOAA Fisheries (ISEMP); the Northwest Forest Plan Aquatic and Riparian Effectiveness Monitoring Plan (AREMP); USFS (Pacfish/Infish Biological Opinion Effectiveness Monitoring; PIBO); the Pacific Northwest Aquatic Monitoring Partnership (PNAMP); Collaborative System-wide Monitoring and Evaluation Project (CSMEP); Chelan and Douglas PUDs (Murdoch and Peven 2005); Washington Salmon Recovery Funding Board (SRFB; Washington Comprehensive Monitoring Strategy For Watershed Health and Salmon Recovery); the Okanogan Basin Monitoring and Evaluation Program (OBMEP), and Washington State Department of Ecology (IMW), or such updated or amended versions of these monitoring and evaluation efforts.

A specific example of our current coordination with M&E efforts is our work with the Entiat IMW project. The IMW design calls for a very intense, one year (2011) restoration implementation effort in a specific reach of the Entiat River. This restoration effort may include up to 15 major restoration projects being implemented by three different project sponsors. Implementation of habitat restoration projects at this volume and urgency is fairly uncommon and difficult, however the Yakama Nation has and will continue to make strenuous efforts to find, design, permit, and construct a large share of these projects in 2011.

### *Adaptive Management*

The Recovery Plan incorporated an adaptive management framework (Section 8.3.6 of the Recovery Plan). This adaptive management approach will be followed for this project. The approach is consistent with the intent of the Accord, Section A.2, and with the general principle of replacement projects and adaptive management described in Section E of the Accord. The approach is also consistent with subbasin plans and the Fish and Wildlife Program.

Toward the goal of assessing the progress of recovery planning efforts in the Upper Columbia Region, the UCSRB and the UCRTT plan to hold a workshop during January 2010. During this workshop, an assessment of the contribution towards improving VSP parameters for ESA-listed salmon and steelhead from the implementation of habitat projects will be presented. The assessment will be used by NMFS for an update to the ICBTRT status assessments and to assess the progress of the recovery planning efforts by subbasin in the Upper Columbia Region. The target audience for this workshop is the UCRTT, scientific colleagues, and technical staff from the WATs.

## **I. Facilities and equipment**

Facilities and equipment currently at the disposal of Yakama Nation include:

### *Office Facilities*

Currently the Yakama Nation maintains three office facilities: two in the Wenatchee area and one in the Methow Subbasin.



### *Vehicles*

The Project has two pickup trucks and access to additional trucks as necessary. Project staff will also have access to a truck-mounted backhoe, a medium-sized tractor, two quad-type off-road vehicles (ORVs), and one six-wheeled ORV with dump bed.

### *Hand Tools*

The Project will use various hand tools at their disposal.

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## **K. Key personnel**

### **Brandon Rogers**

Fisheries Biologist III, 1.0 FTE

**Education:** B.A. Geography, Resource Management 1998  
Central Washington University, Ellensburg WA.

### **Work Experience**

#### **Yakama Nation Fisheries, Fisheries Biologist II, Jul. 2004-Nov. 2005, and Fisheries Biologist III, Nov. 2005-Present:**

- Co-Manager, Yakama Reservation Watersheds Project.
- Identified and implemented stream restoration projects throughout the Toppenish, Ahtanum and Satus watersheds.
- Supervised the completion of three instream restoration projects in FY05. This included contracting, the bid process project implementation, and final project completion signoff.
- 4 years experience implementing and managing restoration projects.
- Familiar with all aspects of stream restoration including rock grade control, vegetation planting, local state and federal permitting, and working with consulting and construction contractors.
- Laid out and contracted over 15 miles of riparian and rangeland fencing.
- Contracted the construction and implementation of a solar powered stock well
- Worked as the lead contact for the Project's funding, including BPA, USFWS and NRCS.
- Applied for and received grant funding from NRCS EQUIP, USFWS Partners for Fish and Wildlife and Private Lands Stewardship programs and Pacific Coastal Salmon Recovery Fund.
- Responsible for creating and implementing the Project's Scope of Work for FY2005 and FY2006.
- Responsible for co-production of the FY06 budget.

#### **Yakama Nation Fisheries, Fisheries Biologist I, Jul. 2001-Jul.2004:**

- Ahtanum Creek Watershed Restoration Project biologist.

- Use GPS and GIS daily in order to gather and maintain the Satus, Toppenish and Ahtanum projects' GIS database.
- Coordinated with landowners to secure permission for construction of 8 miles of riparian fence. Contracted and supervised the construction of the fence.
- Trained technicians in the use of various applications.
- Worked closely with Washington Department of Fish and Wildlife staff to co-manage Ahtanum Creek.
- Write quarterly and annual reports for the BPA funded Ahtanum Project.

**Spokane Tribe of Indians, GIS Coordinator, Jan. 2000-July 2001:**

- Was responsible for the creation and management of the Tribe's GIS.
- Supervised 1 GIS technician.
- Was in charge of all GPS data collection, including collection protocol and quality control.
- Worked closely with the forestry and fisheries programs to meet their GIS needs.
- Designed and completed several large GIS projects including a comprehensive Lake Roosevelt bathymetry project and mapping all reservation roads.
- Performed system administration duties for the Department of Natural Resources.
- Installed and maintained new software on computers throughout the DNR.

**Washington State Department of Transportation, GIS specialist, Jun. 1999-Nov. 1999:**

- Operated ESRI Arc/Info and ArcView on Windows NT platform.
- Project lead on all GIS assignments.
- Developed ArcView interfaces for various environmental and engineering applications.
- Created environmental cartography focused on endangered species protection and wetland mitigation.
- Employed GPS and GIS to delineate wetlands.
- Used Arc/Info to process GIS coverages prior to overlaying them onto airphotos.

**Yakima County GIS Technician, Feb. 1999-Jun. 1999:**

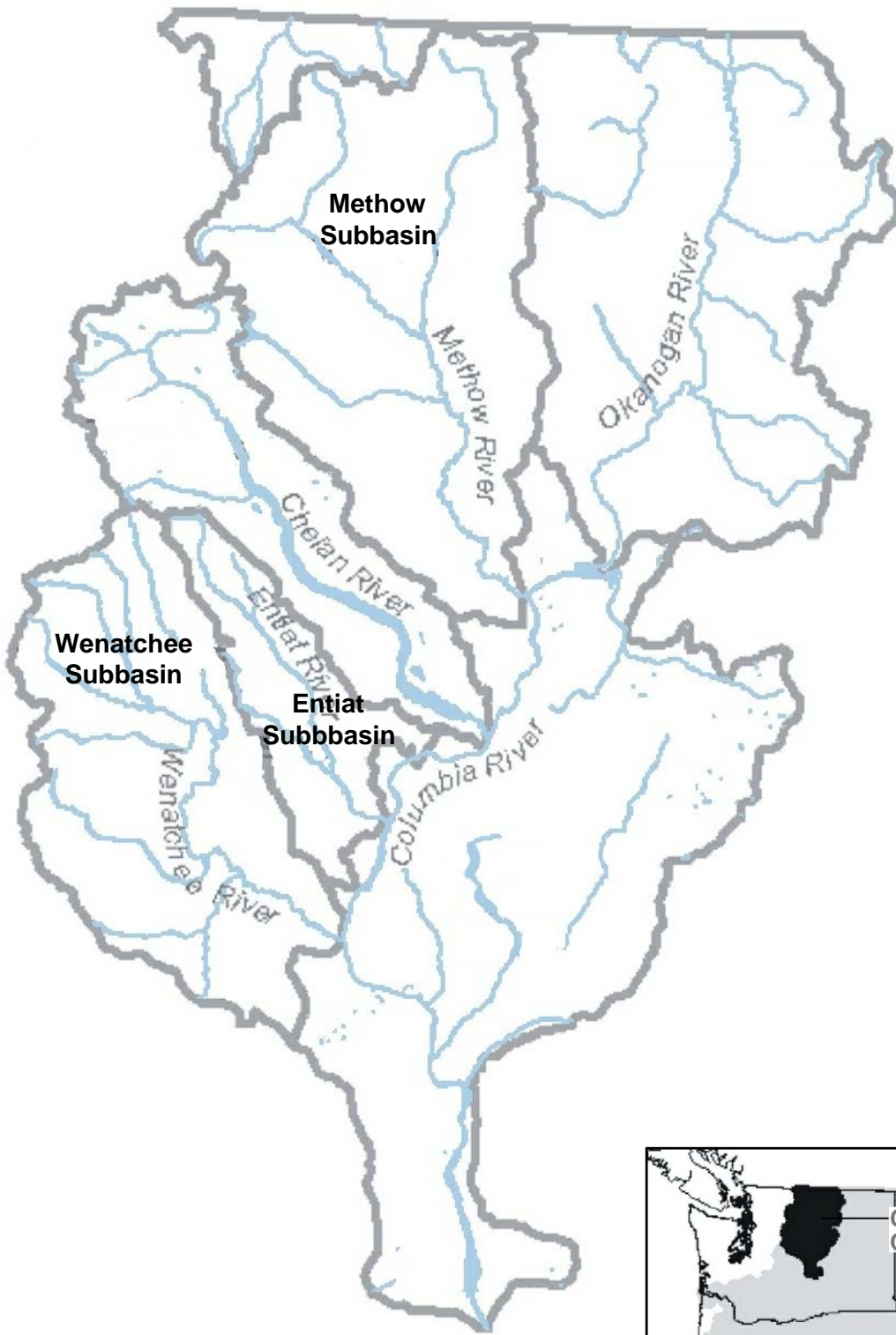
- Used UNIX based ESRI Arc/Info to update county parcel maps.
- Achieved good proficiency with ArcEdit.

**Yakama Nation Fisheries, Cherry Creek Project Volunteer, Oct. 1996-May 1998**

- Planted willow and dogwood cuttings, constructed fences.

