2008 Columbia Basin Fish Accords
Memorandum of Agreement between the
Three Treaty Tribes and FCRPS Action Agencies

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MEMORANDUM OF AGREEMENT AMONG THE UMATILLA, WARM SPRINGS AND YAKAMA TRIBES, BONNEVILLE POWER ADMINISTRATION, U.S. ARMY CORPS OF ENGINEERS, AND U.S. BUREAU OF RECLAMATION

I. INTRODUCTION

The Bonneville Power Administration (BPA), the U.S. Army Corps of Engineers (Corps) and the U.S. Bureau of Reclamation (Reclamation)(the "Action Agencies") 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) ("the Tribes" or "the Treaty Tribes") (collectively "the Parties") have developed this Memorandum of Agreement ("Agreement" or "MOA") through good faith negotiations. This Agreement addresses direct and indirect effects of construction, inundation, operation and maintenance of the Federal Columbia River Power System[1] and Reclamation's Upper Snake River Projects,[2] on fish resources of the Columbia River Basin.[3] The Action Agencies and the Tribes intend that this Agreement provide benefits to all the Parties. Reasons for this Agreement include the following:

- To resolve issues between the Parties regarding the Action Agencies' compliance with the Endangered Species Act ("ESA") regarding these FCRPS and Upper Snake Projects;

- To resolve issues between the Parties regarding compliance with the Pacific Northwest Electric Power Planning and Conservation Act ("NWPA") and the Clean Water Act ("CWA");

- To address the Parties' mutual concerns for certainty and stability in the funding and implementation of projects for the benefit of fish affected by the FCRPS and Upper Snake Projects, affirming and adding to the actions proposed in the draft FCRPS and Upper Snake Biological Opinions; and

- To foster a cooperative and partnership-like relationship in implementation of the mutual commitments in this Agreement.

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[1] For purposes of this Agreement, the FCRPS comprises 14 Federal multipurpose hydropower projects. The 12 projects operated and maintained by the Corps are: Bonneville, the Dalles, John Day, McNary, Chief Joseph, Albeni Falls, Libby, Ice Harbor, Lower Monumental, Little Goose, Lower Granite, and Dworshak dams. Reclamation operates and maintains the following FCRPS projects: Hungry Horse Project and Columbia Basin Project, which includes Grand Coulee Dam.

[2] The Upper Snake River Projects (Upper Snake) are Minidoka, Palisades, Michaud Flats, Ririe, Little Wood River, Boise, Lucky Peak, Mann Creek, Owyhee, Vale, Burnt River and Baker.

[3] This Agreement does not comprehensively address impacts to wildlife from the construction and operations of the FCRPS and Upper Snake Projects. See Section IV terms related to wildlife.

II. HYDRO COMMITMENTS

A. Hydro Performance

A.1. Performance Standards, Targets, and Metrics:

The Tribes concur in the use of the hydro performance standards, targets, and metrics as described in the Main Report, Section 2.1.2.2 of the Action Agencies' August 2007 Biological Assessment (pages 2-3 through 2-6) and the draft FCRPS BiOp at RPA No. 51 (pages 63-64 of 85). Provided that, the Tribes and their representatives may recommend to the Action Agencies actions that may exceed performance standards, which will be considered and may be implemented at the discretion of the Action Agencies.

A.2. Performance and Adaptive Management:

The Parties agree that the BiOps will employ an adaptive management approach, including reporting and diagnosis, as described in Section 2.1 of the Biological Assessment. The Parties agree that if biological or project performance expectations as described above are not being met over time as anticipated, diagnosis will be done to identify causes, and remedies will be developed to meet the established performance standard. The performance standard for species or the federal projects will not be lowered during the terms of the BiOps (although as provided in the BA, tradeoffs among Snake River and lower river dams are allowed). In addition the Parties agree that the current delay and SPE metrics described in Attachment A will not be lowered unless they impede survival.

The Parties recognize that new biological information will be available during the term of the MOA that will inform the methods and assumptions used to analyze the effects of hydro operations on fish species covered by this Agreement. The Parties will work together to seek agreement on methods and assumptions for such analyses, building on analyses performed in development of the FCRPS Biological Opinion as warranted.

As described in the FCRPS BiOp, a comprehensive review will be completed in June, 2012 and June, 2015 that includes a review of the state of implementation of all actions planned or anticipated in the FCRPS and Upper Snake BiOps and a review of the status and performance of each ESU addressed by those BiOps. The Parties agree that they will jointly discuss the development, analyses and recommendations related to these comprehensive evaluations and, in the event performance is not on track, to discuss options for corrective action. This coordination between the Parties is in addition to any coordination that the Action Agencies do with additional regional entities.

John Day Pool Operations

The Action Agencies will meet with the Tribes in the near-term to discuss relevant existing hydraulic and biological information to better understand the biological benefits and/or

detriments associated with John Day reservoir operations. JDA MOP is a contingency and so may be decided as a product of the 2015 comprehensive review.

A.3. Research, Monitoring, and Evaluation.

Maintaining and improving research, monitoring, and evaluation programs is critical to informed decision making on population status assessments and improving management action effectiveness. The Action Agencies will implement status and effectiveness research, monitoring and evaluation sufficient to robustly track survival improvements and facilitate rebuilding actions accomplished, in part, through projects and programs identified in Attachment B. The Parties further agree that the Action Agency effort should be coordinated with implementation partners including other fishery managers.

The Tribes rely heavily on the services of the Fish Passage Center, an organization which the Tribes were instrumental in creating. BPA agrees to provide funding to maintain the Fish Passage Center to provide evaluation resources required by the Tribes, as set forth at Section IID.

B. Spring spill/transport

The Parties agree to the initial spill and transportation protocols set out in the draft BiOp with one exception: the Parties have agreed to an adjustment of the initial transportation protocols in order to benefit adult returns of Group B steelhead, while also taking into account spring and fall Chinook.

Initial Transportation Plan

When flows are less than 65 KCFS[4], full transport (no voluntary spill or bypass provided except as needed for research purposes) will be initiated at the Snake River collector projects from April 3 through early June. Summer spill will commence at collector projects when subyearling numbers exceed 50% of the sample at each of the collector projects for a 3 day period after June 1. This low flow transport strategy is unchanged from the draft FCRPS BiOp

When flows are greater than 65 KCFS[1], spill will begin on April 3, 5, and 7 at LGR, LGS, and LMN dams (all fish to remain in-river until April 21 when collection and transport will begin) and continue through May 6 consistent with the draft FCRPS BiOp. From May 7 through May 20 full transport (no voluntary spill or bypass provided except as needed for research purposes) will be initiated at the Snake River collector projects with spring spill and transport operations resuming May 21 and continuing through early June. Summer spill will commence at collector projects when subyearling numbers exceed 50% of the sample at each of the collector projects for a 3 day period after June 1.

All other transport protocols shall be consistent with the draft FCRPS BiOp.

[4] The seasonal average flow projection will be based on the Corps' STP model and the April final forecast (late March report).

The Parties agree that this transportation adjustment is part of the broader Group B steelhead package that is based on the best available scientific information and is aimed at addressing both FCRPS and *US v. Oregon* objectives. The spill reduction component of this package is the "action of last resort." The Action Agencies agree to fund the implementation of the actions included as part of the Group B steelhead survival improvement package, Attachment C, with specific projects and budgets identified in Attachment B.

Through the adaptive management provisions of the BiOp and otherwise as consistent with the provisions of Section IV of this Agreement, the Parties will review the transportation protocols taking into account new information concerning adult returns, in-river and transportation SARs, and model results. If new information indicates a modified transportation protocol is warranted, adaptive management will be used to make the appropriate adjustments in timing and triggers for transportation, recognizing that spring spill reduction is the "action of last resort". This transport operation would result in a reduction in spring spill compared to the 2006 through 2008 operation. The Group B steelhead survival improvement package is Attachment C.

C. Summer spill

The Parties agree to support the following alternative, based on the summer spill approach described in the draft FCRPS BiOp, recognizing that the alternative would not be implemented until the 2009 season:

> Beginning August 1, curtailment of summer spill may occur first at Lower Granite Dam if subyearling Chinook collection counts fall below 300 fish per day for 3 consecutive days (beginning July 29, 30, and 31 for August 1 curtailment). Using the same 300 fish criterion, the curtailed spill would then progress downstream with each successive dam on the Snake River, with spill at LGS ending no earlier than 3 days after the termination of spill at LGR, and ending at LMN no earlier than 3 days after the termination of spill at LGS assuming the 300 fish criterion has been met at those projects. Spill would be curtailed at IHR no earlier than 2 days after LMN, without use of the 300 fish criterion.
>
> Spill will end at 0600 hours on the day after the necessary curtailment criteria are met. If after cessation of spill at any one of the Snake River projects on or after August 1, subyearling Chinook collection counts again exceed 500fish per day for two consecutive days, spill will resume at that project only. Thereafter, fish collection count numbers will be reevaluated daily to determine if spill should continue using the criteria above (300 fish per day) until August 31.

As this new program is implemented, the Parties will continue to gather data and investigate at least the following issues:

- Adult returns;
- Juvenile passage timing;
- Juvenile fall Chinook salmon life-history diversity traits (i.e. subyearling and yearling emigration attributes);
- Other as agreed to.

The Parties acknowledge that this summer spill is supported by currently available information, and that the operation will be reviewed and may be adjusted to take into account more recent information through the adaptive management provisions of the BiOp and otherwise consistent with the provisions of Section IV of this Agreement. If new information indicates support for a change in timing or triggers to accomplish anticipated coverage of the run (e.g. not a substantially lower percentage of the run as compared to 2005 to 2007 for Snake River fall Chinook), adaptive management and the provisions of Section IV of this Agreement will be used to consider the appropriate adjustments.

D. Monitoring and Verification; Fish Passage Center

The Action Agencies acknowledge that the Tribes' ability to monitor and verify performance of the FCRPS under the BiOps is essential to their participation in this MOA, and the Action Agencies support such monitoring and verification and will so state in any forum.

The Parties agree that monitoring and verification functions are currently provided via funding for the Fish Passage Center. BPA will continue funding the Fish Passage Center, with funds for a manager and for technical and clerical support in order to perform the functions of the Center as stated in the Council's 2003 Mainstem Amendment, for the duration of this MOA unless the Parties agree on an alternative. If the Council changes the Fish Passage Center responsibilities in Program amendments, BPA would consult with the Tribes in advance about what changes BPA would propose, if any, in response to ensure BPA's continued funding is done in a manner consistent with the terms of this Agreement, the Program and Ninth Circuit case law. If a change in Center functions impacts the Tribes' ability to monitor and verify performance of the FCRPS BiOp or this Agreement, BPA would provide funding to the Tribes or an agreed-upon alternative to continue this work.

E. Spring Creek Hatchery Releases

Spring Creek Hatchery commitments are described in Attachment D. The Parties agree that their common priority is to modify Spring Creek Hatchery production so that the early hatchery releases and spill at Bonneville Dam are unnecessary. Consistent with Section IV, the Parties commit to affirmatively support these commitments in appropriate forums.

F. Status of the Lyon's Ferry production program

The parties to *US v. Oregon* have agreed to monitor the Lyon's Ferry production program over the term of the 10-year *US v. Oregon* management plan. Any *US v. Oregon* party may propose changes to that program by invoking the modification provisions of the *US v. Oregon* management plan. The Action Agencies understand that that Tribes' willingness to accept spill operations as outlined above is directly related to their expectation that the Lyon's Ferry production program remains stable and substantially unaltered than as currently designed for the term of this Agreement. Should that fundamental expectation be upset, the Tribes will consider this a material change and grounds for withdrawal from the Agreement, and may, after notice to the Action Agencies, advocate for spill actions that deviate from those contemplated in this Agreement, using the dispute resolution procedures under Section IV.F. Tribal advocacy for

spill actions outside the dispute resolution procedures may be considered by the Action Agencies a material change that would trigger withdrawal.

G. Flow Actions (including flow surrogates)

The Parties agree to the following actions in addition to those in the draft FCRPS BiOp:

- Improve forecasting methods and tools to optimize reservoir use for fish operations; see Attachment E.
- Federal Government coordination with Tribes on objectives and strategies for Treaty/Non-Treaty water negotiations; see Attachment F
- Libby/Hungry Horse Operations -- Implementation of the Libby/ Hungry Horse Operations as described in the 2003 Council Mainstem Amendments and the Draft FCRPS BiOp for modifications to the storage reservoirs in Montana.

H. Lamprey protection

The Parties understand that the Pacific Lamprey is a species of fish that is significant to the well-being of the Tribes, who use these fish for food and medicine. Lamprey abundance has diminished in the Columbia Basin in the last 30 years and this diminishment is of high concern to the Parties. The Parties agree to undertake the actions to protect lamprey described below and in Attachment B.

The Parties will work together to combine Action Agency, Tribal, and other agency lamprey actions into a comprehensive lamprey improvement program. Beginning in 2008, the Parties and the Tribes will meet periodically to discuss the lamprey implementation and funding issues including priorities and impediments.

The Parties agree that being proactive for lamprey is critical to seek to avoid ESA listing. The Tribes' commitments to forbearance regarding lamprey as described in Section IV.B are contingent on good faith implementation of the actions described in this lamprey section of this Agreement.

Material modifications of the lamprey implementation and related funding under Section II.H may, after resort to the Dispute Resolution provisions, result in modification of the Forbearance provision regarding lamprey.

Bonneville Power Administration

BPA will fund the Tribal projects for Pacific Lamprey identified in Attachment B, with a total overall programmatic commitment of $1.866 million per year for lamprey projects. This funding commitment is made with the recognition that lamprey funding may be adjusted between fiscal years in a manner consistent with Section III.F.4, so long as the total funding does not exceed $18.66 million (unadjusted for inflation) except as the Parties may agree otherwise.

Corps of Engineers

In accordance with Section IV.D., the Tribes and the Corps will rank Pacific Lamprey items within the Columbia River Fish Mitigation Program and Anadromous Fish Evaluation Program as high priority consistent with ESA responsibilities and accomplishing appropriate lamprey improvements in a reasonable time frame. The Corps will also work with the tribes and the USFWS towards developing its existing 5-year lamprey plan into a 10-year plan, covering both adult and juvenile passage issues, with implementation to begin in 2008.

The Corps and the Tribes will continue to collaborate in the development of a lamprey implementation plan, including consideration of study results, the tribal draft restoration plan, and other available information. The plan will include priority actions, including those listed below, and identification of authority and funding issues. It will be updated annually based on the most recent information.

The Corps will program approximately $1.8 million in 2008 for associated lamprey work identified in the provisions below. The Corps will ramp up funding to $2-5 million per year, as necessary and appropriate to improve lamprey conditions at dams for passage to implement the actions below as they are ultimately detailed in the 10-year plan. The Parties believe that most of the actions below can be implemented within the next 10 years, and, for planning purposes, anticipate an aggregate implementation cost of approximately $50 million. However, the Parties understand that the development of the 10-year plan may lead to adjustments in the implementation term (e.g. perhaps 12 years is more feasible), action priorities, and estimates of total cost to implement the plan.

The Corps will work with the Parties to this Agreement and through the Regional Forum on implementation priorities for lamprey actions annually, and will address options for funding where appropriate.

Adult Lamprey Passage

The Corps will continue improving adult lamprey migratory conditions at mainstem FCRPS hydropower projects. This will include investigating and identifying potential problem areas and implementing both physical and operational changes to adult ladders. Implementation of changes will be followed by evaluations of passage behavior, likely using PIT and/or active-telemetry to determine the overall effectiveness of the changes. Specific actions include:

- Working with Lamprey Technical Workgroups, the Parties will develop meaningful interim numerical passage metrics for juvenile and adult lamprey passage at the FCRPS dams based on available data and reflecting adaptive management principles.

- Conduct site inspections of each dewatered fish ladder with regional lamprey experts to determine passage bottlenecks. Expand active-tag and PIT-Tag work as appropriate for abundance, passage and behavior studies at McNary and Snake River dams. This may include tracking eels to tributary areas, including above mainstem dams. Conduct concurrent hydraulic studies in fishways to further discern problem areas. Conduct post-

construction adult telemetry evaluations to determine effects of structural and operational improvements.

- Auxiliary systems (primarily Lamprey Auxiliary Passage Systems LAPS) to pass adult lamprey past the dams will be evaluated and fully developed. In particular, the prototype systems under development at Bonneville Dam will be refined and tested. If the Bonneville auxiliary system has been found to be successful, it will be implemented at other Corps dams as warranted. This is a major part of the Corps' lamprey plan and still has some details to work out.