## **FIGURES**

K:\Jobs\080537-Yakama Nation\080537-01\08053701-RP-001.dwg FIG 1



Not to Scale

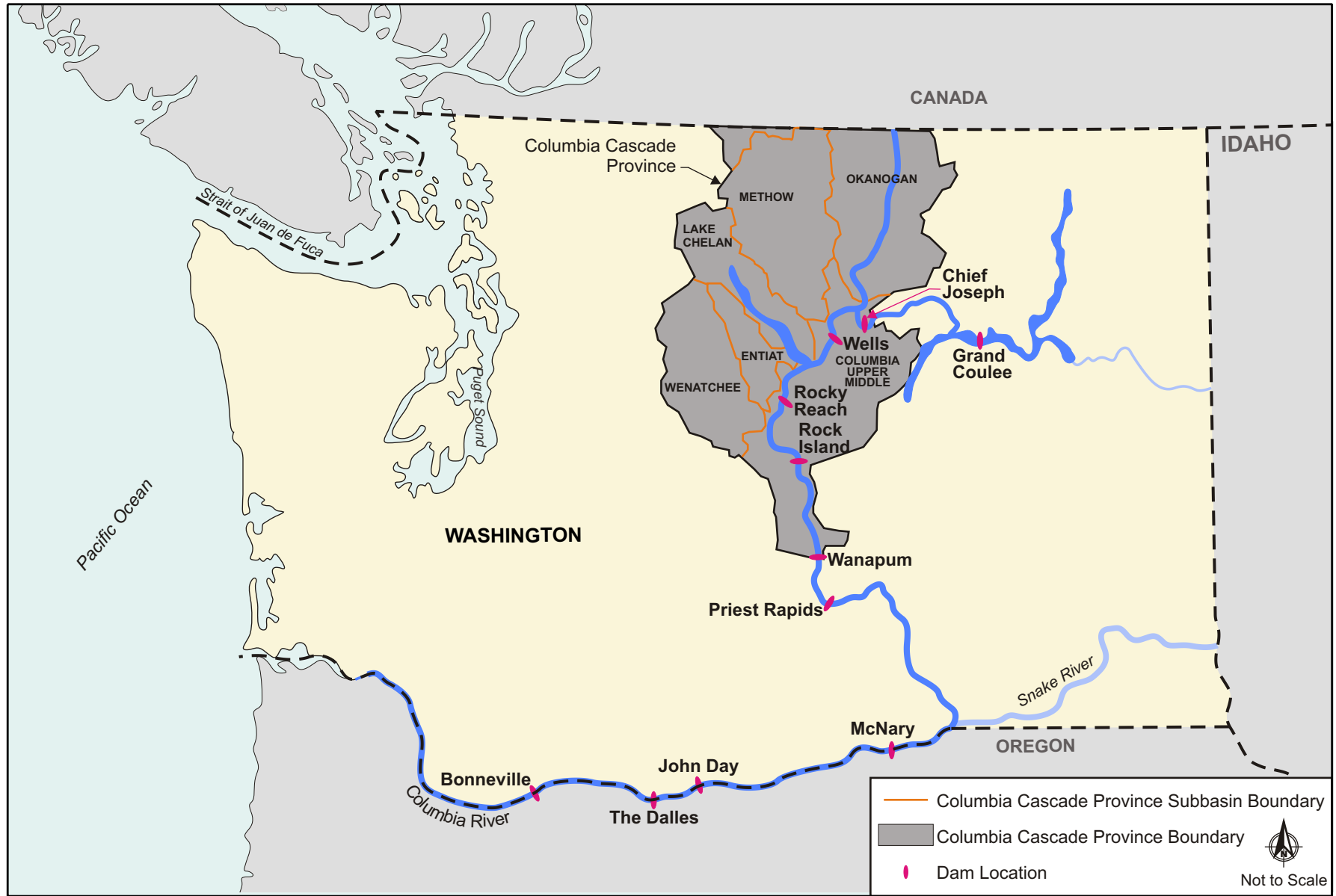


Source: "Draft FY 2003-2005 Columbia Cascade Province Work Plan" by Columbia Basin Fish & Wildlife Authority, Map 17, 2002.

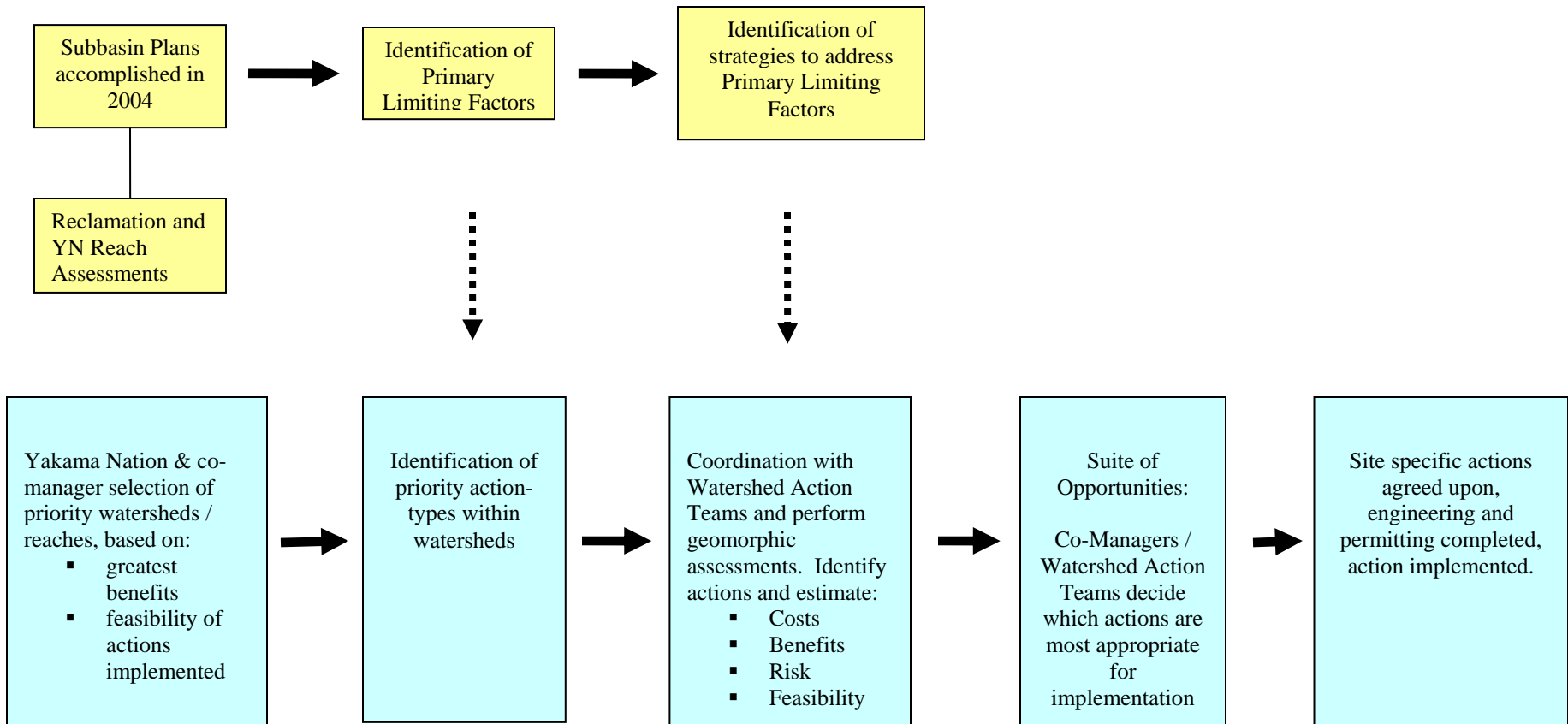
**Figure 1**  
Columbia Cascade Province Map  
ISRP Programmatic Proposal



01/29/2009\_cvd K:\jobs\080537-Yakama Nation\080537-01\FIG 2 Dam Map.cdr

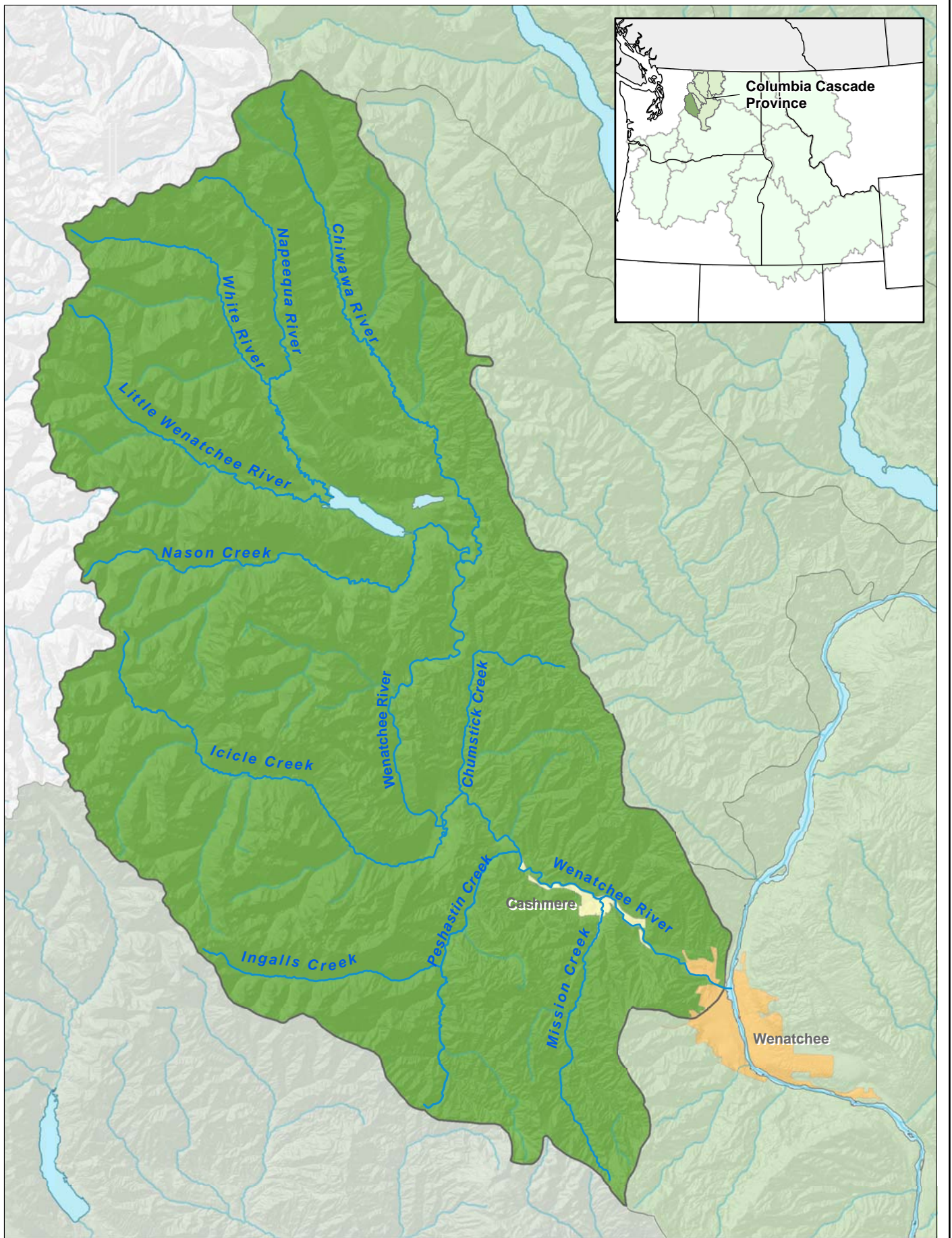


**Figure 2**  
Columbia Cascade Province Subbasins and Columbia River Dams  
ISRP Programmatic Proposal



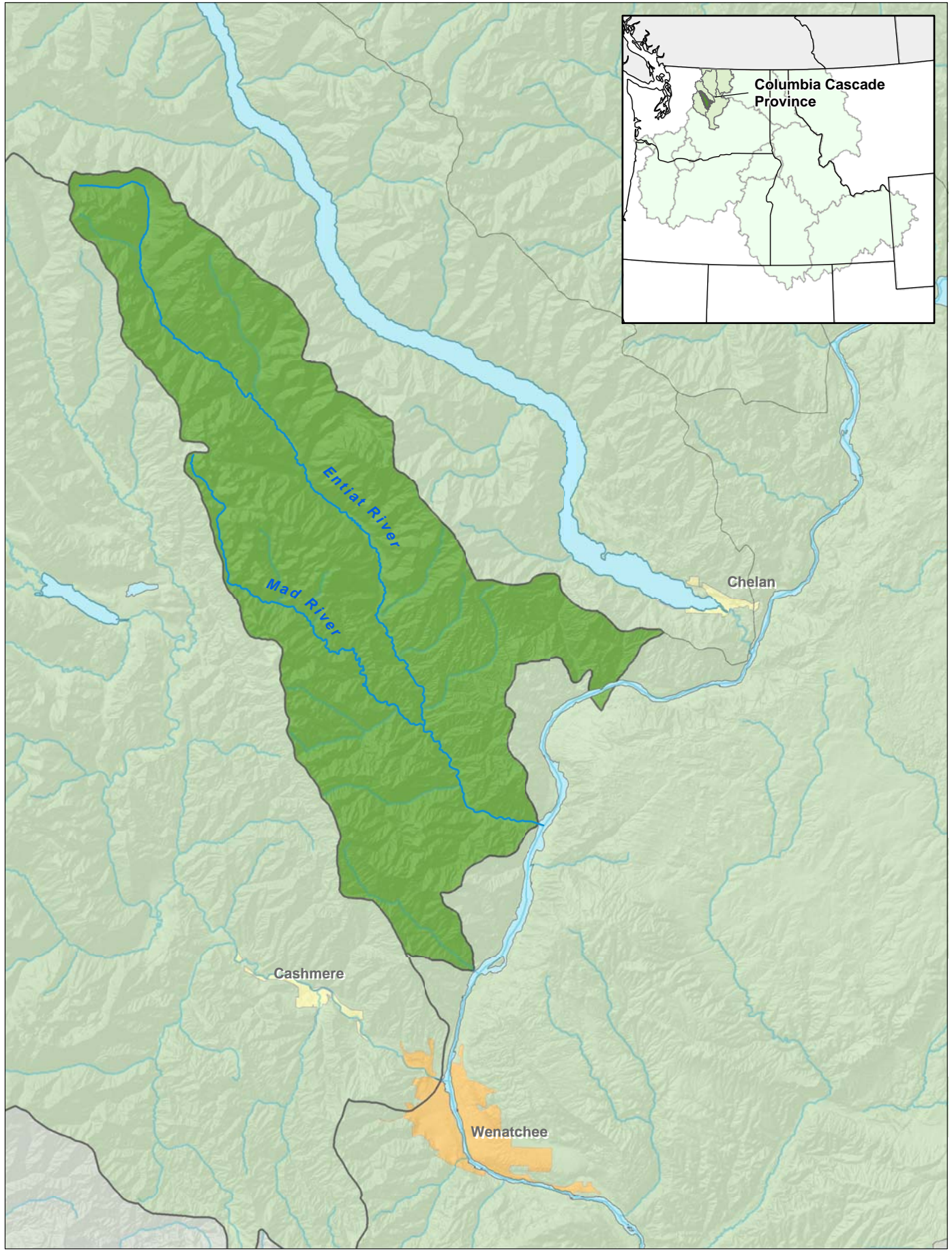
**Figure 3**  
Narrative Diagram  
ISRP Programmatic Proposal

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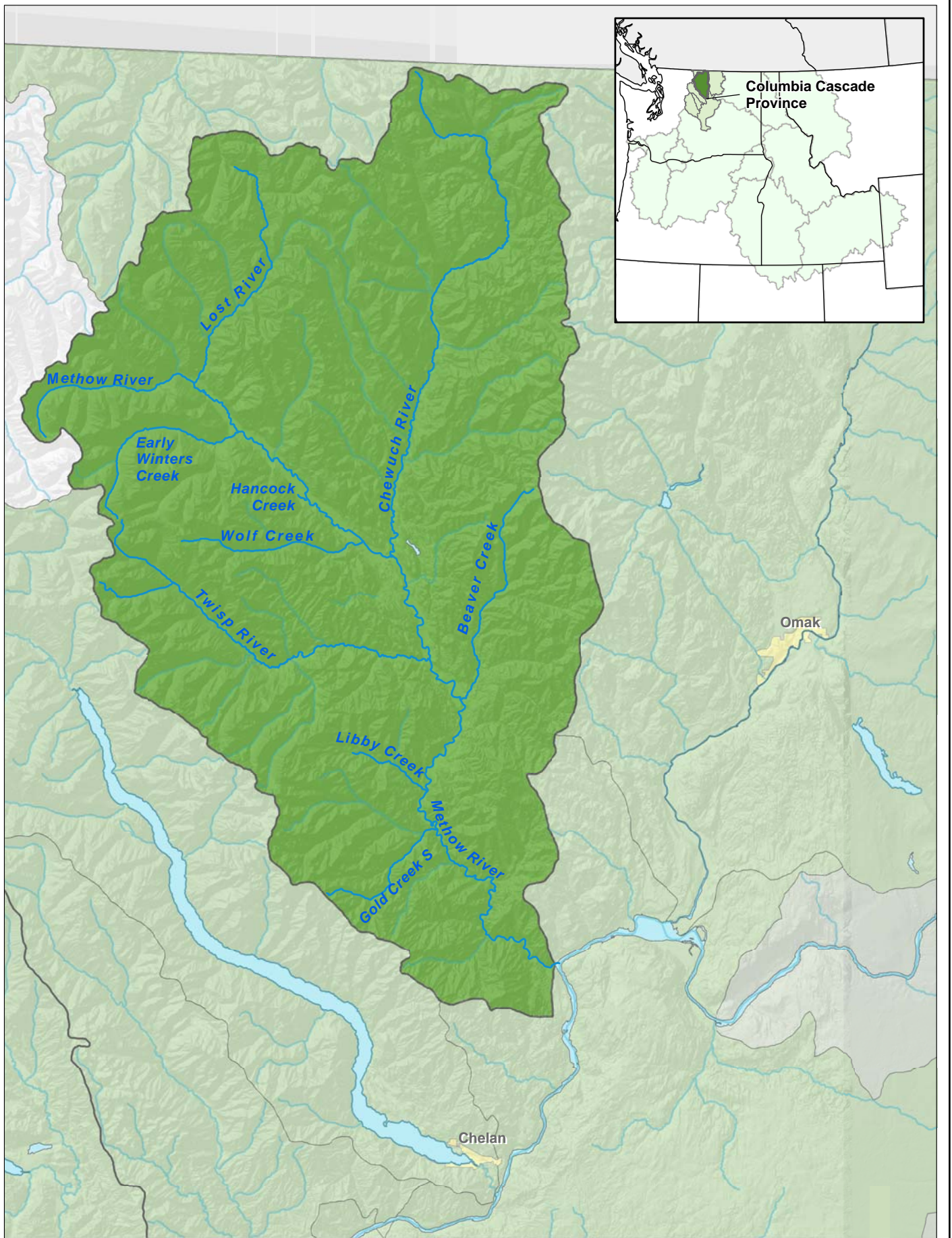
**Figure 4**  
Wenatchee Subbasin  
ISRP Programmatic Proposal

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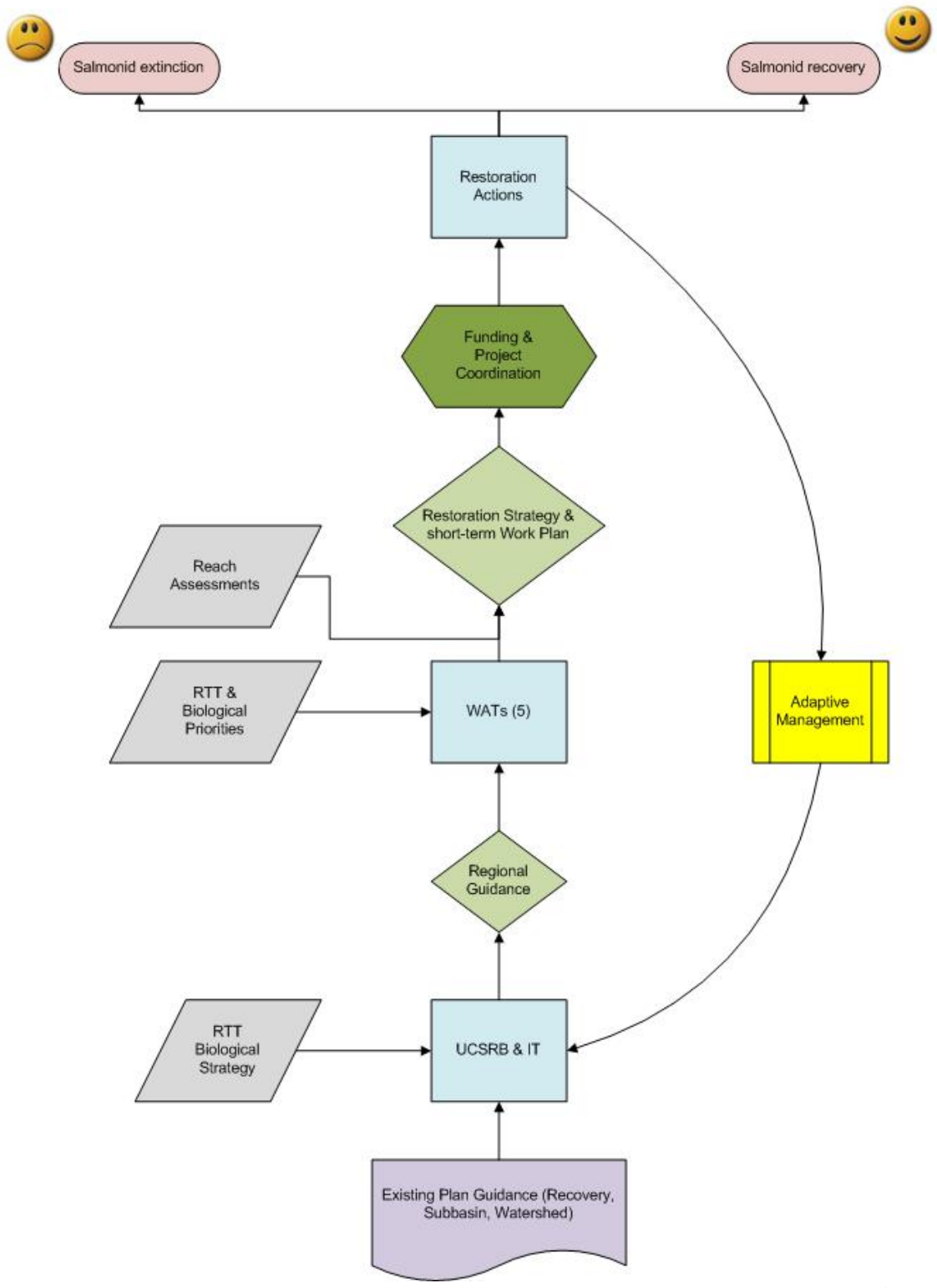
**Figure 5**  
Entiat Subbasin  
ISRP Programmatic Proposal