- Fish ladder entrance areas are problematic passage location at dams for lamprey. Evaluate reducing ladder entrance flows at night to assist with lamprey entrance passage efficiency at Bonneville. As warranted, expand to John Day, McNary and other FCRPS mainstem dam fishways.

- Complete designs for keyhole or alternative ladder entrances for possible installation at Bonneville Dam's Cascade Island ladder in 2009 and John Day Dam's north ladder in 2010/11. If warranted and feasible, expand this design and implementation effort to other FCRPS dams. This would be further developed in the Corps' lamprey plan.

- Inventory all picketed leads, fishway cracks, blind openings, and ladder exits. Also inventory ladder gratings to determine grating type, size, condition, and history of stranding lamprey. Begin replacement of existing gratings with new gratings with ¾ inch spacing in those areas of the fish ladders with the most identified problems. As needed test plates over gratings and proceed until all identified areas are addressed. Modify other fishway areas as appropriate for lamprey passage. Close the McNary – Oregon shore ladder exit false opening if warranted.

- Round sharp corners in and around the fish ladders to aid passage as warranted.

- The Tribes have unique expertise in the field of underwater video enumeration of migratory fish species.

- The Corps will investigate the feasibility, techniques and protocols for counting adult lamprey at mainstem hydropower projects (e.g. Bonneville, McNary, Ice Harbor and Lower Granite Dams). The Corps will count adult lamprey at those projects where counting is reasonably feasible and the Parties agree that such data will be valuable to lamprey management efforts.

Juvenile Lamprey Passage Conditions

The Corps will continue to monitor the passage of juvenile lamprey collected at projects with juvenile fish bypass facilities. When the turbine intake bar screens are in need of replacement, the Corps will replace the existing material with bar screens that have smaller gaps between the bars, as warranted to further protect migrating juvenile lamprey. In consultation with NOAA and the Tribes, the Corps will consider lifting the extended length screens out of the turbine intakes

(primarily McNary Dam, but also any Columbia and Snake River dams), during periods of significant juvenile lamprey passage, where lamprey impingement has been documented, considering effects to both salmon and lamprey.

- To prevent juvenile lamprey from becoming stranded or impinged on collector project raceway screens, prototype juvenile lamprey separators will be developed towards aiding in the ability to pass lamprey safely through juvenile fish bypass facilities. Management alternatives using this technology would be further developed in the Corps' lamprey plan.

- The Corps will continue to work actively with industry to further miniaturize active tags with the intent for use in tracking juvenile lamprey.
    - In collaboration with the Tribes, US Fish and Wildlife Service, and the States, the Corps will plan and conduct studies to determine juvenile lamprey active tag criteria, including tag size, shape, and potting material criteria for bio-compatibility.
    - If and when the technology to meet juvenile lamprey active tag criteria becomes available, and as warranted, the Corps will determine passage routes, outmigrant timing and survival of juvenile lamprey through FCRPS mainstem dams. As related to the ability to assess passage and survival, the Corps will work with Tribes, the U.S. Fish and Wildlife Service, and States to develop meaningful numerical juvenile passage standards.

Bureau of Reclamation

Beginning in 2008, and concluding in 2010, Reclamation will conduct a study, in consultation with the Tribes, to identify all Reclamation projects in the Columbia Basin that may affect lamprey. The study will also investigate potential effects of Reclamation facilities on adult and juvenile lamprey, and where appropriate, make recommendations for either further study or for actions that may be taken to reduce effects on lamprey. The priority focus of the study will be the Umatilla and Yakima projects and related facilities.

Beginning in 2008, Reclamation and the Tribes will jointly develop a lamprey implementation plan for Reclamation projects as informed by the study above, the tribal draft restoration plan, and other available information. The plan will include priority actions and identification of authority and funding issues. It will be updated annually based on the most recent information. Reclamation will seek to implement recommended actions from the implementation plan.

I. Emergency Operations for Unlisted Fish

The Action Agencies agree to take reasonable actions to aid non-listed fish during brief periods of time due to unexpected equipment failures or other conditions and when significant detrimental biological effects are demonstrated. When there is a conflict in such operations, operations for ESA-listed fish will take priority.

III. HABITAT AND HATCHERY COMMITMENTS

A. BPA Funding for Habitat and other Non-Hatchery Actions

A.1 General Principles:

- BPA and the Tribes seek to provide certainty and stability regarding BPA commitments to implement fish and wildlife mitigation activities in partnership with the Tribes, including additional and expanded actions which further address the needs of ESA-listed anadromous fish.
- Projects funded under this Agreement are linked to biological benefits based on limiting factors for ESA-listed fish. See Attachment G..
- Projects funded under this Agreement are consistent with recovery plans and subbasin plans now included in the Columbia Basin Fish and Wildlife Program. More specific linkages will be documented as a function of the BPA contracting process.
- Projects may be modified by mutual agreement over time based on biological priorities, feasibility, science review comments, or accountability for results.

A.2. Types of Projects:

BPA is committing to funding a suite of projects and activities that is summarized in Attachment B, with a total average annual funding commitment of $51.61 million/ year for non-hatchery expense projects, plus additional commitments for existing, expanded and new hatchery operations and maintenance expenses as summarized in Attachment B. The projects or actions are categorized as follows:

- Ongoing actions (currently or recently implemented through the Columbia Basin Fish and Wildlife Program), which can be found in Attachment B. The actions include actions addressing ESA-listed salmon and steelhead ("ESA actions") as well as non-listed species.
- Expanded actions in support of FCRPS BiOp and Program implementation, which can be found in Attachment B.
- New actions benefiting ESA-listed and non-listed species, which can be found in Attachment B.

The same projects in the three categories above can also be categorized or sorted with a "Category" system that allows for particular reference to ESA/BiOp or NWPA implementation as follows:

- Category 1 and Category 2c ongoing – Ongoing actions (currently or recently implemented through the Columbia Basin Fish and Wildlife Program). These actions address ESA-listed salmon and steelhead ("ESA actions") as well as non-listed species. The total average annual budget commitment for this category of work is $17.09 million per year, as summarized in Attachment B.

- Category 2a – New or expanded ESA actions in support of FCRPS BiOp implementation. The total average annual budget commitment for this category of work is $8.17 million per year, as summarized in Attachment B.
- Category 2b – Other new actions benefiting ESA-listed species. The total average annual budget commitment for this category of work is $2.24 million per year, as summarized in Attachment B.
- Category 2c and Category 3 - Actions benefiting other fish and wildlife species addressed under the Northwest Power Act and additional RME actions, which can be found in Attachment B under the headings of Category 2c and Category 3. This includes a new programmatic approach for lamprey, with a menu of projects to be selected from those identified in Attachment B under the heading of lamprey. The average annual budget commitment for these categories of work is $3.46 million for Category 2c, $0.49 million for the Umatilla add-ons, and $1.866 million for lamprey projects. Additionally, the annual commitment of Category 3 projects is a total of $4.37 million per year, as noted in Attachment B.
- Capital projects for both ESA-listed and other fish and wildlife species, which can be found in Attachment B under the heading Non-Hatchery Capital.

A.3. Expense Projects:

- BPA's funding commitment in the form of annual expense planning budgets for each project are identified in Attachment B.
- This commitment is also subject to the General Provisions for All Projects below.

A.4. Non-Hatchery Capital Projects:

BPA will commit $52.11 million over the 10 year period to implement the seven non-hatchery capital projects identified in Attachment B. This commitment includes a commitment to dedicate $1 million per year of the Columbia Basin Water Transaction Project budget for water acquisitions in the Umatilla basin.

- Based on reviews to date, BPA finds that the identified projects meet BPA's capital policy for fish and wildlife; if a project is subsequently found not to meet capital requirements, BPA and the Tribe will work together to find a replacement project or alternative project that can be implemented.

Bureau of Reclamation

Bureau of Reclamation tributary habitat technical assistance in the John Day and Grande Ronde sub-basins is expected to continue for the life of the 2008 FCRPS BiOp substantially at current funding levels. If total program appropriations drop below 2008 levels, if new species listings occur, or if biological benefits are in question, then Parties will meet to discuss a revised habitat program subbasin technical assistance allocation.

B. Funding for Hatchery Actions

B.1. General Principles:

- The Action Agencies and the Tribes recognize that hatcheries can provide important benefits to ESA-listed species and to the Tribes in support of their treaty fishing rights.
- The Action Agencies have reviewed the information provided by the Tribes and support implementation of the hatchery actions identified in Attachment B, subject to Sections III.D and III.C.4. Additional or future review by BPA will be in service of BPA NEPA and related duties and specifically will not include independent review of scientific or biological matters already provided for in Sections III.C.4 and III.D.
- BPA and the Tribes seek to provide certainty and stability to BPA funding of hatchery actions by supporting specific on-going hatchery actions implemented by the Tribes, and to make funding available for new hatchery actions (including hatchery reform efforts) by the Tribes and others as they complete required review processes.
- BPA's funding will be in addition to and not replace funding for hatcheries provided by other entities, including but not limited to funding provided by Congress pursuant to the Mitchell Act, and funding required from the mid-Columbia public utility districts implementing habitat conservation plans and other related agreements.
- If a hatchery project identified in this Agreement is not able to be implemented, the Action Agencies are not obligated to fund a replacement or alternative project, and the unused hatchery funds will not be required to be shifted to non-hatchery projects.

B.2. Expense and Capital Hatchery Actions:

BPA will make available a total of approximately $80.11 million over ten years for new facility construction and/or expansions of existing facilities, as described in the Attachment B. Most of this funding is anticipated to qualify as capital funding. The remaining amount is anticipated to be expense funding to provide for planning expenses or other non-capital activities associated with hatchery design, construction, and implementation.

- BPA will ramp-up operation and maintenance funding for expanded and new hatchery actions under this Agreement, to a total (for existing, expanded and new hatchery O&M) of $13.93 million, once all the expansions and new hatchery construction is completed. See Attachment B.
- Starting with the FY2010 rate period, BPA will collaborate with the Tribes to develop a capital spending plan in advance of each new rate period that arises during the Agreement, so as to ensure that adequate rate period capital budgets are available for funding the capital actions in this MOA.
- Listed salmon and steelhead populations affected by the Tribal hatchery proposals in this Agreement and that are located in tributaries of the Upper Columbia River are also populations affected by hatchery programs managed by the Washington Department of Fish and Wildlife on behalf of Grant County PUD, Chelan County PUD and Douglas County PUD. Consistent with the General Principles contained in Section III.B.1, BPA and Tribes want to ensure that any artificial production actions funded under this Agreement are supplemental to and not in substitution of, any actions undertaken by the

PUDs in fulfillment of their responsibilities. In addition, BPA and the Tribes want to ensure that any artificial production actions funded under this Agreement are appropriately coordinated. Therefore, any artificial production actions under this Agreement affecting listed salmon and steelhead populations in the Upper Columbia will be coordinated with the appropriate entities and committees with existing or planned artificial production responsibilities in the same area, including but not limited to the Grant, Chelan, and Douglas County Public Utility Districts. BPA and the Tribes will jointly work on identifying the appropriate projects, and agree that BPA funding will not exceed $5 million barring additional measures the Parties mutually agree to for the benefit of fish of importance to the Parties.

- Yakima Basin/YKFP. The Parties agree as follows:
  Pursuant to this Agreement, BPA is providing funding for several master planning processes under the YKFP project, and is specifically proposing funding (less PUD cost-share) for expense and capital costs for construction of facilities for spring Chinook as well as coho restoration. As a result of the BPA-funded master planning processes, should the Yakama Nation seek additional facilities, BPA agrees to consider funding them in appropriate planning processes during the term of this Agreement. The Yakama Nation, and the Nation may seek other additional funding, in accordance with Section IV.B.2, seek additional funding in year 15.
- Klickitat Project. The Parties agree as follows:
  (a) That they will work diligently together to include development of the Wakiakus facility in the provisions of the Mitchell Act EIS, which is currently being drafted, specifically identifying the need for the facility in support of important tribal fisheries.
  (b) That the Tribe will actively seek congressional appropriations during FY 2010 and FY 2011 for Mitchell Act funding for this facility, in cooperation with other relevant entities such as the Washington Department of Fish and Wildlife. BPA will actively support proposed legislation that is consistent with this Agreement.
  (c) In the event appropriations for all or a part of the Wakiakus facility cannot be obtained, then the following shall occur:
  (i) The Parties will meet to review options for completing both the Klickitat and Wahkiakus facilities utilizing existing Mitchell Act funds, BPA-funds committed under this Agreement, and any other potential cost-sharing sources.
  (ii) As part of this review, the Parties will consider different allocations of the funding from BPA provided in this Agreement and additional cost-sharing formulas, such as ones currently in place with other federal entities, for any funds that are available from sources other than BPA.

B.3. John Day Dam and The Dalles Dam Mitigation:

The U.S. Army Corps of Engineers and *US v. Oregon* parties are working on proposals regarding mitigation for the losses to anadromous fish caused by the construction of John Day and The Dalles dams, in particular the appropriate balance between upriver and downriver stock production. The Corps, as part of this Agreement, commits to resolving this matter with the Tribes through the *US v. Oregon* Policy Committee. As recognized, the resolution of some aspects of John Day/The Dalles mitigation will also involve other parties. No specific plan has

been proposed yet. The Corps commits to take all actions necessary and appropriate consistent with the resolution reached between the interested parties regarding John Day/The Dalles mitigation. Any commitment from BPA in support of this resolution would be consistent with this Agreement.

B.4. Implementation Sequence:

The Tribes, BPA, (and other federal agencies where applicable) will, as part of developing a capital plan, develop an implementation sequence for these projects. The overall funding commitment reflected in Section III.B.2 above is shown in 2008 dollars, and an annual inflation adjustment of 2.5 percent, applied beginning in FY10, will be utilized in developing the capital plan and implementation sequence for these (i.e., capital projects that are assumed to begin in FY10 will have a 2.5 percent inflation factor applied to the FY10 budget; projects that are assumed to begin five years later will have five years of a 2.5 percent annual inflation factor applied to the project's first-year budget).

- The Tribes will consider, among other things, the following as they develop the sequence of implementation:
    - Level of agreement in *US v. Oregon*;
    - Equitable distribution of resources among Tribes;
    - Degree of readiness for implementation

- Sequencing will not be guided by project-by-project speculation regarding NOAA's willingness to approve or accept the project. Rather, NOAA input on these actions (to the extent they require it) will be sought consistent with this comprehensive Agreement.

C. General Provisions For All Projects

C.1. The Parties Agree that all projects funded pursuant to this Agreement are consistent with the Council's Program (including sub-basin plans), as amended; applicable draft ESA recovery plans; BPA's In-Lieu Policy; and, the data management protocols incorporated in the project contracts.

C.2. For BPA funded commitments, the Tribes will report results annually (including ongoing agreed upon monitoring and evaluation) via PISCES and/or other appropriate databases.

C.3. For non-hatchery projects identified as providing benefits to listed ESA fish, the Tribes shall:

- Provide estimated habitat quality improvement and survival benefits from the project (or suite of projects) to a population or populations of listed salmon and steelhead based on key limiting factors;
- Refine the estimates during the course of the Agreement if it appears benefits may significantly deviate from the original estimates; and
- Support these estimates of habitat improvement and survival benefits in appropriate forums.

C.4. For hatchery projects, the Tribes will:

- Continue to make available identified biological benefits associated with a hatchery projects included in this Agreement, and will support those biological benefits;
- Obtain a NOAA determination that the hatchery project will not impede and where possible will contribute to recovery;
- Secure or assist in securing all legally necessary permits for hatchery construction and operation.

C.5. The Parties will coordinate their RM&E projects with each other and with regional RM&E processes (particularly those needed to ensure consistency with the FCRPS BiOp RM&E framework), as appropriate and agreed to among the Parties.

C.6. For actions on federal lands, the tribes will consult with the federal land managers and obtain necessary permits and approvals.

D. Council and ISRP Review

D.1. General principles:

- In developing this Agreement, the Parties recognize that the Council's Program is a maturing program, one that through several decades of implementation has established a continuing framework for mitigating the impacts of hydroelectric development in the Columbia River Basin.
- The Parties agree that the BPA funding commitments in this Agreement are ten-year commitments of the Bonneville Fund for implementation of projects. The Parties believe that this Agreement and the specific projects are consistent with the Council's Program.
- The Council's expertise and coordination is valuable in addressing science review and accountability on a region-wide scale.
- The Parties recognize that the current regional process for reviewing and funding projects to meet Action Agency obligations under the NWPA and/or ESA have been designed in large part to prioritize actions for a particular implementation period. As such, that process has reviewed "proposals" that essentially are competing with one another for a funding within a set overall budget. However, this Agreement, along with the BiOps, reflects specific and binding funding commitments to the projects in the attached spreadsheets, subject to the other terms and conditions in this Agreement.