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**Figure 6**  
Methow Subbasin  
ISRP Programmatic Proposal

Upper Columbia Salmon Recovery Restoration Project Selection Process



**Figure 7**  
Upper Columbia Salmon Recovery Restoration Project Selection Process  
ISRP Programmatic Proposal

**APPENDIX A**

**CONSERVATION AND RECOVERY PLANNING EFFORTS IN THE UPPER  
COLUMBIA REGION**

## **ESA Salmon and Steelhead Recovery Planning**

Salmon recovery planning began when the 1998 Washington State Legislature passed Engrossed Senate House Bill 2496 codified into RCW 77.85 (Salmon Recovery Act). RCW 77.85 required the production of salmonid habitat limiting factors reports as part of the critical pathway for a habitat work schedule for Washington State subbasins, as well as began the coordination of regional salmon recovery planning. Subsequently, salmonid habitat limiting factors reports were developed for the Wenatchee, Entiat, and Methow subbasins (Andonaegui 1999; Andonaegui 2000; Andonaegui 2001) and the Upper Columbia Salmon Recovery Board (UCSRB) lead entity began work to produce an Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan to support the recovery of spring Chinook salmon, steelhead, and bull trout listed under the Endangered Species Act. The Recovery Plan was developed in coordination with the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) as an outgrowth and culmination of several conservation efforts in the Upper Columbia Basin, including current efforts related to the Endangered Species Act (ESA), state and tribal-sponsored recovery efforts, subbasin planning, and watershed planning. In May 2007, the Recovery Plan was completed, and was approved by NOAA in October 2007 (UCSRB 2007).

The Upper Columbia Spring Chinook and Steelhead Recovery Plan (UCSRB 2007) provides the most current evaluation of aquatic ecosystem functioning condition affecting all ESA-listed salmonid species in the Upper Columbia Region and includes a detailed implementation plan (section 8 of the Recovery Plan) to protect functioning habitat and restore degraded habitat. The implementation plan includes addressing data gaps through research, monitoring, and evaluation; establishing schedules; engaging stakeholders and landowners; identifying responsibilities, and securing funding. The Recovery Plan which will provide supporting information for use in prioritizing geographic areas and identifying, scheduling and implementing habitat actions in the Upper Columbia Region subbasins: Appendix H (A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region, revised 2008); Appendix G (Habitat Matrices); and Appendix M (Implementation Schedules for the Wenatchee, Entiat, and Methow subbasins, revised January 2008, [www.ucsrb.com](http://www.ucsrb.com)). The Biological Strategy provides the technical foundation for setting geographic priorities for habitat protection and restoration actions. The Habitat Matrices identify primary limiting factors and habitat actions within subbasins at the HUC 5 Assessment Unit scale. The Implementation Schedules will identify specific actions, costs, and schedules for implementation as this information is developed, relying on reach assessments, Watershed Action Teams, and UCRTT review, as described in the Recovery Plan.

### *Biological Strategy*

The Biological Strategy is based on available information and the professional judgment of fisheries biologists familiar with the Upper Columbia Region. 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. This prioritization method is simply a means to sequence, not a method of determining if certain actions should occur. Social and financial constraints can and will affect the sequencing. To provide a framework to set priorities consistent with the Biological Strategy, the UCRTT classified each watershed (HUC-5 level) in



the Upper Columbia Region into categories, based on the functionality of the aquatic ecosystems in those watersheds, and the capability of the ecosystem to protect against ecological catastrophe for endemic populations, adapting the classification system used by Quigley and Arbelbide (1997).

In general, Category 1 watersheds should receive priority allocation of financial and management resources. Subsequent allocation of resources should be given to Categories 2 and 3, in that order, once refuge habitats (Category 1) for the target species are protected and secure. This does not mean that specific actions should not occur in Category 2 and 3 watersheds until all activities in Category 1 watersheds are completed. Any action within those watersheds that increase the range, life history diversity, or age cohorts of one or more species should contribute to the overall strategy of making them more robust to disturbances within and outside the region. As salmon recovery progresses, founder populations from core areas would colonize many watersheds that are suitable, yet unoccupied. Restoration of Category 4 watersheds should be considered in the regional recovery planning process, but immediate actions there would not be a priority.

## **Watershed Planning**

Watershed planning began when the 1998 Washington State Legislature passed House Bill (HB) 2514, codified into RCW 90.82, to set a framework for addressing the state's water resources issues. In 2001, HB 1336 amended the law. Currently RCW 90.82 states:

The legislature finds that the local development of watershed plans for managing water resources and for protecting existing water rights is vital to both state and local interests. The local development of these plans serves vital local interests by placing it in the hands of people: who have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management resources. The development of such plans serves the state's vital interests by ensuring that the state's water resources are used wisely, by protecting existing water rights, by protecting instream flows for fish and by providing for the economic well-being of the state's citizenry and communities. Therefore the legislature believes it necessary for units of local government throughout the state to engage in orderly development of these watershed plans.

The purpose of the 1998 Watershed Management Act (WMA) is to provide a framework for local government, interest groups, and citizens to identify and solve water-related issues collaboratively in each of the 62 Water Resource Inventory Areas (WRIAs) of Washington State. Water quantity is a required element of the plan, with water quality, stream flows, habitat, and storage as optional elements to be included. Watershed plans in the Upper Columbia Region have been completed for the Wenatchee, Entiat, Methow, Foster Creek, and Moses Coulee WRIAs and adopted respectively by Chelan, Okanogan, and Douglas counties. Portions of these plans are integral parts of the recovery plan.

The NPCC Fish and Wildlife Program calls for an ecosystem-based approach for planning and implementing fish and wildlife recovery which was incorporated into subbasin plans (see below

NPPC Subbasin Planning section). Pertinent information from both subbasin plans and watershed plans formed the basis for much of the Recovery Plan. Other species, including resident, migrant, and anadromous species are expected to benefit from this plan.

### **Mid-Columbia HCPs**

On June 21, 2004, the Federal Energy Regulatory Commission (FERC) approved an Anadromous Fish Agreement and Habitat Conservation Plan (HCP) for the Rocky Reach, Rock Island, and Wells Hydroelectric Projects on the Columbia River, operated by Chelan County Public Utility District (Chelan PUD; Rocky Reach HCP 2004; Rock Island HCP 2004) and Douglas Public Utility District (Douglas PUD; Wells HCP 2004). The approval of the HCPs enabled legal coverage to operate the hydroelectric projects in compliance with the Endangered Species Act. The HCP documents provide a comprehensive and long-term adaptive management plan for species addressed in the plan and their habitat. The basis of the HCPs is a “no-net-impact” (NNI) standard consisting of two components: 1) 91 percent combined adult and juvenile project survival achieved by project improvement measures implemented within the geographic area of the project; and 2) 9 percent compensation for unavoidable project mortality provided through hatchery and tributary programs, with 7 percent compensation provided through hatchery and 2 percent through tributary programs. The HCP signatory parties, which include federal and state fish managers, tribes, and PUDs, continue to work to ensure that the processes and activities of HCP implementation remain consistent with the Recovery Plan.

### **Biological Opinion on the operation of the Priest Rapids Hydroelectric Project**

On February 1, 2008, NMFS released a Biological Opinion on the Federal Energy Regulatory Commission's (FERC) proposed license for the operation of the Priest Rapids Hydroelectric Project, operated by Public Utility District No. 2 of Grant County (Grant PUD; NMFS 2008a). This document enabled legal coverage to operate the Project in compliance with the Endangered Species Act. The document also incorporated measures for the Project to avoid jeopardizing the continued existence of UCR spring-run Chinook salmon and UCR steelhead as listed in the previous Biological Opinion (NMFS 2004) and the Priest Rapids Project Salmon and Steelhead Settlement Agreement (Settlement Agreement, GPUD 2005). Similar to the HCP process as described above, the parties to this Settlement Agreement, which include federal and state fish managers, tribes, and Grant PUD, continue to work to ensure that the processes and activities of these measures remain consistent with the Recovery Plan.

### **Bull Trout Recovery Planning**

In response to the listing of bull trout under the Endangered Species Act in 1999, the U.S. Fish and Wildlife Service (USFWS) prepared a Draft Bull Trout Recovery Plan for the Upper Columbia Recovery Unit (USFWS 2002) in 2002 with the assistance of recovery unit teams, State and Tribal agencies, and others. The Service intends to finalize the plan with cooperation from federal, state and tribal partners, and with public input. In preparing the Upper Columbia Salmon and Steelhead Recovery Plan, the UCSRB recognized that the USFWS listed the bull trout as a threatened species throughout its range in the lower 48 states, not just the portion of bull trout residing in the Upper Columbia area. The UCSRB therefore submitted the Salmon and Steelhead Recovery Plan to the USFWS as its recommendation for assisting in the recovery of

bull trout in the Columbia River with the understanding that the USFWS will consider these recommendations in its Draft Bull Trout Recovery plan for the entire listed species.

### **NPCC Subbasin Planning**

To address mounting energy issues in the Pacific Northwest, the Northwest Power Act was passed in 1980, creating a regional power planning council (Northwest Power and Conservation Council). The Council was directed to prepare a plan to assure an adequate, efficient, economical and reliable power supply. The Council adopted its first power plan in January 1983 and has revised it five times since then. The Council was also directed as part of this plan to prepare a program to amend, protect, mitigate, and enhance fish, wildlife, spawning grounds, and habitat affected by the construction and operation of Columbia River hydroelectric projects. This program, called the Fish and Wildlife Program, established biological objectives and action strategies for the entire Columbia River basin. Implementation of these objectives and strategies now occurs through subbasin plans that were developed for the various tributary subbasins by the Council, working with watershed councils, state and federal agencies and Indian tribes. The subbasin plans allow the program to be organized at three spatial scales: basinwide level, an ecological province level that addresses the 11 unique ecological areas of the Columbia River Basin, and at the subbasin level.

The actions of the subbasin plans are funded by BPA with the Council responsible for recommending projects to BPA for funding. There is a two-year funding cycle for these projects, which allow for an organized review of submitted proposals. The Fish and Wildlife Program may be amended by the Council's request to the fish and wildlife agencies and tribes for recommendations for measures for fish and wildlife. Because the Fish and Wildlife Program is legally an element of the Power Plan, these recommendations are required prior to any major revision of the power plan.

The Methow, Entiat, and Wenatchee subbasin plans developed in 2006 built upon work accomplished under watershed planning in 2004, including the EDT analyses used in watershed planning. The Recovery plan, in turn, aligned itself with the subbasin and watershed planning efforts. Thus, subbasin plans are designed to contribute to the regional salmon recovery effort contained in the Recovery Plan. Subbasin plan, however, are broader in scope than recovery planning and address management issues for wildlife, resident fish species, and non-ESA-listed anadromous salmonids.

**APPENDIX B**

**SUMMARY OF RECENT METHOW, ENTIAT, AND WENATCHEE SUBBASIN  
PROJECTS**

<b>Funding Sources</b>	<b>Project #</b>	<b>Project Title</b>	<b>Relationship (brief)</b>
BPA / Reclamation / USFS	200705500	Entiat River - UPA - Lower Entiat River Off-Channel Restoration Project	Occurs in Entiat subbasin. Provides 0.28 miles of off-channel habitat to benefit Upper Columbia ESA listed steelhead, spring Chinook, and bull trout, as well as irrigation channel enhancement for rearing and spawning habitat.
BPA F / USFS	200723100	UPA Entiat Subbasin Riparian Enhancement Program	Occurs in Entiat subbasin. Involves Tillicum Creek Fence and programmatic riparian projects to benefit Upper Columbia spring Chinook, steelhead and bull trout.
BPA / Reclamation / USFWS / Grant PUD Habitat Fund	200731800	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	200703500	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	200723700	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 / HCP Trib Fund / SRFB	200726400	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	200708500	UPA Nason Creek Oxbow Reconnection Project	Occurs in Wenatchee subbasin. Installs two bottomless arch culverts in SR 207 to reconnect 0.64 miles of historic oxbow habitat to the mainchannel Nason Creek, to increase Spring Chinook salmonid abundance by 25-50% in the Nason Assessment Unit.
BPA	200708600	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 Upper Columbia steelhead, spring Chinook and bull trout.
BPA	200732500	UPA Wenatchee Subbasin Complexity Proposal	Occurs in Wenatchee subbasin. Implements five potential habitat complexity projects to benefit Upper Columbia spring Chinook, steelhead and bull trout.
SRFB / HCP Trib Fund	08-1984	Twisp River Riparian Protection II	Occurs in Methow subbasin. Involves a reach-based project to purchase conservation easements on 5 properties located along the Twisp River.
SRFB / HCP Trib Fund	08-1986	Twisp River Conservation Acquisition II	Occurs in Methow subbasin. Involves purchase of acquisition areas to complement prior purchase and protection efforts on the right bank opposite the subject properties
SRFB / Federal grant	08-1962	North Road Culvert	Occurs in Wenatchee subbasin. Replaces an existing partial fish passage barrier culvert with a bridge and natural stream channel to provide year-round passage to all fish species at all life stages.

<b>Funding Sources</b>	<b>Project #</b>	<b>Project Title</b>	<b>Relationship (brief)</b>
SRFB / HCP Trib Fund	08-1779	Cashmere Pond Off-Channel Habitat Project	Occurs in Wenatchee subbasin. Addresses the primary habitat limiting factor for juvenile steelhead and spring Chinook salmon on the lower Wenatchee River: the lack of off-channel habitat, by creating habitat in Cashmere Ponds in the Wenatchee floodplain.
SRFB / HCP Trib Fund	08-1782	Below the Bridge (Keystone Diversion/Moody Canyon)	Occurs in Entiat subbasin. Upgrades the existing Keystone Diversion and improves Entiat River salmon habitat diversity by replacing an instream push up dam that is reconstructed each year with a rock wing dam that directs water into a sluiceway.
SRFB / Federal, local, and other grant	08-2060	Lower Icicle Conservation Easement	Occurs in Wenatchee subbasin. Procures an easement on 65 acres of floodplain on Lower Icicle Creek, a tributary to Wenatchee River.
SRFB / HCP Trib Fund	08-1985	Poorman Creek Barrier Removal	Occurs in Methow subbasin. Involves a culvert replacement to restore year-round access to spawning/rearing habitat; restores appropriate bedload transport and LWD movement down Poorman Ck into the Twisp River.
SRFB / HCP Trib Fund	07-1788R	Entiat PUD Canal System Conversion Project	Occurs in Entiat subbasin. Decommissions faulty PUD irrigation system pipeline and delivery system and converts existing irrigation water users to wells to address water quantity and water quality issues, help moderate stream temperature extremes, improve water quality in the lower Entiat, and facilitate salmonid access to spawning and rearing habitats.
SRFB / HCP Trib Fund	07-1849R	Roaring Creek Flow Enhancement and Barrier Removal Project	Occurs in Entiat subbasin. Replaces two surface water diversions and leaking delivery system and serves irrigators with new groundwater wells, to benefit UCR summer steelhead adult holding and spawning, juvenile rearing to smoltification life history stages. Spring Chinook juveniles also benefit.
SRFB	07-1661A	Upper Methow Riparian Projection	Occurs in Methow subbasin. Protects 54 acres of high quality riparian habitat along the Upper Methow River through purchase of two voluntary, permanent conservation easements.
SRFB / State grant	07-1865R	Peshastin Irrigation District Pipeline	Occurs in Wenatchee subbasin. Convert approximately 9900 ft of the Peshastin Irrigation District Canal from an open canal to a closed Pipeline, to conserve water and enhance passage for Chinook salmon and bull trout.
SRFB / HCP Trib Fund	07-1761R	Harrison Side Channel	Occurs in Entiat subbasin. Reconnects relict side channel and floodplain area to restore geomorphology, floodplain function, habitat complexity/diversity, and off-channel habitat and shading.
SRFB / HCP Trib Fund	07-1866R	Keystone Canyon Habitat Restoration Project	Occurs in Entiat subbasin. Restores habitat complexity and promotes localized recruitment and retention of spawning gravels along channel margins to primarily benefit adult steelhead in the lower Entiat.

<b>Funding Sources</b>	<b>Project #</b>	<b>Project Title</b>	<b>Relationship (brief)</b>
SRFB / Local and other grant	07-1771R	Lower Wenatchee River Complexity Site 12/13	Occurs in Wenatchee subbasin. Implements a levee breach to connect 1.7 acres of off-channel refuge and foraging habitat to increase availability of off-channel habitat and instream habitat complexity.
SRFB / State grant	07-1885N	Burlington Northern Santa Fe RR	Occurs in Wenatchee subbasin. Develops a project proposal and review process with the Burlington Northern and Santa Fe (BNSF) Railroad that will facilitate the implementation of projects on BNSF land.
Grant PUD Habitat Fund	None assigned.	Upper Twisp River Hardesty Property Purchase	Occurs in Methow subbasin. Involves property purchase in a portion of a 2 mile long reach of valuable habitat for spring Chinook and steelhead, as well as, bull trout.
Grant PUD Habitat Fund / HCP Trib Fund / WDFW / DOE / Reclamation / Kittitas County Conservation District	None assigned.	Wenatchee River (Monitor) Irrigation Diversion Improvements; Jones Shotwell Irrigation System	Occurs in Wenatchee subbasin. Involves side channel improvement, construction of a permanent rock wing dam berm, berm improvements, and addition of an updated fish screen at the pumping station.
Grant PUD Habitat Fund / USFWS / Reclamation	None assigned.	Mission Creek Habitat Improvement	Occurs in Wenatchee subbasin. Installs 4 rock vanes with large woody debris to increase habitat diversity, control bank erosion, and to improve riparian habitat for juvenile steelhead and Chinook rearing.
Grant PUD Habitat Fund	None assigned.	Blackbird Island Habitat Enhancement	Occurs in Wenatchee subbasin. Implements two restoration actions to increase habitat diversity/channel stability and quantity for spring Chinook, steelhead, and Bull trout, as well as summer Chinook and sockeye.
Grant PUD Habitat Fund / BPA / SRFB / Upper Columbia Regional Fisheries Enhancement Group / HCP Trib Fund / USFWS Fisheries Restoration and Irrigation Mitigation program	None assigned.	Fulton Dam Fish Passage Barrier Removal Project	Occurs in Methow subbasin. Reconstructs the dam as a roughened channel to provide improved passage for listed species at all flow levels while maintaining irrigation viability.
Grant PUD Habitat Fund	None assigned.	Nason Creek Godwin Parcels Land Purchase	Occurs in Wenatchee subbasin. Involves purchase of 62.7 acres of prime riparian habitat.

**APPENDIX C**

**ONGOING MONITORING AND EVALUATION PROGRAMS IN THE UPPER  
COLUMBIA REGION**



*Upper Columbia Spring Chinook Salmon and Steelhead Monitoring and Evaluation Plan (The Recovery Plan M&E Plan).*

The Recovery Plan M&E Plan describes biological monitoring plans for UC ESA-listed anadromous fish species only; steelhead and spring Chinook. Bull trout monitoring plans will be developed separately by the USFWS. The Recovery Plan M&E Plan is being prepared by NMFS for the UCSRB as Appendix P to the Recovery Plan. The document is currently in draft (October 2008). It has been reviewed by the UCRTT and is currently under review by the RIST. Prior to being incorporated into the Recovery Plan, the M&E Plan must be adopted by the UCSRB. The UCSRB is awaiting technical review of this document. The desired outcome of the recovery plan is the long-term persistence of viable populations of naturally produced ESA-listed salmonid species. The Recovery Plan M&E Plan is needed to assess the status of the populations and their limiting factors. Monitoring objectives, sampling designs, variables to be measured, measuring protocols, metrics, and methods are identified and discussed.