D.2. ISRP review of projects implemented pursuant to this Agreement:

- Subject to the commitments in Section III.E.2, the Parties will actively participate in ISRP review of the projects funded under this Agreement. The Parties will work with the Council to streamline and consolidate ISRP project reviews by recommending that the ISRP: (1) review projects collectively on a subbasin scale, (2) focus reviews for ongoing or longer term projects on future improvements/priorities, and (3) unless there is a significant project scope change since last ISRP review, minimize or abbreviate re-review of ongoing projects.

- Subject to the commitments in Section III.E.2 the Parties may agree to expedited ISRP review of new projects that are not substantially similar to projects or activities previously reviewed by the ISRP.
- The Parties will consider reasonable adjustments to non-hatchery projects based on ISRP and Council recommendations. The decision on whether or not to make such reasonable adjustments will require agreement of the affected Tribe and BPA. If the reasonable adjustment results in a reduction of a project budget, the affected Tribe and BPA will select another project to use the funds equal to the amount of the reduction. If the affected Tribe and BPA cannot agree on whether a recommended adjustment should be made, a replacement project that meets the requirements of this Agreement will be identified. In any event, BPA's financial commitment to non-hatchery projects will not be reduced to an aggregate level below that specified in this Agreement for each tribe and CRITFC so long as a replacement project that meets the requirements of this Agreement could be identified (see replacement project discussion, below).
- The proponent for any new hatchery project will participate in then-applicable streamlined ISRP and Council 3-step review processes recognizing that the ultimate decision to implement the projects is for BPA subject to the terms of this Agreement. Capital funding for any new hatchery project is subject to these review processes. The Parties will consider reasonable adjustments to hatchery projects based on ISRP and Council recommendations. The decision on whether or not to make such reasonable adjustments will require agreement of the affected Tribe and BPA.

E. Replacement Projects and Adaptive Management

E.1. General Principles:

- This section applies to non-hatchery projects
- The Parties agree that a non-hatchery project identified in this Agreement may not ultimately be implemented or completed due to a variety of possible factors, including but not limited to:
    - Problems arising during regulatory compliance (e.g., ESA consultation, NEPA, NHPA review, CWA permit compliance, etc);
    - New information regarding the biological benefits of the project (e.g., new information indicating a different implementation action is of higher priority, or monitoring or evaluation indicates the project is not producing its anticipated benefits);
    - Changed circumstances (e.g., completion of the original project or inability to implement the project due to environmental conditions); or
    - Substantive non-compliance with the implementing contract.
- Should a non-hatchery project not be implemented due to one or more of the above factors, the Action Agencies and the implementing Tribe will promptly negotiate a replacement project.

E.2. Replacement Projects:

- A replacement project should be the same or similar to the one it replaces in terms of target species, limiting factor, mitigation approach, geographic area and/or subbasin and biological benefits.
- A replacement project may not require additional Council or ISRP review if the original project had been reviewed.
- A replacement project would have the same or similar planning budget as the one it replaces (less any expenditures made for the original project) and will take into account carry-forward funding as agreed to by the Parties.

E.3. Adaptive Management

In addition to project-specific adaptation described above, the Parties may mutually agree to adaptively manage this shared implementation portfolio on a more programmatic scale based on new information or changed circumstances.

F. Inflation, Ramp Up, Planning v. Actuals, Carry-over:

F.1. Inflation:

Beginning in fiscal year 2010, BPA will provide an annual inflation adjustment of 2.5 percent.

F.2. Treatment of Ramp-up of new/expanded work:

In recognition of the need to "ramp up" work (timing of Agreement execution, contracting, permitting, etc), the Parties agree that average BPA spending for the new/expanded projects in fiscal year 2008 is expected to be approximately one-third of the average planning level shown in the attached project-specific spreadsheets; and for fiscal year 2009, it is expected to be up to 75 percent of the average planning level, with full planning levels expected for most new/expanded projects starting in fiscal year 2010.

F.3. Assumptions regarding Planning versus Actuals:

Historically, the long-term average difference between BPA's planned expenditures for implementing the expense component of the Power Council's Fish and Wildlife Program, and actual spending (what BPA is invoiced and pays under the individual contracts), has been about seven percent, with the actual spending averaging 93 percent of planned spending. While BPA will plan for spending up to 100 percent of the funding commitments described in this Agreement, nevertheless, due to a variety of factors, BPA's actual expenditures may be less. As a result, the Parties agree that provided BPA's actual spending for the totality of projects commitments in this Agreement averages 93% of the planning amount annually, BPA is in compliance with its funding commitments. If BPA is not meeting the 93% average annually due to circumstances beyond the Parties control, BPA will not be in violation of this Agreement, but the Parties will meet to discuss possible actions to remove the impediments to achieving 93%. The Parties also agree that, for the reasons regarding ramp up in Section III.F.2, new projects and

projects expansions during their FY08 and FY09 ramp up phase will be excluded from this calculation.

F.4. Unspent funds, and pre-scheduling/rescheduling:

Annual project budgets may fluctuate plus or minus 20% in relation to the planning budgets for each project, to allow for shifts in work between years (within the scope of the project overall), if work will take longer to perform for reasons beyond the sponsors' control (reschedule) or can potentially be moved to an earlier time (preschedule). Fluctuations within an overall project's scope of work, but outside of the 20 percent band, can also occur if mutually agreeable for reasons such as, but not limited to, floods, fires, or other emergency or *force majeure* events.

Unspent project funds (excluding new/expanded projects subject to ramp-up assumptions covered in Section F.2 above) that are carried over per the reschedule/preschedule provisions above (i.e., within +/- 20% of the annual project budget and within the project's scope of work) may be carried forward from one contract year (e.g., Year 1), to as far as two contract years (e.g., Year 3) into the future before such funds are no longer available. The one exception to this reschedule/preschedule criteria is that for the project expansions and new projects, if actual total FY08 and FY09 spending is less than the sum of 33% of the FY08 budget and up to 75% of the FY09 budgets reflected in the spreadsheet attachments due to circumstances within the Tribes' control, then the increment between what is actually spent in FY08/09 and the sum of 33% of the FY08 budget and up to 75% of the FY09 budgets reflected in the spreadsheet cannot be carried over into FY10.

G. Compliance with the *in lieu* provision of the Northwest Power Act

This Agreement also serves as an agreement addressing Section 4(h)(10)(A) of the Northwest Power Act, which requires that BPA expenditures be "in addition to, not in lieu of other expenditures authorized or required from other entities under other agreements or provisions of law."

The Tribes confirm that no other entity is already *required* by law or agreement to fund the specific projects committed to by BPA under this Agreement. Further, when evaluated at a subbasin scale, the Parties understand that the tribes and others are currently expending substantial funds to protect and enhance fish and wildlife species or their habitats in close proximity to where the BPA funds will be applied. While not strictly an in lieu issue, the Tribes commit to continue their efforts to secure or support funding for fish and wildlife from non-BPA sources

In order to address potential *in lieu* issues, the Tribes have identified the following sources of funding by subbasin as described in Attachment H (tribal and non-tribal funding).

The Parties anticipate that similar levels of funding for these parallel and complementary actions will continue for the duration of the Agreement. If there is a change in the composition or levels of funding described, it will not affect the commitments in this Agreement, but will be addressed in future *in lieu* reviews after the end of this Agreement.

As a result of this documented parallel and complementary funding, BPA agrees that projects committed to in this Agreement satisfy the *in lieu* provision.

IV. FORBEARANCE, WITHDRAWAL, AND DISPUTE RESOLUTION

A. Forbearance

A.1. The Tribes will provide a copy of this Agreement to the court in *NWF v. NMFS*.

A.2. The Tribes covenant that during the term of this Agreement:

a. The Treaty Tribes will not initiate, join in, or support in any manner ESA, Northwest Power Act, Clean Water Act or APA suits against the Action Agencies or NOAA regarding the legal sufficiency of the FCRPS PA, FCRPS BiOp, Upper Snake BiOp and/or conforming implementing RODs.

b. So long as the Agreement is being implemented by the Action Agencies, the Tribes will not initiate, join in, or support in any manner ESA, Northwest Power Act, Clean Water Act or APA suits against the Action Agencies or NOAA regarding the effects on fish resources and water quality (water quality issues addressed in the FCRPS BA and the Draft BiOps or otherwise related to the operation or existence of the 14 FCRPS projects regarding temperature and total dissolved gas[5]) resulting from the operations of the FCRPS and Reclamation dams that are specifically addressed in the FCRPS PA, FCRPS BiOp, Upper Snake BiOp and/or conforming implementing RODs.

c. The Treaty Tribes' participation in ongoing and future BPA rate making/approval/review proceedings will be consistent with the terms of this Agreement. This means, for example, that the Tribes agree not to request additional fish or wildlife funding from BPA in on-going and future BPA rate making/approval/review proceedings during the term of this Agreement, and that the Tribes will not make such requests in ongoing or future rate making/approval/review proceedings based on alleged infirmities in prior rate making/approval/review proceedings, including but not limited to the 2002-2006 rate period.

d. The Tribes agree that breaching will not occur within the term of the Agreement. In addition, the Tribes will not advocate for breaching dams covered by the FCRPS and Upper Snake Biological Opinions during the term of this Agreement. This commitment is made subject to the following mutual understandings and a single exception specified below:

[5] Water quality here is not intended to include matters not specifically addressed in the FCRPS BA and BiOps such as the Corps' 404 regulatory program, toxics clean-up issues.

- It is understood by all Parties that nothing in this Agreement may be interpreted or represented as any tribe rescinding or altering their long-standing policy, scientific, and legal positions regarding breach of federal dams.
- As required by the draft NOAA Fisheries FCRPS Biological Opinion, a comprehensive review will be completed in June, 2012 and June, 2015 that includes a review of the state of implementation of all actions planned or anticipated in the FCRPS and Upper Snake BiOps and a review of the status and performance of each ESU addressed by those BiOps. As described in Section II.A.2 of this Agreement, the Parties agree to meet to discuss the results of the 2012 comprehensive evaluation and, in the event performance is not on track, to discuss options for corrective action. If, after the June, 2015 comprehensive review, the status of Snake River ESUs is not improving and the Tribes review of Diagnostic Performance Framework indicates contingent actions are needed, the Tribes may advocate that actions to implement Snake River dam breaching after 2017 should be initiated.

A.3. The Action Agencies covenant that during the term of this Agreement:

a. The Action Agencies will not support in any manner any suits that challenge the legal sufficiency of the 2008-2017 *United States v. Oregon* Management Plan, its BiOp or implementing RODs.

b. The Action Agencies will not support in any manner actions that undermine the Fish Passage Center provisions of Section II.D.

A.4. Nothing in this Agreement shall be construed by the Parties in any forum to limit or restrict the Parties or their agents or employees from advocating for actions that they believe are required to implement this Agreement. Disputes among the Parties regarding implementation will be handled under the Good Faith and dispute resolutions sections.

A.5. The ability and willingness of the Tribes to enter into an agreement with respect to an FCRPS BiOp is contingent on having a *U.S. v. Oregon* agreement (management plan) of equal duration entered as a Court Order and upon the assumption that NOAA Fisheries will give ESA coverage for the same.[6] In the event the *U.S. v. Oregon* agreement or the implementation of any of its provisions is challenged in Court, the Tribes expect the United States to vigorously defend the final agency action, and the Tribes reserve the right to assert all defenses, counter claims, and to offer any and all evidence, including defenses, counter-claims, cross-claims and evidence related to the FCRPS. If such offers by the Tribes are inconsistent with the forbearance and affirmation of adequacy commitments made in this Agreement, the Action Agencies retain the options of dispute resolution or withdrawal.

[6] "NMFS properly found that, although difficult to quantify, tribal treaty fishing rights were present effects of past federal actions that must be included in the environmental baseline. See 50 C.F.R. 402.02. To quantify (Tribal Treaty fishing) rights and add them to the environmental baseline, NMFS reasonably looked to current harvest levels and assumed that future harvests would be the same." *CSRIA v. Gutierrez,* unpublished memorandum opinion at 2 (9th Cir., April 6, 2007).

B. Affirmation of Adequacy

B.1. This Agreement builds upon and expands the commitments of the Action Agencies called for in the FCRPS and Upper Snake Biological Opinions (the BiOps). This Agreement also takes into account and supports the 2008 - 2017 *United States v. Oregon* Management Plan and its pending BiOp. The Parties support this package of federal and tribal actions as an adequate combined response of these Parties for the ten year duration of the Agreement and BiOps to address the government's duties for:

- conserving listed salmon and steelhead, including avoiding jeopardy and adverse modification of critical habitat under the Endangered Species Act;
- protection, mitigation, enhancement and equitable treatment of fish under the Northwest Power Act; and
- Clean Water Act provisions related to the FCRPS dams.

B.2. The Tribes further agree that:

- the Action Agencies' commitments under this Agreement and the BiOps as to hatchery projects are adequate for 30 years from the effective date of this Agreement, with the exception of the Yakama/Klickitat projects, which are addressed in Section III.B.2, and except that if after year 15 of the 30 year forbearance for hatcheries there is a change in the status of an ESU (e.g., a new listing), or if after year 15 there is new information or changed circumstances that indicate additional hatchery actions are needed to assist in mitigating impacts of the FCRPS consistent with current science and applicable law, the Tribes are not precluded from seeking additional funding from the Action Agencies for hatcheries. If within the year prior to the expiration of this Agreement, due to no fault of the Parties, any capital funded hatchery actions identified in this Agreement have not begun construction, BPA will continue to make the identified capital funding in this Agreement available for the identified project (or projects) for an additional five years at which point the Parties will meet and discuss the disposition of any hatcheries that have not completed construction and the related capital funding.
- the Action Agencies' commitments under this Agreement for lamprey actions are adequate for the duration of this Agreement such that the Tribal parties will not petition to list lamprey or support third party efforts to list lamprey as threatened or endangered pursuant to the ESA.

B.3. The Tribes' determination of adequacy under applicable law is premised on several important assumptions and understandings with which the federal parties to this Agreement concur:

- The specific actions identified in this Agreement and/or funding for such actions is provided by the federal parties in full and timely manner;
- Other actions not specifically identified in this Agreement, but committed to in the FCRPS BiOp, are carried out in a timely manner;
- The biological performance and status of the species affected by the development and operation of the FCRPS and Upper Snake hydroprojects are diligently and comprehensively monitored, analyzed, and reported to the Tribes and others as provided in this Agreement (Sections II.A.1 and II.A.2) and the BiOps; and

- Adaptive management will be used as described in the Section II.A.2 to ensure achievement of performance objectives for the FCRPS. That if during the 2012 or 2015 comprehensive review called for in the BiOps it is found that the status of ESA covered species are not improving as anticipated in the Adaptive Management section of the BA, that the Tribes will have the opportunity to advocate that actions over and above those in the Agreement and/or BiOps should be implemented in the future, consistent with the terms of this Agreement.

B.4. The Tribes agree to affirmatively support the adequacy of the package of federal and tribal actions contained in the BiOps and this Agreement in appropriate forums, including NOAA's administrative record. The Parties expect the United States to continue affirmative support of the *US v. Oregon* BiOp and 2008-2017 Management Plan.

B.5. That the Parties acknowledge that this Agreement does not comprehensively address the Action Agencies' legal obligation related to wildlife under the NWPA. The Parties understand that there are currently differing positions as to what is required to meet NWPA and Program standards for wildlife. The Parties agree that the Tribes may request or advocate for additional terrestrial wildlife protection, mitigation and enhancement funding by BPA under the Northwest Power Act, that BPA may decline such requests, and the Tribes may seek recourse for BPA decisions; none of these actions by the Tribes or BPA will violate the terms of this Agreement.

C. Council Program Amendment Process

C.1. During the term of the Agreement, the Action Agencies and Tribes will submit recommendations or comments or both in relation to Council Program amendments that are consistent with and are intended to effectuate this Agreement. The Tribes and the Action Agencies have agreed to submit the following to the Council in any recommendations or comments each may make for Program amendments solicited in 2008 to describe this Agreement and its role in such Program amendments:

> Description and Rationale: The Action Agencies and the Tribes have agreed to a ten year commitment of actions in support of the Action Agencies' obligations both generally under the Northwest Power Act, as well as specifically for anadromous species listed under the Endangered Species Act. The commitments include support for the actions in the 2008 Biological Opinions for the FCRPS and the Upper Snake. The commitments also include actions already reviewed and recommended by the Council to BPA, as well as expanded and new actions. The Action Agencies and the Tribes have found these commitments consistent with the Program and the Council's intent to integrate Power Act and ESA responsibilities. The expanded and new actions are, moreover, subject to reasonable modifications determined by the Parties to the Agreement based on Council and ISRP review.