*Upper Columbia Monitoring Strategy (Hillman 2006).*

The Upper Columbia Monitoring Strategy incorporates many of the monitoring methods from throughout the basin to reduce redundancy, increase efficiency, and meet the goals and objectives of the various entities implementing tributary actions and conducting monitoring studies in the Upper Columbia Region. The Upper Columbia Monitoring Strategy brings together existing programs being implemented to monitor the following: tributary habitat in Upper Columbia Region subbasins; hydropower actions in the Upper Columbia; Upper Columbia Region hatchery programs; and actions outside of the Upper Columbia tributary subbasins (e.g., Columbia mainstem hydropower, estuary conditions and salmon use, mainstem and ocean harvest) downstream to the mouth of the Yakima River. The plan is designed to test implementation, validation, status/trend, and effectiveness of habitat protection and restoration actions implemented in the Upper Columbia Region. The plan also provides a way to assess the recovery of ESA-listed fish species based on the VSP parameters by enabling scientists to detect fish population changes over a sufficient period of time (McElhaney et al. 2000). In addition, the Upper Columbia Monitoring Strategy coordinates through annual monitoring practitioners' workshops in order to decrease redundancy and increase efficiency for those entities planning monitoring efforts in the Upper Columbia Region. The Upper Columbia Monitoring Practitioners Workshop occurs every winter to discuss the upcoming field season.

Hillman (2006) contains appendices which are subbasin-specific plans for implementing monitoring strategies in the respective subbasins (Nelle and Ward 2009 [final, Wenatchee], Nelle, Bouwes, and Beasley 2009 [draft, Entiat]). These documents are not regional M&E plans. The Wenatchee and Methow monitoring strategies are being implemented under the Bonneville Power Administration (BPA) Integrated Status and Effectiveness Monitoring Program (BPA Project #2003-017-00; ISEMP) and do not cover other monitoring efforts that are ongoing in the subbasins. The Methow subbasin monitoring strategy is still being developed and a draft has not yet been developed. The Okanogan subbasin monitoring strategy has not been presented but will

essentially be the Colville Confederated Tribes (CCT) Okanogan Basin Monitoring and Evaluation Program (OBMEP, [www.colvilletribes.com](http://www.colvilletribes.com)).

#### *USGS Effectiveness Monitoring.*

The USGS Columbia River Research Laboratory, under contract by the U.S. Bureau of Reclamation, is conducting a 5-year evaluation of the effectiveness of vortex weirs for providing desired fish passage. This evaluation includes: 1) an assessment of anadromous fish and bull trout production in Gold, Libby, and Beaver creeks in the Methow Subbasin, associated with the presence or removal of irrigation diversion passage barriers, and 2) an assessment of the subsequent change in fish populations in Beaver Creek associated with the modified irrigation diversion structures and its effect on fish passage.

The USGS study documents the physical and biological responses to the modifications of diversion dams that were implemented by the Reclamation at four sites on Beaver Creek: Lower Stokes (BOR 2004a), Thurlow Transfer (BOR 2004b), Upper Stokes (BOR 2004c) in 2003, and Fort-Thurlow in 2004 (as cited in Martens and Connolly 2008). This study was designed to specifically measure important parameters listed in the Research, Monitoring, and Evaluation (RME) Plan (Jordan et al. 2003): size and age structure of fish populations, freshwater productivity, proportions of hatchery and wild spawners, biological and physical condition of spawning and rearing habitat, and habitat conditions and fish passage at the diversion structures. Similar data are being gathered in the Libby Creek and Gold Creek watersheds. These two watersheds were sampled to serve as controls to help us judge the fish response to actions taken in Beaver Creek. Preliminary findings from work conducted by USGS during the summer of 2004 through spring 2006 are contained in an interim report (Martens and Connolly 2008).

Data gathered under this monitoring program will be used to improve future designs of fish passage structures to maximize passage efficiency. Juvenile fish are tagged with Passive Integrated Transponders (PIT-tagged) as part of this study. Data collected from these PIT-tagged fish, and from the pit tag detectors established as part of this study, may provide insight into juvenile and adult fish movement in the Methow Subbasin that could prove informative for evaluating the effectiveness of actions implemented in the Methow Subbasin.

#### *Integrated Status and Effectiveness Monitoring Project (ISEMP)*

NOAA Fisheries Northwest Fisheries Science Center (NOAA NWFSC), with funding from the BPA, initiated ISEMP in 2003 in response to the need for status and trend and effectiveness monitoring for Interior Columbia Basin watersheds called for by the 2000 FCRPS Biological Opinion (NMFS 2000). Along with the John Day and Salmon Creek drainages, monitoring under the ISEMP began in the Wenatchee subbasin in 2004 and in the Entiat subbasin in 2005 as pilot projects. In addition to monitoring salmon and steelhead populations and habitat within pilot subbasins, ISEMP is designed to test the robustness of monitoring protocols, indicator metrics, and sampling designs currently used in monitoring programs and is implemented in the Upper Columbia Region in collaboration with the UCRTT, providing data useful for recovery plan implementation.

Since 2004, ISEMP in the Wenatchee basin has focused on the design and implementation of the Recovery Plan monitoring strategy (Hillman 2006) sampling regime and which is a status and trend monitoring program with 67 monitoring indicators. Additionally, the design, implementation, and monitoring of an effectiveness monitoring project is being conducted collaboratively for habitat restoration projects in the Entiat basin associated with the Bridge to Bridge habitat improvement projects under Cascadia Conservation District. The Wenatchee-Entiat ISEMP program also includes a side-by-side comparison of habitat and fish protocol with PNAMP protocols (See below for a description of PNAMP).

#### *Northwest Forest Plan Aquatic and Riparian Effectiveness Monitoring Plan (AREMP)*

The Aquatic and Riparian Effectiveness Monitoring Program (AREMP) is a multi-federal agency program developed to assess the effectiveness of the Aquatic Conservation Strategy in maintaining or restoring the condition of watersheds in the Northwest Forest Plan area, which covers a large portion of the mountain western U.S. The goals of the program include monitoring current condition of watersheds and changes in condition through time. Yearly and 5-yearly measurements are taken in certain watersheds to create and supplement watershed condition assessments and validate the models used to assess known stream conditions. This information provides useful status/trend information for the region's streams.

#### *Pacfish/Infish Biological Opinion Effectiveness Monitoring (PIBO)*

The PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring Program was initiated in 1998 to provide a consistent framework for monitoring effects of land management on aquatic and riparian resources on most Forest Service and Bureau of Land Management lands within the Upper Columbia River Basin. This information helps provide context on whether restoration projects are effective in maintaining or improving the structure and function of riparian and aquatic conditions in the region.

#### *Pacific Northwest Aquatic Monitoring Partnership (PNAMP)*

Pacific Northwest Aquatic Monitoring Partnership (PNAMP) is not a monitoring program, but rather is a forum to coordinate state, federal, and tribal aquatic habitat and salmonid monitoring programs. PNAMP has developed a coordination plan called the Strategy for Coordinating Monitoring of Aquatic Environments in the Pacific Northwest. This project will coordinate with PNAMP throughout monitoring of restoration actions.

#### *Collaborative, Systemwide Monitoring and Evaluation Project (CSMEP)*

CSMEP is a coordinated effort to improve the quality, consistency, and focus of fish population and habitat data to answer key monitoring and evaluation questions relevant to major decisions in the Columbia Basin. The CSMEP project was initiated in 2003 and is administered by the Columbia Basin Fish and Wildlife Authority, with participation from scientists from federal, state and tribal fish and wildlife agencies, and consulting firms. This project will follow CSMEP methods, as incorporated into the Recovery Plan M&E Plan.

### *Mid-Columbia HCP Monitoring and Evaluation Plans*

As discussed in Section D of this proposal, Chelan and Douglas PUDs are parties to HCPs that provide ESA coverage and mitigation requirements for the operation of Rocky Reach, Rock Island, and Wells Hydroelectric Projects. Because part of the mitigation for the HCPs involves hatchery production, the HCPs specify a general HCP hatchery program objective, which is to contribute to the rebuilding and recovery of naturally reproducing populations in their native habitats, while maintaining genetic and ecologic integrity, and supporting harvest. Chelan and Douglas PUD have each developed a monitoring and evaluation plan (HCP M&E Plan) to provide the conceptual framework to monitor and evaluate the success of these hatchery programs (Murdoch and Peven 2005). An HCP M&E report is produced annually to support adaptive management of these programs and to share information within the Upper Columbia Region. The data derived from the HCP M&E program provides crucial information useful for assessing the benefit of habitat improvements on biological objectives.

### *Washington Comprehensive Monitoring Strategy for Watershed Health and Salmon Recovery (CMS)*

The CMS incorporates monitoring recommendations provided by the state's Independent Science Panel (ISP) to the Governor and Legislature in December 2001. The intent of the strategy is to better coordinate existing monitoring activities and improve data exchange most relevant to local, state, and federal watershed health. The strategy helps the state to achieve its monitoring goals, and in the process, address key management issues or policy decisions. The monitoring implemented in this project will be consistent with the CMS strategy.

### *Okanogan Basin Monitoring and Evaluation Program (OBMEP)*

The Okanogan Basin Monitoring & Evaluation Program (OBMEP) was created in 2004 to improve the resource management infrastructure for the upper Columbia region, the Colville Tribes, their resource management partners and the general public. This was done by implementing and conducting a basin-wide monitoring and evaluation program using a scientifically-based design. This project will coordinate with OBMEP through the practitioner's workshops as needed to maintain consistency in data collection for the region.

### *Intensively Monitored Watersheds (IMW)*

To track the contribution of restoration projects to salmon recovery, the Washington State Department of Ecology administers an Intensively Monitored Watersheds (IMW) project designed to compare changes in salmon production among experimental treatment (restoration) and control (no restoration) watersheds. The Wenatchee and Entiat subbasins were identified as IMWs in the project, but unlike several other watersheds in the project, intensive monitoring is already ongoing in the Wenatchee and Entiat watersheds under the ISEMP program (see below). Thus, information for the IMW project for the Wenatchee and Entiat is collated from monitoring being conducted by various entities: U.S. Forest Service, U.S. Fish & Wildlife Service, Washington Departments of Fish and Wildlife, and Ecology, Chelan County, and Chelan County Public Utility District. As such, data collated for the IMW project provides a statewide glimpse of habitat restoration effectiveness that is useful for subbasin planning and recovery plan implementation.