The Tribes and the Action Agencies will recommend that the Council amend the Fish and Wildlife Program to incorporate the BiOps and Agreement, consistent with the following approach:

- The actions in the 2008 Biological Opinions for the FCRPS and Upper Snake should be implemented, in conjunction with the FCRPS Action Agencies' Biological Assessment, as measures to protect, mitigate, and enhance listed salmon and steelhead affected by the federal hydro system.
- The actions in the 2008 Memoranda of Agreement between the FCRPS Action Agencies and the Tribes should be implemented per its terms as additional measures to protect, mitigate and enhance both listed and non-listed fish.

C.2. Neither the Tribes, nor the Action Agencies, waive the right to assert that, if adopted by the Council based on its own recommendations, or recommendations of third parties, an amendment that is contrary to this Agreement is either lawful or unlawful under the Northwest Power Act, or any other law, provided they act consistent with the terms of this Agreement.

D. Good Faith Implementation and Support

This Agreement is based on bargained-for consideration. The Parties agree to work together in partnership to implement the mutual commitments in this Agreement. Although neither the Action Agencies nor the Tribes are relinquishing their respective authorities through this Agreement, they commit to make best effort to sit down with each other prior to making decisions in implementation of this Agreement.

The Parties enter into this Agreement cognizant of its scope, duration, and complexity, and commit to its implementation and support at all levels and in all areas, e.g. policy, legal, and technical. Further, the Parties understand that matters explicitly addressed within and/or related to this Agreement are routinely dealt with in a wide variety of contexts and fora, often on short notice and in time-sensitive situations. Even with those understandings, the Parties will vigorously endeavor to implement and support this Agreement in good-faith. Best effort good-faith implementation and support of this Agreement is the general duty to which all Parties agree to be bound. Nonetheless, the Parties understand that from time to time questions or concerns may arise regarding a Party's compliance with the terms of this Agreement. In furtherance of the continuing duty of good faith, each Party agrees that the following specific actions or efforts will be carried out:

D.1 On a continuing basis, it will take steps to ensure that all levels of their government/institution is made aware of the existence of this Agreement and the specific commitments and obligations herein, and emphasize the importance of meeting them;

D.2 Each Party will designate a person to be initially and chiefly responsible for coordinating internal questions regarding compliance with the Agreement;

D.3. Each Party will make best efforts to consult with other Parties prior to taking any action that could reasonably be interpreted as inconsistent with any part of this Agreement. To assist in this, the Parties will designate an initial contact point; the Tribes will designate their legal representatives as their initial contact points, the contacts for the Action Agencies are to be determined. The formality and nature of the consultation will likely vary depending on circumstances. The initial contact points are initially charged with attempting to agree on what

form of consultation is required. In some instances, the contacts between representatives may suffice for the consultation, while in others, they may need to recommend additional steps. The Parties agree that consultations should be as informal and with the least amount of process necessary to ensure that the Parties are fulfilling the good-faith obligation to implement and support the Agreement.

D.4. If a Party believes that another has taken action that is contrary to the terms of the Agreement, or may take such action, it has the option of a raising a point of concern with other Parties asking for a consultation to clarify or redress the matter. The Parties will endeavor to agree upon any actions that may be required to redress the point of concern. If after raising a point of concern and having a consultation the Parties are unable to agree that the matter has been satisfactorily resolved, any Party may take remedial actions as it deems appropriate, so long as those remedial actions do not violate the terms of the Agreement.

E. Changed Circumstances, Renegotiation/Modification, Withdrawal

E.1. The Parties enter into this Agreement with the assumption that NOAA will issue final biological opinions for the FCRPS, Upper Snake, and 2008 – 2017 *United States v. Oregon* Management Plan. The Parties assume these BiOps will conclude that the respective proposed actions, with reasonable and prudent alternatives if any, are not likely to jeopardize the continued existence of any ESA-listed salmon and steelhead or result in the destruction or adverse modification of critical habitat of such species.

E.2 If any court, regardless of appeal, finds that the BiOp or agency action is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law, and subsequently remands the BiOp to NOAA Fisheries, this Agreement shall remain in force. If any court, regardless of appeal, finds that the BiOp or agency action is arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law, the Parties will seek to preserve this Agreement and will meet promptly to determine the appropriate response as described below:

- In the event that a portion(s) of this Agreement is in direct conflict with a court order or resulting amended BiOp, the Parties shall meet and agree on an appropriate amendment to that section, or, if such amendment is not possible under the terms of the court order or resulting amended BiOp, then a substitute provision shall be negotiated by the Parties.

- If court-ordered FCRPS operations or resulting amended BiOp require additional actions that are either financially material to an Action Agency or that materially constrain the Corps or Reclamation from meeting FCRPS purposes, Section IV.E.4 below shall apply. The Parties intend that determinations of materiality will only be made in cases of great consequence.

- The Parties will participate in any court-ordered process or remand consultation in concert with IV.D and IV.E of this Agreement.

- Without limiting the other provisions of this Section IV.E.2, in the case of a court order or resulting amended BiOp that constrains actions in the 2008 – 2017 *United States v. Oregon* Management Plan, the Parties agree that this Agreement shall remain in effect unless a court order or resulting amended BiOp materially constrains the actions in the 2008 – 2017 *United States v. Oregon* Management Plan. The Parties intend that determinations of materiality will only be made in cases of great consequence.

E.3. Regardless of any legal challenge, BPA will take steps to:

- Ensure that the commitments in this Agreement are not modified or reduced based on agency-wide streamlining or other cost-cutting efforts;
- Imbed the estimated cost of implementing this Agreement in the agency's revenue requirement to be recovered through base wholesale power rates;
- Propose and, if established after a Northwest Power Act section 7(i) hearing, exercise rate risk mitigation mechanisms as needed to maintain the funding commitments in this Agreement (e.g., cost recovery adjustment clauses); and
- Consider agency cost reductions, or other measures to maintain the funding commitments in this Agreement.

E.4. In the event of the occurrence of any of the material effects in E.2, or in the event of material non-compliance with the Agreement not resolved by dispute resolution, the affected Party or Parties shall notify the other Parties immediately, identifying why the event is considered material. The Parties shall utilize dispute resolution if there is a disagreement as to whether the event is material. In addition, prior to any withdrawal, the Parties shall first make a good faith effort to renegotiate mutually agreeable modifications to the Agreement. If renegotiation is not successful, the affected Party may notify the other Parties in writing of its intent to withdraw by a date certain. A Party may not withdraw from the Agreement on the basis of its own non-compliance. If renegotiation is not successful, at the time the withdrawal is effective, all funding commitments and/or other covenants made by the withdrawing Party cease, and the withdrawing Party shall have no further rights or obligations pursuant to the Agreement, and reserves any existing legal rights under applicable statutes, including all arguments and defenses, and this Agreement cannot be used as an admission or evidence.

If the affected Party does not withdraw, that Party may challenge in any appropriate forum the asserted non-compliance with the terms of this Agreement, provided that judicial review of disputes arising under this Agreement is limited to BPA.

The Parties may, by mutual agreement, consider negotiations or withdrawal for changed circumstances other than those enumerated above.

If one Party withdraws from the Agreement, any other Party has the option to withdraw as well, with prior notice.

The provisions of this Agreement authorizing renegotiation, dispute resolution, withdrawal, or challenge in appropriate forums provide the sole remedies available to the Parties for remedying changed circumstances or disputes arising out of or relating to implementation of this Agreement.

E.5. Savings. In the event of withdrawal, BPA will continue providing funding for projects necessary for support of BiOp commitments (as determined by the Action Agencies), and will provide funding for other on-going projects or programs that the Parties mutually agree are important to continue.

F. Dispute Resolution

F.1. Negotiation

1.a. The Parties shall attempt in good faith to resolve any dispute arising out of or relating to implementation of this Agreement in accordance with this section and without resort to administrative, judicial or other formal dispute resolution procedures. The purposes of this section is to provide the Parties an opportunity to fully and candidly discuss and resolve disputes without the expense, risk and delay of a formal dispute resolution.

1.b. If the Parties are unable to resolve the dispute through informal dispute resolution, then the dispute shall be elevated to negotiating between executives and/or officials who have authority to settle the controversy and who are at a higher level of management than the person with direct responsibility for administration of this Agreement. All reasonable requests for information made by one Party to the other will be honored, with the Action Agencies treating "reasonable" within the context of what would be released under the Freedom of Information Act.

1.c. In the event a dispute over material non-compliance with the Agreement has not been resolved by negotiation, the affected Party may seek to withdraw or seek review in appropriate forums in accordance with Section IV.E, above.

F.2. Mediation

In the event the dispute has not been resolved by negotiation as provided herein, the disputing Parties may agree to participate in mediation, using a mutually agreed upon mediator. To the extent that the disputing Parties seeking mediation do not already include all Parties to this Agreement, the disputing Parties shall notify the other Parties to this Agreement of the mediation. The mediator will not render a decision, but will assist the disputing Parties in reaching a mutually satisfactory agreement. The disputing Parties agree to share equally the costs of the mediation.

G. Modification

The Parties by mutual agreement may modify the terms of this Agreement. Any such modification shall be in writing signed by all Parties.

V. MISCELLANEOUS PROVISIONS

A. Term of Agreement

Except as otherwise provided regarding hatcheries, see Section IV.B.2, the term of this Agreement will extend from its effective date through the end of fiscal year 2018 which is midnight on September 30, 2018.

B. Applicable Law

All activities undertaken pursuant to this Agreement must be in compliance with all applicable laws and regulations. No provision of this Agreement will be interpreted or constitute a commitment or requirement that the Action Agencies take action in contravention of law, including the Administrative Procedure Act, the National Environmental Policy Act, the Endangered Species Act, Federal Advisory Committee Act, Information Quality Act, or any other procedural or substantive law or regulation. Federal law shall govern the implementation of this Agreement and any action, whether mediated or litigated, brought or enforced.

C. Authority

Each Party to this Agreement represents and acknowledges that it has full legal authority to execute this Agreement.

D. Consistency with Trust and Treaty Rights

Nothing in this Agreement is intended to nor shall in any way abridge, abrogate, or resolve any rights reserved to the Tribes by treaty. The Parties agree that this Agreement is consistent with the treaty rights of the signatory Tribes and the United States' trust obligation to tribes, but does not create an independent trust obligation. The Tribes specifically represent and warrant that no approval of this Agreement by the Secretary of the Interior or the Bureau of Indian Affairs or any other federal agency or official is required in order for the Tribes to execute this Agreement or for this Agreement to be effective and binding upon the Tribes.

E. Effective Date & Counterparts

The effective date of this Agreement shall be the date of execution by the last Party to provide an authorized signature to this Agreement. This Agreement may be executed in counterparts, each of which is deemed to be an executed original even if all signatures do not appear on the same counterpart. Facsimile and photo copies of this Agreement will have the same force and effect as an original.

F. Binding Effect

This Agreement shall be binding on the Parties and their assigns and successors. Each Party may seek dispute resolution in accordance with Sections IV.F, or to withdraw in accordance with Sections IV.E, if the dispute is not resolved. The commitments made by the Parties in this Agreement apply to the Parties, their staff, any persons hired or volunteering for a Party, any representative or organization under a Party's guidance or control, and any person or entity that acts as an agent for a Party, and to participation in all forums (e.g., Tribal participation in the Columbia Basin Fish and Wildlife Authority, Action Agency participation in the Pacific Northwest Coordination Agreement processes). The commitments made by the Parties in this Agreement also includes a commitment not to directly or indirectly support third-party efforts to challenge the adequacy of the BiOps, this Agreement, or the Parties efforts to implement them.

G. No third party beneficiaries are intended by this Agreement.

H. All previous communications between the Parties, either verbal or written, with reference to the subject matter of this Agreement are superseded, and this Agreement duly accepted and approved constitutes the entire Agreement between the Parties.

I. Waiver, Force Majeure, Availability of Funds

I.1. The failure of any Party to require strict performance of any provision of this Agreement or a Party's waiver of performance shall not be a waiver of any future performance of or a Party's right to require strict performance in the future**.**

I.2. No Party shall be required to perform due to any cause beyond its control. This may include, but is not limited to fire, flood, terrorism, strike or other labor disruption, act of God or riot. The Party whose performance is affected by a force majeure will notify the other Parties as soon as practicable of its inability to perform, and will make all reasonable efforts to promptly resume performance once the force majeure is eliminated. If the force majeure cannot be eliminated or addressed, the Party may consider withdrawal pursuant to Sections IV.E and IV.F.

I.3 The actions of the Corps and Reclamation set forth in this Agreement are subject to the availability of appropriated funds. Nothing in this Agreement shall be construed to require the obligation or disbursement of funds in violation of the Anti-Deficiency Act.

J. Notice.

1. Any notice permitted or required by the Good Faith provisions of this Agreement, Section IV.D, may be transmitted by e-mail or telephone to a Party's initial contact points, as that person is defined pursuant to the Good Faith provisions.

2. All other notices permitted or required by this Agreement shall be in writing, delivered personally to the persons listed below, or shall be deemed given five (5) days after deposit in the United States mail, addressed as follows, or at such other address as any Party may from time to time specify to the other Parties in writing. Notices may be

delivered by facsimile or other electronic means, provided that they are also delivered personally or by mail. The addresses listed below can be modified at any time through written notification to the other Parties.

Notices to BPA should be sent to:

Vice President, Environment Fish & Wildlife
Mail Stop KE-4
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Notices to the U.S. Army Corps of Engineers should be sent to:

U.S. Army Corps of Engineers, Northwestern Division
Chief, Planning, Environmental Resources and Fish Policy Support Division
1125 NW Couch Street
Suite 500
P.O. Box 2870
Portland, OR 97208-2870

Notices to the U.S. Bureau of Reclamation should be sent to:

Deputy Regional Director
Bureau of Reclamation
Pacific Northwest Region
1150 N. Curtis Rd., Suite 100
Boise, ID 83706

Notices to the Confederated Tribes of the Umatilla Indian Reservation should be sent to:

Brent H. Hall
Associate Attorney General
Confederated Tribes of the Umatilla Indian Reservation
P.O. Box 638
Pendleton, OR 97801

Notices to the Confederated Tribes of Warm Springs Reservation of Oregon should be sent to:

John W. Ogan
Karnopp Petersen, Attorneys for the Confederated Tribes of the Warm Springs Reservation of Oregon
1201 N.W. Wall Street, Suite 300
Bend, OR 97701-1936

Notices to the Yakama Nation should be sent to:

Ralph Sampson
Chairman
P.O. Box 151
Toppenish, WA 98948

and

Tim Weaver
Attorney for Yakama Nation
Weaver Law Office
The Tower, 402 E Yakima Ave Ste 190
Yakima, WA 98901

Notice Notices to the Columbia River Inter-Tribal Fish Commission should be sent to:

Rob Lothrop
Columbia River Inter-Tribal Fish Commission
729 NE Oregon
Portland, OR 97232

K. List of Attachments

Attachment A: Passage Standards
Attachment B: Project Commitment Spreadsheets
Attachment C: Group B Steelhead Package
Attachment D: Spring Creek Hatchery Commitments
Attachment E: Forecasting Commitments
Attachment F: Canadian Treaty Commitments
Attachment G: Biological Benefits Analysis
Attachment H: In Lieu Requirements

SIGNATURES

/s/ Stephen J. Wright — *May 2, 2008*

Stephen J. Wright — Date
Administrator and Chief Executive Officer
Bonneville Power Administration

/s/ Steven R. Miles, P.E. — *May 2, 2008*

Steven R. Miles, P.E. — Date
Colonel, U.S. Army Corps of Engineers
Division Commander

/s/ Tim Personius — *May 2, 2008*

(for) J. William MacDonald — Date
Regional Director
U.S. Bureau of Reclamation
Pacific Northwest Region

/s/ Antone Minthorn — *May 2, 2008*

Antone Minthorn — Date
Chairman, Board of Trustees
Confederated Tribes of the Umatilla Indian Reservation

/s/ Ron Suppah *May 2, 2008*

Ron Suppah, Chair Date
Tribal Council
Confederated Tribes of the Warm Springs Reservation

/s/ Ralph Sampson *May 2, 2008*

Ralph Sampson, Chair Date
Tribal Council
Confederated Tribes and Bands of the Yakama Nation

/s/ Fidelia Andy *May 2, 2008*

Fidelia Andy, Chair Date
Columbia River Inter-Tribal Fish Commission

/s/ Rebecca A. Miles *May 9, 2008*

(for) Gary Green, Secretary Date
Columbia River Inter-Tribal Fish Commission

ATTACHMENT A

Attachment A

The following describes the commitment from the Action Agencies for achieving dam performance on a per project basis for the course of the Agreement. The information for each project includes recent operations and dam survival performance standards to be achieved prior to making potential reductions in spill, as well as additional performance metrics to be considered, as provided below.