The development of some of these regional monitoring programs may result in modifications to the monitoring programs used in the Upper Columbia Region. These programs, in various states of development, include the Bull Trout Recovery Monitoring and Evaluation Program being developed by the Recovery Monitoring and Evaluation Technical Group (RMEG), the Collaborative, Systemwide Monitoring and Evaluation Project (CSMEP), and the Pacific Northwest Aquatic Monitoring Partnership (PNAMP). As these programs develop more fully, they will provide guidance on valid sampling and statistical designs, measuring protocols, and data management. This information may be used to refine and improve the existing monitoring and evaluation programs in the Upper Columbia Region, with the intent to make monitoring and evaluation programs more consistent throughout the Columbia Basin and Pacific Northwest.

Monitoring and evaluation in this project will be guided by the Upper Columbia Spring Chinook Salmon and Steelhead Monitoring and Evaluation Plan (Recovery Plan M&E Plan; Appendix P of the Recovery Plan). Specifically, monitoring in this project will be implemented by collating information from existing programs in the region described above and incorporating updated or amended plans as those plans develop. This information will be used to evaluate status/trend and effectiveness of the actions in addressing subbasin and Recovery Plan objectives.

**APPENDIX D**  
**LIST OF ACRONYMS**

## List of Acronyms

Accord	2008 Columbia Basin Fish Accords Memorandum of Agreement between the Three Treaty Tribes and FCRPS Action Agencies
A/P	abundance/productivity
AREMP	Aquatic and Riparian Effectiveness Monitoring Plan
AU	assessment unit
BPA	Bonneville Power Administration
CCD	Cascadia Conservation District
CCNRD	Chelan County Natural Resources Department
CMS	Comprehensive Monitoring Strategy
Corps	U.S. Army Corps of Engineers
CRITFC	Columbia River Inter-Tribal Fish Commission
CSMEP	Collaborative System-wide Monitoring and Evaluation Project
DOE	Washington State Department of Ecology
DPS	Distinct Population Segment
EDT	Ecosystem Diagnosis and Treatment
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
HB	House Bill
HCP	Habitat Conservation Plan
HUC	Hydrological Unit Code

ICBTRT	Interior Columbia Basin Technical Recovery Team
IMW	Intensively Monitored Watersheds
ISEMP	Integrated Status and Effectiveness Monitoring Project
ISP	Independent Science Panel
ISRP	Independent Scientific Review Panel
IT	Implementation Team
LWD	large woody debris
M&E Plan	Monitoring and Evaluation Plan
MOA	Memorandum of Agreement
MSRF	Methow Salmon Recovery Foundation
NMFS	National Marine Fisheries Service
NNI	no-net-impact
NPCC	Northwest Power and Conservation Council
NWFSC	Northwest Fisheries Science Center
OBMEP	Okanogan Basin Monitoring and Evaluation Program
ORV	off-road vehicle
PIBO	PACFISH/INFISH Biological Opinion
PNAMP	Pacific Northwest Aquatic Monitoring Partnership
PUD	Public Utility District
SRFB	Salmon Recovery Funding Board
SS/D	spatial structure/diversity
RCW	Revised Code of Washington
Reclamation	U.S. Bureau of Reclamation



Recovery Plan	Upper Columbia Spring Chinook and Steelhead Recovery Plan
Recovery Plan M&E Plan	Upper Columbia Monitoring and Evaluation Plan
RIST	Recovery Implementation Science Team
RMEG	Recovery Monitoring and Evaluation Technical Group
RME Plan	Research, Monitoring, and Evaluation Plan
UC	Upper Columbia
UCRTT	Upper Columbia Regional Technical Team
UCSRB	Upper Columbia Salmon Recovery Board
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VSP	Viable Salmonid Populations
WAT	Watershed Action Team
WDFW	Washington Department of Fish and Wildlife
WMA	Watershed Management Act
WRIA	Water Resource Inventory Area

**APPENDIX E**

**DRAFT – REACH ASSESSMENT AND PROJECT SELECTION PROTOCOL**

# DRAFT – Reach Assessment and Project Selection Protocol

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*Provided for Yakama Nation Fisheries*

## Introduction

Stream reach assessment and project selection typically follows a sequence of analytical steps that leads investigators to the identification of enhancement projects that support the recovery of ecosystem processes and aquatic habitat. The strategy should be efficient and repeatable; building off of existing and newly collected data using contemporary analysis protocols to ensure that projects are compatible with basin and reach-scale processes.

The methodology should strive to achieve the following objectives:

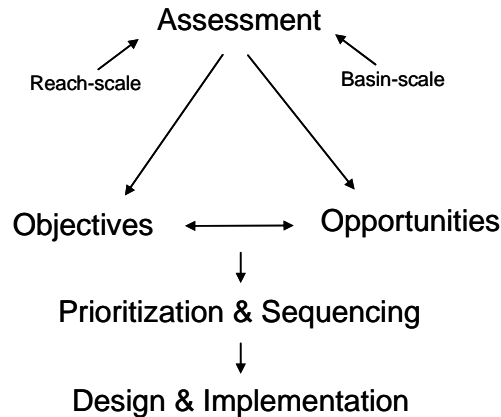
- ✓ Maximize the use of existing data
- ✓ Be scientifically-based and quantitative
- ✓ Be efficient, timely, and repeatable
- ✓ Provide the greatest habitat benefit

Become the foundation for design and implementation

- ✓ Identify projects that are compatible with geomorphic processes and land-use

## Methods

A reach assessment and project selection process should begin with a review/collection of existing information throughout the watershed as well as collection of any necessary habitat data at the stream reach scale. This information is analyzed to allow the investigators to compartmentalize the stream into individual reaches. Each reach is then characterized according to its unique physical, biological, and geomorphic conditions. The reach assessment culminates in a set of reach-level habitat enhancement objectives. Specific enhancement opportunities are then evaluated and selected according to the reach objectives. Formulation of opportunities unique to each reach assures that enhancements are appropriate to both reach level scales as well as basin wide. These opportunities are further prioritized at the basin scale and then advanced to the design and implementation phase. The following section describes these basic analysis steps. An overview is provided in the diagram below.



### **Step 1: Assessment**

Assessment should maximize the use of existing information. When available information is insufficient, additional information should focus on key metrics needed to characterize background conditions and trends necessary to provide context for project selection. The key metrics can be broken into basin and reach scales with subsets within each.

**Basin-scale:** Basin-scale assessment relies on GIS-based analysis and existing information often available from published governmental sources. This is not a detailed watershed analysis, but rather a characterization of the salient watershed conditions. It includes the following categories:

Hydrology – characterizes the runoff and disturbance regime using hydrograph data, flood frequency statistics, road density, land cover/ imperviousness, and the condition of forest vegetation.

Sediment – describes the basin sediment regime through the characterization of surficial geology, road density, ground cover, and delivery/disturbance mechanisms.

Land-use – historical, existing, and future land-use patterns and trends will be characterized with respect to their impact on ecological processes and stream habitat conditions. This assessment will rely on existing information, aerial photo analysis, and land-use designations.

**Reach-scale:** Reach-scale assessment relies on existing detailed information and oftentimes additionally collected information to characterize specific attributes such as physical habitat, geomorphology, fish use, and reach-level land-use impacts:

Physical habitat – a stream habitat survey conducted using the USFS Level II survey or similar protocol. The methodology employs a habitat unit survey along with general characterization of substrate, large woody debris, and riparian conditions. These surveys help to characterize stream channel and riparian habitat conditions. Existing stream habitat data may already exist for some reaches.

- Geomorphology – a geomorphic analysis identifies channel types, sediment transport and response conditions, floodplain, channel migration zones, and off-channel connectivity, and the impacts of adjacent land-use. Trends in channel and planform evolution are often characterized. These evaluations rely on site observations, GIS analysis, and aerial photo analysis. Hydraulic modeling is often utilized where it is already available and may be conducted anew if deemed necessary based on site objectives and uncertainties.
- Fish use and distribution – species life-stage uses and limiting factors should be summarized in order to inform the selection of enhancement projects that address the key issues facing fish populations. For many areas, existing data may be available from WA Department of Fish & Wildlife, Yakama Nation Fisheries, USGS-Biological Resources Division, US Forest Service, Ecosystem Diagnosis & Treatment analysis, or other sources. These data typically include spawning surveys, juvenile surveys, adult counts, and modeled information.
- Land-use conditions and site constraints – The condition and impact of land uses (historic and current) on reach-scale processes and habitat should be determined/described. Risks and constraints associated with existing or planned land-uses should be documented.

## ***Step 2: Developing Restoration Objectives***

### **Synthesis – Telling the riverine landscape story**

This synthesis stage uses the assessment information to describe existing conditions at the watershed and stream-reach scales. Habitat, geomorphic, and land use conditions are summarized for each reach. The processes that create and sustain habitats are typically identified along with the limitations imposed by existing conditions and land-use. Desired future conditions should also be described along with the general approaches and techniques that are needed to get there. Key constraints, opportunities, and sequencing considerations are necessarily included. The synthesis culminates with the development of reach-scale restoration objectives based on basin and reach-scale assessment and data analysis.

### **Reach-based ecosystem indicators (REI)**

To assist in the synthesis effort, the assessment data can be fed into a subset of reach-based ecosystem indicators (REI, see Bureau of Reclamation 2008) matrix that can help to further tell the habitat story. The REI is a platform for interdisciplinary collaboration, organization, and synthesis as a means to interpret river condition. Ultimately, the collection of data sufficient to populate the relevant indicators are used to rate the condition of the river ecosystem based on the various established metrics and protocols representing physical habitat, water quality, riparian conditions, and biological conditions offers consistency and repeatability. REI indicator thresholds (aka ‘criteria ranges’) may be adjusted as necessary to reflect the specific geomorphic setting of the reach of interest. REI values assist with: 1) summarizing reach-scale conditions, 2) supporting the development of reach objectives, and 3) evaluating potential benefits of specific projects. Using the REI allows for a consistent comparison of conditions across multiple reaches and provides consistency with already completed assessments such as the Methow Big Valley Reach Assessment (BOR 2008).

### ***Step 3: Describing Project Opportunities***

Project opportunities are the recommended measures that accomplish the reach-scale objectives. Projects might include in-the-ground restoration projects, protection projects, programmatic considerations, and recommended monitoring or additional assessment efforts. Specific in-the-ground enhancement projects that advance the cause of fish population recovery are a primary focus.