Dam Survival Performance Standard

Dam survival is the overarching performance standard. The dam passage performance standard is to meet 96% dam passage survival for yearling Chinook and steelhead and 93% for subyearling Chinook and achievement of the standard is based on two years of empirical survival data (see Table 1 on the following page) as set out in FCRPS BA Appendix B.2.6-2-6, section 3.3 and the draft BiOp dated October 30, 2007.

Spill Passage Efficiency and Delay Metrics

Spill passage efficiency (SPE) and delay metrics under current spill conditions, as shown below in the Table 1, are not expected to be degraded ("no backsliding") with installation of new fish passage facilities at the dams. If maintaining SPE and/or passage delay metrics would reduce dam survival or impede achievement of the dam survival performance standards, operations (including spill as necessary) may be adjusted to meet dam survival performance. This provision does not apply at projects where SPE or delay are not currently known and so are not specified in Table 1, but future research, monitoring and evaluation of the metrics is expected at all of those projects.

Future Research, Monitoring and Evaluation

The Action Agencies' dam survival studies for purposes of determining juvenile dam passage performance will also collect information on SPE, BRZ to BRZ survival and delay as well as other distribution and survival information. SPE and delay metrics will be considered in the performance check-ins or with COP updates, but not as principle or priority metrics over dam survival performance standards. Once a dam meets the survival performance standard, SPE and delay metrics may be monitored coincidentally with dam survival testing.

The Action Agencies retain the ability to make adjustments in spill levels as needed to maintain dam survival performance pending further configuration improvements. The specific dam passage testing requirements will continue to be coordinated through the Anadromous Fish Evaluation Program annual process.

ATTACHMENT A

Table 1. Current estimates of dam survival (COMPASS and empirical), spill passage efficiency, and delay.

	Project	Current Survival (COMPASS)	2006 Survival (Empirical)	2007 Survival (Empirical)	Most Recent SPE[4]	Date of SPE Data Source	Most Recent Median Delay*
Yearling Chinook	LGR	96.1	97.5	na	43-66	2002-2005	2.28 -10h
	LGS	95.6	95.5	99.7	57-82	2006-2007	4.4 - 6.5h
	LMN	93.6	94.3	95.2	58-75	2006-2007	2.2 - 3.0h
	IHR[1]	96.6	96.1 / 96.2	94.9 / 95.8	73->90	2005-2007	1.1 - 2.3h
	MCN	94.2	94.0	92.8 /93.0	45-57	2005,2007	1.0 - 3.9 h
	JDA[5]	93.9	92.9/96.3	92.2/94.0	48-75	99,00,02,03	0.2 - 8.5 h
	TDA[6]	91.4	91.0	93.0	70->90	2002-2005	0.51 - 0.70h
	BON[7]	97.1	95.1	96.6	53-54	2004-2005	0.01 - 3.4 h
Steelhead	Project	Current Survival (COMPASS)	2006 Survival (Empirical)	2007 Survival (Empirical)	Most Recent SPE[4]	Date of SPE Data Source	Most Recent Median Delay*
	LGR	96.2	97.6	na	51-74	2002-2005	1.7 - 6.0h
	LGS	95.9	98.5	98.5	36-51	2006-2007	5.5 - 36.3h
	LMN	93.2	100.0	95.5	48-64	2006-2007	5.5 - 19.0h
	IHR[1]	98.8	100 / 100	97.3 / 96.4	61->90	2005-2007	1.1 - 1.9h
	MCN	95.2	na	na	52-78	2005,2007	4.38 - 10.2 h
	JDA[5]	91.7	95.7/90.4	94.0/91.5	45-64	99-00,03	0.3 - 13.4h
	TDA[6]	92.3	na	na	90**	2002-2005	0.23 - 0.8h
	BON[7]	97.2	99.1	96.3	74-75	2004-2005	0.01 - 9.7h
Subyearling Chinook	Project	Current Survival (COMPASS)	2006 Survival (Empirical)	2007 Survival (Empirical)	Most Recent SPE[4]	Date of SPE Data Source	Most Recent Median Delay*
	LGR	na	91.4	na	67-88	2005-2007	8.37 - 15.87
	LGS	na	94.2	90.5	58-84	2006-2007	6.8 - 16.3h
	LMN	na	95.0	84.2	81->90	2005-2007	2.7-3.0h
	IHR	na	95.2	95.6	84->90	2005-2007	2.0- 5.0h
	MCN	na	96.0	96.1 / 89.5	61-64	2005,2007	0.84 - 3.2h
	JDA[5]	na	92.8/99.2	92.2/94.0	58-59	99,00,02,03	1 - 3h
	TDA[6]	na	82.0	90.0	63->90	2002-2005	0.62 - 0.69h
	BON[7]	na	89.1	93.8	55-75	2004-2005	0.01 - 5.7 h

1 – 30% 24-hour spill / 45 kcfs day, Gas Cap night
2- Green shading indicates that the dam survival performance standard has been met at that project for that species.
3 – Current COMPASS survival numbers may change upon completion of final modeling.
4-Sources and assumptions are attached at the end of this document
5-JDA Empirical survival-yearling and subyearling data is from 2002 and 2003. Steelhead is from 2000 and 2002
6-TDA Empirical survival is from 2004 and 2005
7-BON Empirical survival is from 2004 and 2005
*See notes under assumptions regarding specific delay measurements
**-Two years of steelhead data both measured 90% SPE at The Dalles so there is no range

<u>Sources and Assumptions for SPE and Delay Estimates in Table 1:</u>

***Lower Granite Dam**:*

- SPE estimates include both RSW and standard spill.
- Forebay Residence Time measured from 2km upstream to face of dam.
    - 2005 Spring Estimates were based on Figure 26 from Perry et al, 2007. RSW treatment only.
    - Range of point estimates in 2003 was 0.5 hours to 103.8 hours for yearling Chinook, 0.07 to 146.61 hours for steelhead (wild and hatchery combined)
    - 05 range for yearling Chinook was from near 0 to approx 60 h. Steelhead ranged from near zero to approx 42 h.
    - In 2005, delay ranged from 0.89 to 206.17 hours for subyearling Chinook.
    - Forebay estimates only calculated when RSW was operating
    - Sub-yearling estimates are estimated from J. Beeman's 2006 AFEP presentation. 05 and 07 estimates fell with the range of the 03 and 06 estimates.

Beeman, J., T. Counihan, A. Braatz, S. Fielding, J. Hardiman, H. Hansel, A. Pope, A. Puls, J. Schei, C. Walker, and T. Wilkerson. 2006. Migration Characteristics of Juvenile Salmonids in the Forebay of Lower Granite Dam During Removable Spillway Weir (RSW) and Behavioral Guidance Structure (BGS) tests, in 2006. Preliminary Data Presented at 2006 AFEP review in Portland, OR.

Counihan, T., A. Puls, J. Hardiman, C. Walker, and I. Duran. 2007. Survival and Migration Behavior of Subyearling Chinook Salmon Passing Lower Granite Dam, 2007. Preliminary Data presented at 2007 AFEP Review. Walla Walla, WA.

Perry, R.W., T.J. Kock, M.S. Novick, A.C. Braatz, S.D. Fielding, G.S. Hansen, J.M. Sprando, T.S. Wilkerson, G.T. George, J.L. Schei, N.S. Adams, and D.W. Rondorf. 2007. Survival and Migration Behavior of Juvenile Salmonids at Lower Granite Dam, 2005. Final Report.

Plumb, J.M., A.C. Braatz, J.N. Lucchesi, S.D. Fielding, A.D. Cochran, T.K. Nation, J.M. Sprando, J.L. Schei, R.W. Perry, N.S. Adams, and D.W. Rondorf. 2004. Behavior and Survival of Radio-Tagged Juvenile Chinook Salmon and Steelhead Relative to the Performance of a Removable Spillway Weir at Lower Granite Dam, Washington, 2003. Final Report.

***Little Goose Dam**:*

- Forebay Residence Time measured from 2km upstream to face of dam.
    - Yearling Chinook and Steelhead estimates in table 1 represent the ave median residence time of spill, bypass, and turbine estimates during spill. Taken from appendix table C1 in Perry et al. 2007.

- Range of point estimates in 2005 was 1.3 hours to 221.41 hours for yearling Chinook, 0.27 hours to 101.43 hours for steelhead, and 0.7 hours to 100.12 hours for subyearlings. Point estimates ranged from near 0 residence time to over 200 hours in 2007.
- 05 usually set the low end of residence time range for all three species.
- 06 was very close to values that were previously in table and usually fell within 05 and 07 estimates.
- 07 steelhead was high end of range and was estimated from 07 AFEP powerpoint presentation (assumed 22hr median delay for both gas cap and bulk 2 treatment, assumed 63 hr for bulk 1 treatment).
- 07 sub-yearling was high end of range. Also based on 07 AFEP powerpoint. Assumed 18.75h for bypass and 12.5h for spill and turbine.

Beeman, J.W., A.C. Braatz, S.D. Fielding, H.C. Hansel, S.T. Brown, G.T. George, P.V. Haner, G.S. Hansen, and D.J. Shurtleff. 2007. Migration Behavior and Survival of Juvenile Salmonids at Little Goose Dam, 2007. Preliminary data reported at 2007 AFEP review in Walla Walla, WA.

Beeman, J., T. Counihan, A.Braatz, S. Fielding, J. Hardiman, H. Hansel, A. Pope, A. Puls, A. Schei, C. Walker, and T. Wilkerson. 2006. Passage, Survival, and Approach Patterns of Juvenile Salmonids at Little Goose Dam, 2006. Preliminary data reported at 2006 AFEP review in Portland, OR.

Perry, R.W., M.S. Novick, A.C. Braatz, T.J. Kock, A.C. Pope, D.J. Shurtleff, S.N. Lampson, R.K. Burns, N.S. Adams, and D.W. Rondorf. 2007. Survival and migration behavior of juvenile salmonids at Little Goose Dam, 2005. Final Report.

Lower Monumental Dam:

- Forebay Residence Time measured from X km upstream to face of dam.
  - High est. for yearling Chinook came from 06 and 07 AFEP review, and steelhead was from 07 AFEP Review. Highest for subs came from 05 and 07 AFEP review, low was from 06.
  - Range of yearling data from 0 to 42 hrs in 06, from 0 to over 100hrs for steelhead in 07, and for sub-yearlings residence time ranged from near 0 to 156 h in 05.

E.E. Hockersmith, G.A. Axel, D.A. Ogden, R.F. Absolon, and B.P. Sandford. 2007. Passage Behavior and Survival for Radio-Tagged Sub-yearling Chinook Salmon at Lower Monumental Dam, 2006. Preliminary Data presented at 2006 AFEP review in Portland, OR.

E.E. Hockersmith, G.A. Axel, D.A. Ogden, R.F. Absolon, and B.P. Sandford. 2007. Passage Behavior and Survival for Radio-Tagged Sub-yearling Chinook Salmon at Lower Monumental Dam, 2007. Preliminary Data presented at 2007 AFEP review in Walla Walla, WA.

R.F. Absolon, E.E. Hockersmith, G.A. Axel, D.A. Ogden, B.P. Sandford, and S.G. Smith. 2007. Passage Behavior and Survival for Radio-Tagged Sub-yearling Chinook Salmon at Lower Monumental Dam, 2007. Preliminary Data presented at 2007 AFEP review in Walla Walla, WA.

R.F. Absolon, E.E. Hockersmith, G.A. Axel, D.A. Ogden, B.P. Sandford, and S.G. Smith. 2006. Passage Behavior and Survival for Radio-Tagged Sub-yearling Chinook Salmon at Lower Monumental Dam, 2006. Preliminary Data presented at 2006 AFEP review in Portland, OR.

R.F. Absolon, E.E. Hockersmith, G.A. Axel, D.A. Ogden, B.P. Sandford, and S.G. Smith. 2005. Passage Behavior and Survival for Radio-Tagged Sub-yearling Chinook Salmon at Lower Monumental Dam, 2005. Preliminary Data presented at 2005 AFEP review in Walla Walla, WA.

Ice Harbor Dam:

- All SPE estimates combine RSW and standard spill efficiency. 2007 preliminary data was considered but all estimates fell within the ranges prescribed by the 2005 and 2006 data.
- Forebay Residence Time measured from upstream BRZ to face of dam.
    - Only RSW treatment was considerend for 05 spring data
    - High est. for yearling Chinook came from 05 RSW treatment, and steelhead was from 06 30% treatment. Low est for both spring species was for 06 BiOp spill. High est for subs came from 05, low was from 06 (based on Ogden's 2007 AFEP presentation).
    - High end of 90% percentile residence times was greater than 25hrs for both yearling chinook and steelhead in 2005. Max. residence times of subs was approx 150hrs in 2005.

Axel, G.A., E.E. Hockersmith, D.A. Ogden, B.J. Burke, K. Frick, B.P. Sandford, and W.D. Muir. 2007. Passage Behavior and Survival of Radio-Tagged Yearling Chinook Salmon and Steelhead at Ice Harbor Dam, 2006. Draft report dated Sept. 2007.

Axel, G.A., E.E. Hockersmith, D.A. Ogden, B.J. Burke, K. Frick, and B.P. Sandford. 2007. Passage Behavior and Survival of Radio-Tagged Yearling Chinook Salmon and Steelhead at Ice Harbor Dam, 2005. Final Report.

Ogden, D.A., E.E. Hockersmith, Axel, G.A., R.F. Absolon, and B.P. Sandford. 2006. Passage Behavior and Survival of Sub-yearling Chinook Salmon at Ice Harbor Dam, 2006. Preliminary Data presented at 2006 AFEP review in Portland, OR.

Ogden, D.A., E.E. Hockersmith, Axel, G.A., R.F. Absolon, B.P. Sandford, S.G. Smith, and D.B. Dey. 2005. Passage Behavior and Survival of Sub-yearling Chinook Salmon at Ice

Harbor Dam, 2005. Preliminary Data presented at 2005 AFEP review in Walla Walla, WA.

McNary Dam:

- 2007 SPE includes TSWs.
- 2006 data was not used due to continued analysis by USGS. The preliminary data previously presented from 2006 is expected to change, possibly significantly with the draft final report.
- High Delay estimates for yearling Chinook, steelhead, and subyearlings were from **2005** and were **measured from 2km upstream**. Low estimates were from **2007** and were **measured from 60m upstream**.
    - 2005 residence times ranged from 0.84 to 171.87 hrs for yearling Chinook, from 1.07 to 135.35 hrs for steelhead, and from 0.78 to 2.28 hours for sub-yearling Chinook during court ordered spill.
    - 2007 residence times ranged from 0.002 to 5.997 hrs for yearling Chinook, 0.003 to 4.176 hours for steelhead, and from 0.001 to 12.838 hours for sub-yearling Chinook.

Adams, N.S. and T.D. Counihan. 2008. Survival and Migration Behavior of Juvenile Salmonids and McNary Dam, 2007. Draft Report dated Feb 12, 2008.

Perry. R.W., A.C. Bratz, M.C. Novick, J.L. Lucchesi, G.L. Rutz, R.C. Koch, J.L.Schei, N.S. Adams, and D.W. Rondorf. 2007. Survival and Behavior of Juvenile Salmonids at McNary Dam, 2005. Final Report.

John Day Dam:

- Chinook SPE estimates are from 1999,2000,2002, and 2003. Steelhead SPE estimates are from 1999,2000, and 2002.
- Forebay Residence Time measured from 100m upstream to face of dam.
    - High est. for yearling Chinook came from 2000 0/45 daytime treatment. High steelhead was from 2004 30% treatment. Low est for yearling Chinook and steelhead were both from 2000 0/45 night treatment. High est for subs came from 2003 0/60 daytime estimate, low was from 2002 0/60 treatment.

John Day Lock and Dam Configuration and Operation Plan. April 2007.

Delay estimates summarized by Mike Langsley and submitted to COMPASS dam passage group.

The Dalles Dam:

- SPE estimates include sluiceway efficiency as well as spill efficiency. Data collected from 2002-2005.
- Forebay Residence Time measured from approx. 100m upstream to face of dam.
    - All estimates are from 2002-2005. There is very little variability among years.

Johnson, G.E., J.W. Beeman, I.N. Duran, and A.L. Puls. 2007. Synthesis of Juvenile Salmonid Passage Studies at The Dalles Dam- Volume II: 2001-2005. Final Report.

Bonneville Dam:

- SPE estimates based on Spill efficiency and B2CC efficiency only. B1 sluiceway is not included in these estimates. Estimates are from 2004 and 2005.
- Forebay Residence Time measured from approx. 100m upstream to face of dam.
    - Data from 2001 was excluded.
    - Yearling and subyearling all had residence times less than one hour for all routes other than B1 when B2 was priority.
    - The high estimate for steelhead was from also from B1, but steelhead had a high estimate of 6.4 hours in the forebay of B2.

Ploskey, G.R., G.E. Johnson, A.E. Giorgi, R.L. Johnson, J.R. Stevenson, C.R. Schilt, P.N. Johnson, and D.S. Pattersion. 2007. Synthesis of Biological Research on Juvenile Fish Passage and Survival at Bonneville Dam through 2005. Final Report.

PROJECT BUDGET SUMMARY

Expense Category	Avg. Annual Expense
Category 1	**$15,185,295**
Category 2c-ongoing	**$1,908,023**
Subtotal - Ongoing	**$17,093,318**
Category 2a	**$8,167,217**
Category 2b	**$2,235,353**
Category 2c	**$3,462,119**
Category 3	**$4,372,218**
Supplemental	**$490,000**
Lamprey	**$1,866,000**
Subtotal - Non AP Expense	**$37,686,225**
Art Prod Existing/ Expanded	**$10,051,971**
Art prod new	**$3,875,800**
Subtotal - AP O&M	**$13,927,771**
Total	**$51,613,997**

Capital Funding	10- Year Total Amount
Non AP Capital	**$52,111,712**
Art Prod Capital	**$80,112,006**
Total	**$132,223,718**

Non-AP Expense Categories

ATTACHMENT B

Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
Category 1								
Existing	Category 1	199608300	CTUIR Grande Ronde Subbasin Restoration Project	CTUIR	Blue Mountain	Grande Ronde	Habitat	$190,000
Existing	Category 1	200003100	North Fork John Day Basin Anadromous Fish Habitat Enhancement Project	CTUIR	Columbia Plateau	John Day	Habitat	$249,000
Existing	Category 1	198902700	Power Repay Umatilla Basin Project	CTUIR	Columbia Plateau	Umatilla	Habitat	$1,150,000
Existing	Category 1	198710001	Umatilla Anad Fish Hab – CTUIR	CTUIR	Columbia Plateau	Umatilla	Habitat	$326,000
Existing	Category 1	198802200	Umatilla Fish Passage Operations	CTUIR	Columbia Plate	Umatilla	Habitat	$362,164
Existing	Category 1	199601100	Walla Walla Juvenile and Adult Passage Improvements (expense)	CTUIR	Columbia Plate	Walla Walla	Habitat	$21,600
Existing	Category 1	199604601	Walla Walla River Basin Fish Habitat Enhancement	CTUIR	Columbia Plate	Walla Walla	Habitat	$337,710
Existing	Category 1	200003300	Walla Walla River Fish Passage Operations	CTUIR	Columbia Plate	Walla Walla	Habitat	$89,000
Existing	Category 1	200203000	Develop Progeny Marker for Salmonids to Evaluate Supplementation	CTUIR	Columbia Plateau	Umatilla	RM&E	$297,000
Existing	Category 1	199000501	Umatilla Basin Natural Production Monitoring and Evaluation Project	CTUIR	Columbia Plate	Umatilla	RM&E	$420,129
Existing	Category 1	200003900	Walla Walla Subbasin Collaborative Salmonid Monitoring & Evaluation Project (CTUIR & WDFW)	CTUIR	Columbia Plate	Walla Walla	RM&E	$713,796
Existing	Category 1	199506001	Iskuulpa Watershed Project	CTUIR	Columbia Plateau	Umatilla	Wildlife	$200,000
Existing	Category 1	200002600	Rainwater Wildlife Area Operations and Maintenance	CTUIR	Columbia Plate	Walla Walla	Wildlife	$300,000
Existing	Category 1	199009200	Wanaket Wildlife Area	CTUIR	Columbia Plate	Umatilla	Wildlife	$250,000
Existing	Category 1	199802101	Hood River habitat program	CTWSRO	Columbia Gorg	Hood river/ fifteen mile	Habitat	$139,000
Existing	Category 1	200104101	Forrest conservation area	CTWSRO	Columbia Plate	Upper Mainstem John	Habitat	$206,635
Existing	Category 1	199801800	John Day Watershed Restoration program	CTWSRO	Columbia Plate	MF John Day	Habitat	$350,929
Existing	Category 1	200001500	Oxbow Conservation area	CTWSRO	Columbia Plate	MF John Day	Habitat	$200,070
Existing	Category 1	198805303	Hood river Production M&E	CTWSRO	Columbia Gorg	Hood river/ fifteen mile	RM&E	$502,103
Existing	Category 1	199802200	Pine Creek wildlife conservation area	CTWSRO	Columbia Plate	lower John Day	Wildlife	$210,000
Existing	Category 1	199603501	Yakama Reservation Watersheds Project	YN	Columbia Plate	Yakima	Habitat	$1,086,458
Existing	Category 1	199705100	Yakima Basin Side Channels	YN	Columbia Plate	Yakima	Habitat	$500,000
Existing	Category 1	198812035	YKFP Klickitat Management, Data, and Habitat	YN	Columbia Plate	Klickitat	Habitat	$461,666
Existing	Category 1	198812025	YKFP Management, Data, Habitat	YN	Columbia Plate	Yakima	Habitat	$1,237,239
Existing	Category 1	199506325	Yakima Klickitat Fisheries Project - Monitoring And Evaluation	YN	Columbia Plate	Yakima	RM&E	$4,100,251
Existing	Category 1	199506335	YKFP - Klickitat Subbasin Monitoring and Evaluation	YN	Columbia Gorg	Klickitat	RM&E	$520,000
Existing	Category 1	199206200	Yakama Nation - Riparian/Wetlands Restoration (O&M)	YN	Columbia Plate	Yakima	Wildlife	$764,545
								$15,185,295
Category 2a								
Expanded	Category 2.a.	199608300	CTUIR Grande Ronde Subbasin Restoration Project	CTUIR	Blue Mountain	Grande Ronde	Habitat	$399,500
Expanded	Category 2.a.	198710001	Umatilla Anad Fish Hab – CTUIR	CTUIR	Columbia Plate	Umatilla	Habitat	$842,300
Existing	Category 2.a.	199206200	Yakama Nation - Riparian/Wetlands Restoration (acquisition)	YN	Columbia Plate	Yakima	Habitat	$750,000

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Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
Expanded	Category 2.a.	199705100	Yakima Basin Side Channels	YN	Columbia Plate	Yakima	Habitat	$400,000
New	Category 2.a.	New	BOR Reach Complex Side channel reconnection, LWD recruitment, levee removal, riparian restoration with an emphasis in the lower Twisp River.	YN	Columbia Cascade	Methow	Habitat	$80,000
New	Category 2.a.	New	Design and build in-channel pool forming structures in main stem Entiat for juvenile rearing and spawning habitat.	YN	Columbia Cascade	Entiat	Habitat	$120,000
New	Category 2.a.	New	Reconnect main stem Wenatchee River side channel at Monitor in Lower Wenatchee Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$50,000
New	Category 2.a.	New	Install rock gravel catchers to promote gravel recruitment and spawning gravels on Mad River	YN	Columbia Cascade	Entiat	Habitat	$10,000
New	Category 2.a.	New	Continue hatchery carcass out planting and/or use of nutrient analogs in mid- and lower Entiat main stem.	YN	Columbia Cascade	Entiat	Habitat	$15,000
New	Category 2.a.	New	Add log and rock complexes to identified small tributary channels at key stream locations to reactivate floodplain where appropriate.	YN	Columbia Cascade	Methow	Habitat	$30,000
New	Category 2.a.	New	Install stream structures to increase thalwag depth on lower Peshastin Creek.	YN	Columbia Cascade	Wenatchee	Habitat	$30,000
New	Category 2.a.	New	BOR Reach Complex riparian reconnection / floodplain function - side channel improvements for the Methow River with an emphasis on reaches between Carlton to Weeman Bridge.	YN	Columbia Cascade	Methow	Habitat	$60,000
New	Category 2.a.	New	BOR Reach complexity and side channel development, Early Winters fan to Gate Creek	YN	Columbia Cascade	Methow	Habitat	$200,000
New	Category 2.a.	New	Culvert Replacement (11-13 structures) at private landowner access in Chumstick watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$83,000
New	Category 2.a.	New	BOR Reach Complex - Restore Primarily side channel and increase habitat complexity in the Chewuch River.	YN	Columbia Cascade	Methow	Habitat	$130,000
New	Category 2.a.	New	Add nutrients using hatchery carcasses and/or carcass analogs - 9-watersheds identified	YN	Columbia Cascade	Wenatchee	Habitat	$68,000
New	Category 2.a.	New	Assess and inventory mill ponds in Middle Methow River reaches (and others) in relationship to providing additional main stem spawning and rearing habitat (acclimation, off-channel habitat, etc)	YN	Columbia Cascade	Methow	Habitat	$7,500
New	Category 2.a.	New	BOR Reach Complex - Modify levees, riparian restoration, LWD recruitment and side channel reconnection with an emphasis in the upper Twisp River Watershed.	YN	Columbia Cascade	Methow	Habitat	$80,000
New	Category 2.a.	New	Assess potential temperature refugia, (using FLIR and temperature profiles) to identify important summer/winter juvenile rearing areas for future protection and restoration actions.	YN	Columbia Cascade	Methow	Habitat	$17,500
New	Category 2.a.	New	Protect cottonwood forests, and replant unused riparian agricultural areas where feasible in lower Methow River reaches.	YN	Columbia Cascade	Methow	Habitat	$50,000
New	Category 2.a.	New	Protection Riparian and Floodplain in Middle Methow River with general emphasis from Carlton to Weeman Bridge.	YN	Columbia Cascade	Methow	Habitat	$200,000
New	Category 2.a.	New	Implement Ecosystem Diagnosis and Treatment (EDT) Alternative 5 related to side-channel options.	YN	Columbia Cascade	Entiat	Habitat	$60,000
New	Category 2.a.	New	Culvert replacement Clear Creek (2)	YN	Columbia Cascade	Wenatchee	Habitat	$6,000
New	Category 2.a.	New	Improve Irrigation delivery and use efficiency at Dryden Ditch, Pioneer and Jones/Shotwell (Efficiency)	YN	Columbia Cascade	Wenatchee	Habitat	$50,000

Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
New	Category 2.a.	New	Work with willing landowners to protect larger, undisturbed riparian areas by first pursuing conservation easement, lease, and options other than outright property acquisition	YN	Columbia Cascade	Entiat	Habitat	$110,000
New	Category 2.a.	New	Culvert replacement Alder Creek and Misc. for Chiwawa Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$45,000
New	Category 2.a.	New	Programmatic Riparian Floodplain Habitat Protection Program for Wenatchee Subbasin.	YN	Columbia Cascade	Wenatchee	Habitat	$1,200,000
New	Category 2.a.	New	Reconnect main stem Wenatchee River side channel at Sleepy Hollow in Lower Wenatchee Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$50,000
New	Category 2.a.	New	Develop lower Nason Creek Restoration Plan	YN	Columbia Cascade	Wenatchee	Habitat	$41,000
New	Category 2.a.	New	Restoration (on National Forests and Private lands) of riparian and channel conditions to relieve sediment inputs in Chiwawa River Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$6,000
New	Category 2.a.	New	Riparian Floodplain Habitat Protection Program with an emphasis in lower reaches of Methow River.	YN	Columbia Cascade	Methow	Habitat	$1,200,000
New	Category 2.a.	New	UPA Project - Programmatic Methow Basin Riparian Enhancement and re-establishment with an emphasis in key tributary streams.	YN	Columbia Cascade	Methow	Habitat	$110,864
New	Category 2.a.	New	UPA Project - Programmatic Implementation of Habitat Complexity Projects in the Methow River Subbasin in areas not already identified.	YN	Columbia Cascade	Methow	Habitat	$499,500
New	Category 2.a.	New	Assess, design and build large wood structures for habitat diversity in Upper Wenatchee Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$218,000
New	Category 2.a.	New	Reconnect main stem Wenatchee River side channel Cashmere in Lower Wenatchee Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$50,000
New	Category 2.a.	New	North Road culvert passage: provide year-around passage through North Road culvert on Chumstick Creek.	YN	Columbia Cascade	Wenatchee	Habitat	$50,000
New	Category 2.a.	New	Design and implement Engineered Log Jams in the Upper Methow, Early Winters Creek and Lost River; identify areas, to increase and diversify key spawning and rearing habitat.	YN	Columbia Cascade	Methow	Habitat	$60,000
New	Category 2.a.	New	Assess, design and implement Instream structures in various smaller tributary streams	YN	Columbia Cascade	Methow	Habitat	$14,000
New	Category 2.a.	New	Entiat River - UPA - Lower Entiat River Off-Channel Restoration Project	YN	Columbia Cascade	Entiat	Habitat	$15,997
New	Category 2.a.	New	Evaluate NF (National Forest) riparian roads and develop restoration plan in upper Peshastin Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$15,000
New	Category 2.a.	New	Culvert replacement Clear Creek (1)	YN	Columbia Cascade	Wenatchee	Habitat	$3,000
New	Category 2.a.	New	Identify, Protect and Restore areas providing thermal refugia in the lower Methow reaches.	YN	Columbia Cascade	Methow	Habitat	$25,000
New	Category 2.a.	New	Programmatic Stream Bank Restoration in the Icicle Creek Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$65,000
New	Category 2.a.	New	Replace culverts at Beaver Creek in Upper Wenatchee Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$20,000
New	Category 2.a.	New	Riparian Floodplain Habitat Protection Program with an emphasis in upper reaches/tributaries of Methow River.	YN	Columbia Cascade	Methow	Habitat	$130,000
New	Category 2.a.	New	UPA Entiat Subbasin Riparian Enhancement Program	YN	Columbia Cascade	Entiat	Habitat	$73,557
New	Category 2.a.	New	Increase irrigation delivery and on-site efficiencies in Peshastin Creek watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$54,500
New	Category 2.a.	New	Restoration 30%+ of lineal stream area - Upper Methow tributaries with emphasis on Wolf Creek and Hancock Springs.	YN	Columbia Cascade	Methow	Habitat	$12,000
New	Category 2.a.	New	Increase pool quality and quantity in Nason Creek Watershed by installing in-channel structures.	YN	Columbia Cascade	Wenatchee	Habitat	$250,000
New	Category 2.a.	New	Programmatic Side/Off channel reconnections and restoration in the Nason Creek Watershed.	YN	Columbia Cascade	Wenatchee	Habitat	$110,000
								$8,167,217

Category 2b

Existing	Category 2.b.	200139100	Conservation Enforcement	CRITFC	mainstem	Multiple	Harvest	$450,000

Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
Expanded	Category 2.b.	200003100	North Fork John Day Basin Anadromous Fish Habitat Enhancement Project	CTUIR	Columbia Plateau	John Day	Habitat	$261,450
Expanded	Category 2.b.	199604601	Walla Walla River Basin Fish Habitat Enhancement	CTUIR	Columbia Plate	Walla Walla	Habitat	$554,596
Expanded	Category 2.b.	200003399	Walla Walla River Fish Passage Operations	CTUIR	Columbia Plate	Walla Walla	Habitat	$35,784
Existing	Category 2.b.	200739000	Conservation Enforcement	CTUIR	Columbia Plateau	UM, WW, GR, JD	Harvest	$150,000
Expanded	Category 2.b.	200104101	Forrest conservation area	CTWSRO	Columbia Plate	Upper Mainstem John	Habitat	$69,581
Expanded	Category 2.b.	199802101	Hood River habitat program	CTWSRO	Columbia Gorg	Hood river/ fifteen mile	Habitat	$188,892
Expanded	Category 2.b.	199801800	John Day Watershed Restoration program	CTWSRO	Columbia Plate	Upper Mainstem John	Habitat	$163,525
Expanded	Category 2.b.	200001500	Oxbow Conservation area	CTWSRO	Columbia Plate	MF John Day	Habitat	$79,675
New	Category 2.b.	New	Deschutes River restoration program	CTWSRO	Columbia Plate	Lower Deschutes	Habitat	$281,850
								$2,235,353