Project opportunities are often identified during the assessment/synthesis efforts and further vetted with field visits and aerial photo interpretation. Opportunities are also commonly identified during the stream habitat surveys. Project descriptions are compiled that describe the project location, extents, objectives, constraints, landownership, land management, and construction access conditions along with anticipated benefits. Projects are further documented through site photographs and maps (i.e. aerial photograph overlays, see **Figure 1**). If applicable, multiple project alternatives are described. Conditions that may favor or preclude project work in a particular area should also be included.

### ***Step 4: Prioritization – Sequencing***

This phase compares project opportunities both within and between reaches in order to develop a final prioritized list of projects. A custom prioritization scheme is typically developed that evaluates projects according to reach-scale/watershed-scale objectives and other considerations such as costs, site constraints, access conditions, and sequencing. The REI can be used to predict how potential projects will affect key environmental indicators. A process-based ecosystem management philosophy should be followed, focusing first on projects that protect and restore processes, then on projects that re-connect isolated habitats, and next on projects that enhance or restore habitat features. If work is to be considered on private land, landowner contact and support must be gained early to properly evaluate priorities and sequencing.

### ***Step 5: Design and Implementation***

High priority projects are then carried forward to design and implementation assuming landowner support and implementation resources are available. Project design is guided by established ‘design criteria’ distilled directly from restoration objectives. For many projects, conceptual designs are developed as a first step, followed by refinement and advancement to final design and implementation.

#### **Design criteria**

Project development is guided by a set of established design criteria unique to each project. Design criteria reflect the reach-scale objectives and also account for site-specific considerations. Specific site conditions include landowner concerns, interface with infrastructure, relationships with land management practices, site construction logistics, and other considerations. These variables are explicitly addressed in design criteria to ensure the development of successful projects. Project design should follow an interdisciplinary approach that combines expertise in stream ecology, hydraulic engineering, fluvial geomorphology, and fisheries biology. The interdisciplinary

approach ensures that final designs reflect contemporary approaches to process-based restoration.

### **Conceptual designs**

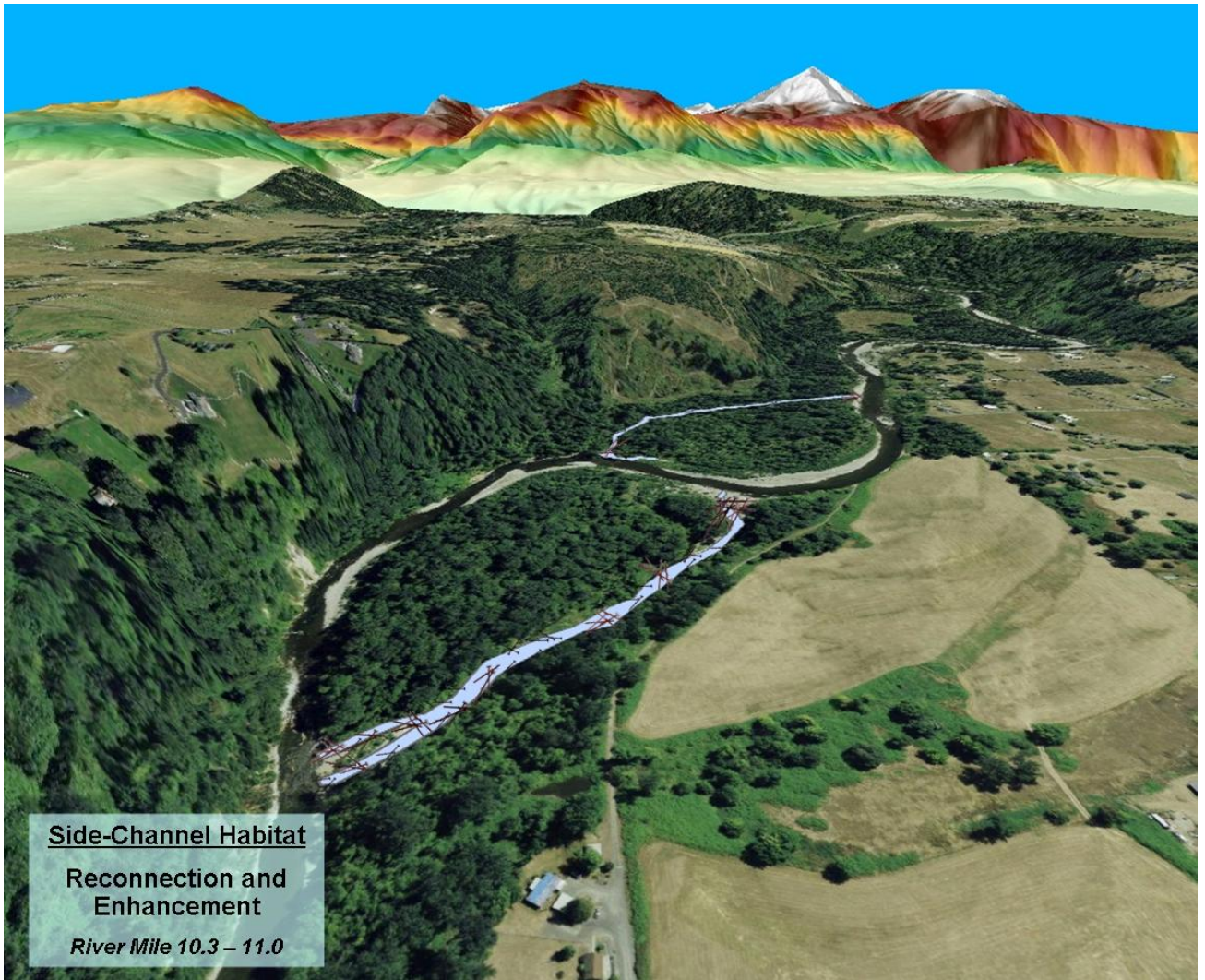
For some projects, the first step will be the development of project conceptual designs. Conceptual designs, which represent approximately a 30% level of design, are useful for beginning a dialogue about project specifics and can be used to solicit support and funding for a project. Conceptual designs outline the general strategy and alternatives to be employed and include a generalized site plan, drawings of typical treatments, and planning-level cost/material estimates. Review and refinement of conceptual designs leads to a final design that best accomplishes the reach-level restoration objectives while also satisfying project-specific design criteria.

### **Final design and implementation**

Projects with secured support and funding (with or without conceptual designs), may be advanced to final design and implementation. Contact and communication with regard to private landownership must continue through this stage. The type of final design will vary with project type and need. Some projects can be implemented with permit level drawings whereas other projects may require design-build level of drawings. The amount of design level of effort is determined on a case-by-case basis. Construction using permit level drawings generally requires more construction oversight than bid-level drawings.

## ***Step 6: Monitoring and Adaptive Management***

The approach to project identification, prioritization, and implementation outlined in the previous steps provides a systematic platform for linkage to reach-based effectiveness monitoring that can be coordinated through other regional efforts. Systematic project identification, prioritization, and implementation when linked with associated effectiveness monitoring efforts at the reach scale. Further, it establishes a mechanism to employ an adaptive management strategy to demonstrate which treatments meet biological objectives, which need to be modified to meet biological objectives, and to reach recovery goals in the most timely, cost-effective way.



**Figure 1. Example Project Opportunity Map.**



**APPENDIX F**

**HABITAT RESTORATION ACTION SELECTION PROCESS**

## **5 Stage process (Brandon Rogers, Yakima Nation)**

Habitat Restoration Action Selection: Actions are found and selected through a science based process based on 5 stages.

In our initial proposal we did not include mention of limiting factors and that was an oversight. Habitat actions identified for implementation under this Project will be based on limiting factors identified in the tables in Appendix G of the Recovery Plan (UCSRB 2008). Appendix G contains tables listing primary limiting factors and classes of restoration actions by subbasin and assessment unit (i.e. side-channel reconnection, floodplain restoration, LWD restoration, riparian planting, etc). Table G-2 in this proposal illustrates how Project actions will be associated with limiting factors using as examples habitat actions currently being implemented in the Upper Columbia Region by the Yakama Nation, or planned for implementation in 2010 and 2011. We would like to make it clear that the following 5 stages are undertaken with the knowledge and acceptance of the various limiting factors described in the Recovery Plan. The Reach Assessment process is designed to find restoration projects to address those limiting factors, not to question them. Limiting factors within each subbasin were identified using EDT methodologies: Entiat Watershed Plan (Chelan County Conservation District 2004), Methow Subbasin Plan (NPCC 2004b), and the Wenatchee Subbasin Plan<sup>2</sup> (NPCC 2004c).

Stage 1 involves a Tributary-scale stream assessment. Tributary Assessments usually include the entire stream (i.e. the Methow River.) The Tributary Assessment has been designed by Reclamation and generally documents the geomorphology, geology, hydrology, and physical nature of the stream (see Appendix E of this proposal). During this process, smaller stream reaches are identified based on hydraulic controls like alluvial fans or geologic confinement. The data from an assessment is summarized and reviewed by a group of technical experts. The final output from these assessments includes descriptions of physical stream and channel processes for stream reaches within the Tributary assessment area and a basic protection and restoration strategy for the assessed area.

Stage 2 involves a Reach-scale stream assessment. In this assessment, the reaches identified in the Tributary Assessment are assessed in much greater detail. Obviously not all reaches in a stream need protection or restoration and so reaches to be assessed are chosen both through the basic protection and restoration strategy and with the guidance of the Watershed Action Team (WAT). The basic Reach Assessment includes data collection aimed at refining the understanding of local channel processes, and the Reach Ecosystem Indicators (REI.) A thorough understanding of local channel processes is necessary prior to initiating any restoration activities and the REIs provide a baseline of environmental conditions prior to restoration. During this stage restoration actions are identified and in some cases initial design is begun.

Stage 3 involves the presentation of the Reach Assessment findings to the WAT. Through a series of meetings, potential restoration actions are discussed and habitat action sponsors are

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<sup>2</sup> A Qualitative Habitat Assessment (QHA) methodology was used for the Wenatchee. The QHA is a derivation of the EDT methodology, as described in the subbasin plan.

assigned. Once habitat action sponsors are assigned to an action, landowner contacts are made and initial habitat action design begins.

Stage 4 involves the habitat action design being brought before the Upper Columbia Regional Technical Team (UCRTT), a group of technical experts who have significant local knowledge and have been assigned the task of reviewing habitat action proposals and where possible suggesting improvements. The UCRTT reviews and comments on the habitat action proposals.

Stage 5: Project implementation.