Category 2c

New	Category 2.c.	new	GSI to Evaluate Catch	CRITFC	Mainstem	Multiple	Harvest	$400,000
New	Category 2.c.	new	Expanded Tribal Catch Sampling	CRITFC	Mainstem	Multiple	Harvest	$75,000
New	Category 2.c.	new	Sockeye Studies	CRITFC	Multi-province	Multiple	RM&E	$225,000
New	Category 2.c.	new	Sturgeon Genetics	CRITFC	Mainstem	Multiple	Sturgeon	$40,000
Expanded	Category 2.c.	200708300	Grande Ronde Cooperative Salmonid Monitoring and Evaluation Project	CTUIR	Blue Mountain	Grande Ronde	RM&E	$44,995
Expanded	Category 2.c.	199000501	Umatilla Basin Natural Production Monitoring and Evaluation Project	CTUIR	Columbia Plate	Umatilla	RM&E	$354,179
Existing	Category 2.c.	200003800	NEOH Walla Walla Hatchery - Three Step Master Planning Process (M&E beginning in 2011)	CTUIR	Columbia Platea	Walla Walla	RM&E	$352,778
Expanded	Category 2.c.	198805303	Hood river Production M&E	CTWSRO	Columbia Gorg	Hood river/ fifteen mile	RM&E	$48,800
Expanded	Category 2.c.	199802200	Pine Creek wildlife conservation area	CTWSRO	Columbia Plate	lower John Day	wildlife	$152,162
New	Category 2.c.	New	siteability index for wildlife habitat on the reservation	CTWSRO	Columbia Plate	Lower Deschutes	wildlife	$9,000
Expanded	Category 2.c.	199705600	Klickitat Watershed Enhancement	YN	Columbia Gorg	Klickitat	Habitat	$162,257
Expanded	Category 2.c.	198812025	YKFP Management, Data, Habitat	YN	Multiple	Yakima	Habitat	$116,500
Expanded	Category 2.c.	200715600	Rock Creek Fish and Habitat Assessment for the Prioritization of Restoration and Protection.	YN	Columbia Gorg	Rock Cr	RM&E	$191,307
Expanded	Category 2.c.	199506325	Yakima Klickitat Fisheries Project - Monitoring And Evaluation	YN	Multiple	Yakima	RM&E	$474,005
Expanded	Category 2.c.	199506335	YKFP - Klickitat Subbasin Monitoring and Evaluation	YN	Columbia Gorg	Klickitat	RM&E	$816,136
								$3,462,119

Category 2c Ongoing

Existing	Category 2.c. - Ongoing	199803100	Implement Wy-Kan-Ush-Mi Wa-Kish-Witt	CRITFC	systemwide	Multiple	data management /coordination	$225,000
Existing	Category 2.c. -	198810804	Streamnet Library	CRITFC	systemwide	Multiple	data management	$420,060
Existing	Category 2.c. -	200303600	Regional RM&E Coordination	CRITFC	systemwide	Multiple	RM&E	$117,925
Existing	Category 2.c. -	Unknown - 2	PSMFC-SMOLT MONITORING	CRITFC	mainstem	Multiple	RM&E	$75,000
Existing	Category 2.c. -	200203700	Freshwater Mussel Research and Restoration Project	CTUIR	Columbia Plateau	Umatilla	RM&E	$233,000
Existing	Category 2.c. -	200708300	Grande Ronde Cooperative Salmonid Monitoring and Evaluation Project	CTUIR	Blue Mountain	Grande Ronde	RM&E	$147,624
Existing	Category 2.c. - Ongoing	200725200	Multi-scale assessment of hyporheic flow, temperature and fish distribution in Columbia River Tributaries	CTUIR	Multiple	All	RM&E	$77,000

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Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
Existing	Category 2.c. - Ongoing	200715700	Bull trout status in the lower Deschutes Subasin	CTWSRO	Columbia Plate	Lower Deschutes	RM&E	$115,000
Existing	Category 2.c. - Ongoing	199705600	Klickitat Watershed Enhancement	YN	Columbia Gorg	Klickitat	Habitat	$397,414
Existing	Category 2.c. - Ongoing	200715600	Rock Creek Fish and Habitat Assessment for the Prioritization of Restoration and Protection.	YN	Columbia Casc	Lower Middle Mainsten	RM&E	$100,000
								$1,908,023
Category 3								
New	Category 3.	new	Tribal Monitoring Data	CRITFC	Systemwide	Multiple	data management /coordination	$340,400
New	Category 3.	new	Power Analysis to Determine Catch Sampling Rates	CRITFC	Mainstem	Multiple	Harvest	$50,000
New	Category 3.	199803100	Sea Lion Hazing	CRITFC	Mainstem	Multiple	Hydro	$200,000
New	Category 3.	new	SNP Discovery	CRITFC	Systemwide	Multiple	RM&E	$60,000
New	Category 3.	new	Bonneville GSI	CRITFC	Mainstem	Multiple	RM&E	$250,000
New	Category 3.	new	Habitat Validation Monitoring (formerly Water Quality Monitoring)	CRITFC	Mainstem	Multiple	RM&E	$175,000
New	Category 3.	new	Improved escapement estimation	CRITFC	Multi-province	Multiple	RM&E	$70,000
New	Category 3.	new	Management Scenerios for Climate Change	CRITFC	Systemwide	Multiple	RM&E	$150,000
New	Category 3.	new	Modeling Survival of Spring Chinook	CRITFC	Systemwide	Multiple	RM&E	$250,000
New	Category 3.	new	Climate Change Database (formerly Global Warming Database)	CRITFC	Systemwide	Multiple	RM&E	$114,000
New	Category 3.	new	Develop comparable baselines of habitat conditions across subbasins (formerly monitoring trends in habitat conditions)	CRITFC	Systemwide	Multiple	RM&E	$325,000
New	Category 3.	new	Upstream Migration Timing	CRITFC	Mainstem	Multiple	RM&E	$275,000
New	Category 3.	new	Expression of Traits Related to Recovery	CRITFC	Systemwide	Multiple	RM&E	$100,000
New	Category 3.	new	Genetic Baseline Expansion	CRITFC	Systemwide	Multiple	RM&E	$150,000
New	Category 3.	new	Landscape Genetics (Ch & STHD)	CRITFC	Multi-province	Multiple	RM&E	$40,000
New	Category 3.	new	Basin-wide evaluation of supplementation benefits and risks	CRITFC	Systemwide	Multiple	RM&E	$200,000
New	Category 3.	new	Supplementation monitoring	CRITFC	Systemwide	Multiple	RM&E	$475,000
New	Category 3.	new	Columbia river operations admistration and program implementation	CTWSRO	Columbia Plate	Lower Deschutes	data managem	$182,880
New	Category 3.	New	Warm springs watershed spring chinook production monitoring	CTWSRO	columbia platea	lower deschutes	RM&E	$168,300
New	Category 3.	New	Warm springs reservation steelhead production monitoring	CTWSRO	columbia platea	lower deschutes	RM&E	$115,079

Non-AP Expense Categories

ATTACHMENT B

Existing/ Expanded/ New	Category	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
New	Category 3.	New	Develop and adopt biologically based escapement goals for Deschutes R. fall Chinook salmon	CTWSRO	Columbia Plate	Lower Deschutes	RM&E	$170,850
New	Category 3.	New	Deschutes River Sockeye development	CTWSRO	columbia platea	upper deschutes	RM&E	$150,710
New	Category 3.	New	Status and Trend	YN	Columbia Cascade	Up Col	data management /coordination	$95,000
New	Category 3.	New	Project Development / Mgt	YN	Columbia Cascade	Up Col	RM&E	$125,000
New	Category 3.	New	RME Existing (Regional RM&E Coordination - Monitoring)	YN	Columbia Cascade	Up Col	RM&E	$140,000
								$4,372,218
Supplemental								
Expanded		198710001, 199604601,	CTUIR Ceded Area Tributary Culvert/Passage Assessment, Prioritization and Implementation	CTUIR	Columbia Plateau, Blue Mountain	Walla Walla, Umatilla, Grande Ronde, John Day, Tucannon	Habitat	$250,000
New			Protect and Restore Tucannon Watershed	CTUIR	Blue Mountain	Umatilla	Habitat	$200,000
New			Inventory and assess fish habitat, passage and screening needs and develop plan for steelhead reintroduction in Willow Creek, Butter Creek and McKay Creek.	CTUIR	Columbia Plateau	Umatilla	Habitat	$20,000
New			Inventory and assess habitat status and needs for anadromous reintroductions in Eastern Oregon tributaries above Hells Canyon Dam	CTUIR	Middle Snake	Powder, Burnt, Malheur	Habitat, RM&E	$20,000
								$490,000

Lamprey

ATTACHMENT B

Existing/ Expanded/ New	Proposal #	Budget Title	Org.	Province	Sub-Basin	Project Type	Average 08-17 LRT Budget
New		Lamprey Mainstem passage design assistance	CRITFC	Mainstem	Multiple	Lamprey	$575,000
Existing	199402600	Pacific Lamprey Research and Restoration Project - including translocaton	CTUIR	Columbia Plateau	Umatilla	Lamprey	$400,000
Expanded	199402600	Lamprey outmigration	CTUIR	Multiple		Lamprey	$100,000
New	New	Willamette Falls lamprey escapement and population status study	CTWSRO	Lower Columbia	Willamette	Lamprey	$150,000
Existing	200201600	Evaluate the status of Pacific Lamprey in the Deschutes Basin	CTWSRO	Columbia Plateau	Lower Deschutes	Lamprey	$132,000
Expanded	200201600	Evaluate the status of Pacific Lamprey in the Deschutes Basin	CTWSRO	Columbia Plateau	Lower Deschutes	Lamprey	$25,000
New	200700700	Determine status and limiting factors of Pacific Lamprey in 15mile and Hood basins	CTWSRO	Columbia Gorge	Hood River/ Fifteen Mile	Lamprey	$234,000
New		Amocoete densities	YN	Multiple		Lamprey	$50,000
New		Lamprey presence /absence and other baseline in Upper Columbia and Yakima	YN	Multiple		Lamprey	$150,000
New		Translocation and other data	YN	Multiple		Lamprey	$50,000
							$1,866,000

Non-Hatchery Capital								
Existing/ Expanded/ New	**Proposal #**	**Proposal Title**	**Org.**	**Province**	**Sub-Basin**	**Project Type**	**Total LRT Budget (08-17)**	**Average 08-17 LRT Budget**
Expanded	199801800	John Day Watershed Restoration program	CTWSRO	Columbia Plateau	MF John Day	Habitat	$2,939,452	$293,945
Existing	199802100	Hood River habitat program	CTWSRO	Columbia Gorge	Hood River/ Fifteen Mile	Habitat	$5,606,260	$560,626
Existing	199801800	John Day Watershed Restoration program	CTWSRO	Columbia Plateau	MF John Day	Habitat	$13,776,000	$1,377,600
New	New	Instream flow restoration projects, including water rights purchase from willing sellers and development and replacement of water sources for agricultural uses in Umatilla and Walla Walla tributaries.***	CTUIR	Columbia Plateau	Umatilla	Habitat	$10,000,000	$1,000,000
Existing	199601100	Walla Walla Juvenile and Adult Passage Improvements (capital)	CTUIR	Columbia Plateau	Walla Walla	Habitat	$7,290,000	$729,000
Expanded	200002600	South Fork Touchet Watershed Protection and Restoration (capital acquisition)	CTUIR	Columbia Plateau	Walla Walla	Habitat	$2,500,000	$250,000
New	New	CTUIR Ceded Area Priority Stream Corridor Covservation and Protection (capital acquisition)	CTUIR	Blue Mt., Col. Plateau	Grande Ronde, Umatilla, WW or JD	Habitat	$10,000,000	$1,000,000
							$52,111,712	**$5,211,171**

*** Commitment is dedication of $1 million per year from the Columbia Basin Water Transaction Project budget.

Hatchery Planning, O&M

Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Category	Average 08-17 LRT Proposal
Existing and Expanded					
Existing	200001700 (200306200)	Recondition Wild Steelhead Kelt (and Evaluate their reproductive success)	CRITFC	Artificial Production	$936,425
Existing	200001700	Snake River Kelts - Expense	CRITFC	Artificial Production	$600,000
Existing	199800703	Grande Ronde Supplementation Operations and Maintenance	CTUIR	Artificial Production	$536,830
Existing	200003800	NEOH Walla Walla Hatchery - Three Step Master Planning Process (expense)	CTUIR	Artificial Production	$50,500
Existing	200003800	NEOH Walla Walla Hatchery - Three Step Master Planning Process (O&M beginning in 2011)	CTUIR	Artificial Production	$534,100
Existing	198343500	Umatilla Hatchery Satellite Facilities O&M	CTUIR	Artificial Production	$948,466
Existing	198805307	Hood river Production O&M	CTWSRO	Artificial Production	$396,514
Existing	198811535	Klickitat Fishery YKFP Design	YN	Artificial Production	$70,000
Existing	199604000	Mid-Columbia Coho Restoration	YN	Artificial Production	$1,908,878
Existing	199701325	Yakima/Klickitat Fisheries Project Operations and Maintenance	YN	Artificial Production	$2,666,666
Expanded	198805307	Hood river Production O&M	CTWSRO	Artificial Production	$524,022
Expanded	199701335	Klickitat Fishery YFKP O & M	YN	Artificial Production	$568,852
Expanded	199604000	Mid-Columbia Coho Restoration (expense)	YN	Artificial Production	$49,228
Expanded	199701325	Yakima/Klickitat Fisheries Project Operations and Maintenance	YN	Artificial Production	$261,489
					$10,051,971
New					
New	new	John Day Reprogramming and Construction - Expense	CRITFC	Artificial Production	$200,000

Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Category	Average 08-17 LRT Proposal
New	200715500	Sturgeon Master Planning - Expense	CRITFC	Artificial Production	$150,000
New	New	Snake River Safety Net Program - UGR and CC	CTUIR	Artificial Production	$500,000
New	New	Walla Walla Steelhead Supplementation Hatchery O&M	CTUIR	Artificial Production	$69,500
New	New	White River Supplementation program - operate	CTWSRO	Artificial Production	$82,500
New	New	Methow spring Chinook - Methow, Twisp, Chewuch acclimation - operate facilities	YN	Artificial Production	$60,000
New	New	Methow steelhead - Methow, Twisp, Chewuch acclimation - operate facilities	YN	Artificial Production	$60,000
New	New	Methow steelhead - reprogram Winthrop for release of 100k smolts in upper watershed	YN	Artificial Production	$30,000
New	New	Program coordination & administration	YN	Artificial Production	$1,200,000
New	New	Sturgeon Mgt	YN	Artificial Production	$125,000
New	New	Upper Columbia spring Chinook - nutrient supplementation	YN	Artificial Production	$60,000
New	New	Upper Columbia steelhead - nutrient supplementation	YN	Artificial Production	$60,000
New	New	Upper Columbia Steelhead Kelt Reconditioning	YN	Artificial Production	$510,000
New	New	Wenatchee spring Chinook - Chiwawa River & Nason Ck acclimation - operate acclimation facilities	YN	Artificial Production	$60,000
New	New	Wenatchee spring Chinook - Little Wenatchee 150K smolts - operate	YN	Artificial Production	$90,000
New	New	Wenatchee spring Chinook - Peshastin 100K smolts - operate acclimation facility	YN	Artificial Production	$70,000
New	New	Wenatchee steelhead - Wenatchee, Peshastin, Chumstick, Mission acclimation - operate facilities	YN	Artificial Production	$80,000
New	New	Yakima coho production facility O&M	YN	Artificial Production	$175,000
New	New	Yakima coho production marking	YN	Artificial Production	$156,800
New	New	Yakima fall Chinook - JDM move 1.7M URBs from PR to Prosser - operate	YN	Artificial Production	$45,000

Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Category	Average 08-17 LRT Proposal
New	New	Yakima steelhead - acclimation facilities - operate	YN	Artificial Production	$45,000
New	New	Yakima/Naches coho - mobile acclimation units - operate	YN	Artificial Production	$40,000
New	New	Yakima/Naches coho - nutrient supplementation	YN	Artificial Production	$7,000
					$3,875,800
					$ 13,927,771

Hatchery Capital

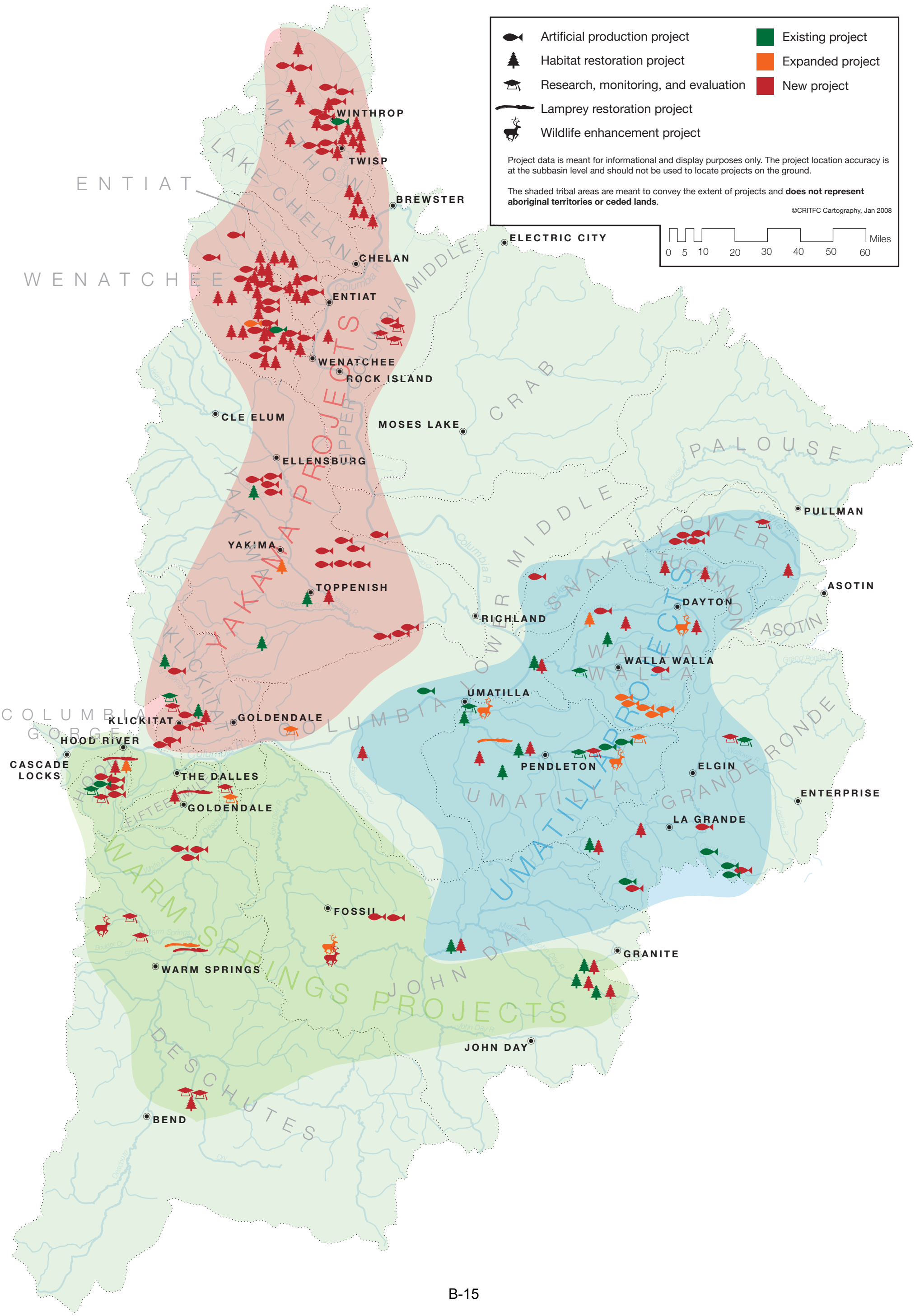
Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Total LRT Budget (08-17)	Average 08-17 LRT Budget
Existing	200001700	Snake River Kelts - Capital	CRITFC	Systemwide	Multiple	Artificial Production	$2,000,000	$200,000
New	new	John Day Reprogramming and Construction - Capital	CRITFC	Columbia Plateau	John Day	Artificial Production	$4,000,000	$400,000
New	200715500	Sturgeon Master Planning - Capital	CRITFC	Mainstem	Multiple	Artificial Production	$6,000,000	$600,000
New	New	Snake River fall Chinook - modify ponds @ Lyons Ferry to improve adult holding	CTUIR	Blue Mountain	Mainstem Snake	Artificial Production	$500,000	$50,000
Existing	200003800	NEOH Walla Walla Hatchery - Three Step Master Planning Process (capital)	CTUIR	Columbia Plateau	Walla Walla	Artificial Production	$11,862,000	$1,186,200
New	New	White River Supplementation program - construct	CTWSRO	Columbia Plateau	Lower Deschutes	Artificial Production	$1,000,000	$100,000
New	new	Master plan expansion and tributary weir development for hood river facitlity	CTWSRO	Columbia Gorge	Hood River	Artificial Production	$5,600,000	$560,000
New	New	Methow spring Chinook - Methow, Twisp, Chewuch acclimation - build facilities	YN	Cascade Columbia	Methow	Artificial Production	$150,000	$15,000
New	New	Methow steelhead - Methow, Twisp, Chewuch acclimation - build facilities	YN	Cascade Columbia	Methow	Artificial Production	$150,000	$15,000
New	New	Wenatchee spring Chinook - Chiwawa River & Nason Ck acclimation - build acclimation facilities	YN	Cascade Columbia	Wenatchee	Artificial Production	$150,000	$15,000
New	New	Wenatchee spring Chinook - Little Wenatchee 150K smolts - construct	YN	Cascade Columbia	Wenatchee	Artificial Production	$100,000	$10,000
New	New	Wenatchee spring Chinook - Peshastin 100K smolts - build acclimation facility	YN	Cascade Columbia	Wenatchee	Artificial Production	$100,000	$10,000
New	New	Wenatchee steelhead - Wenatchee, Peshastin, Chumstick, Mission acclimation - build facilities	YN	Cascade Columbia	Wenatchee	Artificial Production	$200,000	$20,000
New	New	Yakima coho production facility construction	YN	Columbia Plateau	Yakima	Artificial Production	$7,700,000	$770,000
New	New	Yakima fall Chinook - JDM move 1.7M URBs from PR to Prosser - construction	YN	Columbia Plateau	Yakima	Artificial Production	$1,000,000	$100,000
New	New	Yakima steelhead - acclimation facilities - construct	YN	Columbia Plateau	Yakima	Artificial Production	$1,000,000	$100,000
New	New	Yakima/Naches coho - mobile acclimation units - construct	YN	Columbia Plateau	Yakima	Artificial Production	$56,000	$5,600
Expanded	198811525	YKFP - Design & Construction	YN	Columbia Plateau	Yakima	Artificial Production and M&E	$1,800,000	$180,000

Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Province	Sub-Basin	Project Type	Total LRT Budget (08-17)	Average 08-17 LRT Budget
Expanded	198811535	Klickitat Fishery YKFP Design	YN	Columbia Gorge	Klickitat	Artificial Production	$26,775,000	$2,677,500
Expanded	198811525	Monitoring and Evaluation Replacement Facility	YN	Columbia Plate	Yakima	RM&E	$723,006	$72,301
Expanded	199604000	Mid-Columbia Coho Restoration (Capital)	YN	Cascade Columbia	Wenatchee / Methow	Artificial Production	$9,246,000	$924,600
							$80,112,006	**$8,011,201**

ATTACHMENT B

Existing, Expanded, and New Projects made possible by the MOA

FY2008 - FY2017



ATTACHMENT C
GROUP B STEELHEAD
Term Sheet on Group B Steelhead Actions

The Parties agree that the following actions can provide substantial survival benefits to Group B Steelhead. Further details of these actions are included in the MOA or its attachments.

Kelt Reconditioning – Capturing steelhead kelts (mature fish migrating downstream subsequent to spawning) and rearing them to allow for repeat spawning has demonstrated success in the Yakima and other basins. The overall benefit to Snake River Group B steelhead has been estimated to yield an average 6% survival improvement.

Nutrient Enhancement – Treatment of selected Snake River basin streams with nutrients to improve fitness will be evaluated.

Transportation Strategy – Alternative Snake River steelhead transportation operations scenarios are estimated to provide relative survival benefits for steelhead and/or spring Chinook..

Abundance-based Harvest Schedule – The *US v Oregon* parties have agreed to an abundance based Group B Steelhead harvest schedule that reduces Group B harvest rate by 2% at lower run sizes. The Parties understand NOAA Fisheries will incorporate a 1% increase in survival for the 10 year BiOp term, and will further describe longer term survival benefits qualitatively.

Conservation Law Enforcement: Enhanced law enforcement efforts have been correlated to increased compliance rates in non-Indian and Indian fisheries, estimated by NOAA Fisheries to provide survival improvement for Group B Steelhead.

Fall Back Operations – Adult steelhead are known to migrate up and downstream in the mainstem Snake and Columbia rivers. The Action Agencies will conduct fallback studies as described in the FCRPS BiOp and will consider the results through adaptive management.

ATTACHMENT D

Spring Creek Hatchery

March 2008

Introduction

- In response to the SOR, the Federal Agencies have agreed to implement many elements of the request, with the exception of the requested spill.
- We are also operating the Bonneville corner collector as the primary means of passage for the Spring Creek release.
- The Federal agencies are making a proposal today, having reviewed the record and the views of all parties on the SOR.
- We have developed this proposal in conjunction with representatives for the Warms Springs Tribe, the Yakama Indian Nation, the Nez Perce Tribe, and the Umatilla Tribe, and this proposal also has their endorsement and support. We would like to hear from the other sovereign executives in this meeting.

Background

- We remain convinced, based on the available data, that there may be no biological benefit from the additional spill for returning Spring Creek adults. However, we recognize that there is biological uncertainty in the available data, and have heard the differing views of the parties on this. In addition, we have heard from the tribes regarding the importance of these fish for tribal fisheries.
- We believe that our priority is to reprogram the Spring Creek hatchery production so that this release and spill are unnecessary. Under this proposal, the sovereigns and the action agencies will work together to do just that.
- Because the goal is reprogramming that would make this early spill unnecessary, there is not a need for further testing of this additional spill request. Nevertheless, some information may be collected because the fish have been marked.
- One biological consideration we consider relevant is the issue of crowding at the bypass, because of the concentrated fish release. This is not a large concern, but in the interest of compromise and optimizing conditions for fish we are willing to spill for this purpose for one year only, as part of a broader multi-year agreement.

Proposal

- Based on advice from NOAA Fisheries and our biologists, we believe that a spill of 35 kcfs would be appropriate to alleviate the crowding issue. For 2008, we would propose to implement this level of spill from midnight Thursday, 3/6/08, to 6 am Monday, 3/10/08, while maintaining the current chum protection level.
- Next year (2009) and beyond, we would not spill, but would work with the sovereign parties to stagger fish releases to minimize crowding.
- We would expect a mutual commitment from the sovereign parties to join us in supporting and implementing Spring Creek reprogramming as early as 2010, but no later than 2012.
- We will seek to memorialize these understandings in the MOAs we are negotiating with the sovereign parties.

ATTACHMENT E
Actions To Improve Forecasting Methods And Tools To Optimize Reservoir Use For Fish Operations

- The Action Agencies and Tribes (as defined in the accompanying Treaty Tribes-Action Agency MOA) will convene a Columbia River Forecast and Data Committee described below.[7] The Action Agencies agree to consider the committee outcomes and recommendations in their implementation processes.

The primary function of the group will be to promote and support the advancement of forecasting skill, products and techniques in the Columbia Basin. It will provide an open forum for sharing, discussing, evaluating and potentially implementing new forecasting techniques into the operation and planning of the Columbia Basin system. The term forecasting will refer to both water supply forecasting and streamflow forecasting.

The group will be composed of technical representatives from the Action Agencies and the Tribes, but will be open for participation from any representative of a governmental organization willing to contribute to the effectiveness and success of the group. The group will be chaired by a representative from the core group and will rotate annually. General business meetings of the group will occur no less than quarterly but more frequently if workload and projects require it. In addition to business meetings, there will be an annual meeting in the early fall to review the performance of various operational and experimental forecast procedures over the previous water year, to report on any new approved procedures being implemented next year, and to plan committee work for the coming year.

Responsibilities of the group will include tracking and reviewing the performance of current forecasting procedures and techniques and sharing, discussing, and investigating the potential of new forecasting techniques and modeling. When promising research or techniques are discovered or introduced for consideration, the group will develop a strategy for either investigating the potential improvements with available technical staff or providing recommendations or proposals to the Action Agencies for possible funding and support. The group as a whole will oversee the progress and results of any work initiated and supported by the group. The group will also set up criteria for determining the level of "improvement" to the forecasting required to warrant implementation. The group will participate in the evaluation of new forecast procedures, models, and techniques and provide recommendations on the incorporation of the new procedures into the planning and operation of the Columbia River system.

Also within the scope of the group will be facilitating the sharing of data, where possible, and the monitoring of the data network and systems which enhance and support the forecasting capabilities of the region. When necessary, the group will provide recommendations on improvements and enhancements to the network.

[7] Possible names: Columbia River Forecast and Data Committee (CRFDC), Columbia River Advancement in Forecasting Team (CRAFT)

The group will also have an educational role, providing forums for the exchange of technical information and research. This will take the shape of open workshops with presenters speaking on current research and forecast projects. The group will also have a role in educating users on forecasting products and on specific forecast areas, providing the technical expertise and platform for conducting seminars on topics such as ESP forecasting, climate change impacts to forecasting, etc.

Potential Initial Items for CRWMG to address:

Forecasting:

1. Evaluation of the NRCS daily statistical water supply forecast procedure
2. Evaluate the benefits/problems with increased frequency of water supply updates
3. Review the indices evaluated and selected when the Libby forecast procedure was last updated. Assess the need and/or merits of updating the procedure with other indices, such as the Trans-Niño index.
4. Consider coordinating several agencies' forecasts into one forecast.
5. Consider climate change impacts on future forecasting needs and priorities.

Data:

1. Evaluate the benefits to additional SNOTEL sites, particularly in the Canadian portion of Columbia drainage.

ATTACHMENT F

Treaty and Tribal Action Agency Consultation Regarding Columbia River Treaty

Consistent with BPA and Corps Tribal Policies, BPA and the Corps will coordinate with the Tribes ("Tribes" as defined in the accompanying Treaty Tribes-Action Agency MOA) concerning annual operations under the Columbia River Treaty of 1964 ("Treaty"), potential future non-Treaty storage use, and BPA and Corps actions related to possible future U.S.-Canada discussions of post-2024 matters under the Treaty, as follows.

Annual Treaty/Non-Treaty Operations and Treaty Operating Plans

Consistent with the Proposed Action identified in the August 2007 FCRPS Biological Assessment, each operating year, BPA and the Corps will coordinate with the Tribes to discuss Treaty and non-Treaty operations and Treaty operating plans. This coordination will include meeting in the fall to discuss Treaty and non-Treaty operations that occurred during the preceding fish passage season, and to seek tribal input, ideas, and information on planned operations for the next fish passage season. BPA and the Corps also will inform the Tribes of the final operating plan and/or planned operations once finalized. Typical agenda items for the fall meeting would include a review of Treaty and non-Treaty operations for preceding year (including supplemental operating agreements), a review of the current year Detailed Operating Plan and possible supplemental operating agreements, an update on the most-recently prepared Assured Operating Plan and upcoming Detailed Operating Plan. One additional meeting will be held during the fish passage season to provide an update on Treaty and non-Treaty operations.

Potential Non-Treaty Storage

Consistent with the Proposed Action identified in the August 2007 FCRPS Biological Assessment, BPA will seek to negotiate a new long-term agreement with BC Hydro regarding non-Treaty storage use once BPA and BC Hydro have made substantial progress in refilling non-Treaty storage space, and the collective U.S. interests in terms of such a new agreement are established. BPA also will seek to negotiate an annual agreement if a new long-term agreement is not in place or does not address flows for fisheries purposes. If BC Hydro is interested in negotiating a new annual or long-term non-Treaty storage agreement, BPA will coordinate with the Tribes prior to any negotiation to obtain ideas and information on possible points of negotiation. If negotiations occur, BPA will report on major developments during negotiations and will report to the Tribes on any new agreement resulting from negotiations.

Post-2024 Treaty Matters

BPA and the Corps will take the following specific measures to coordinate with the Tribes concerning their actions related to possible U.S.-Canada discussions of post-2024 Treaty matters:

1. Consult with the Tribes during planning activities for post-2024 Treaty matters by holding discussions with the Tribes at a government-to-government level to seek tribal input and identify general issues of concern to the Tribes. Although the schedule for these planning

activities is currently uncertain, it is possible that these activities may continue through 2013 or beyond.

2. Coordinate with tribal staff at a technical level during the expected planning activities for post-2024 Treaty matters to identify possible methods for addressing tribal issues of concern.

3. Provide the results of both the government-to-government and technical discussions with the Tribes to the U.S. Entity under the Treaty for consideration.

4. If formal Treaty negotiations occur, report on a periodic basis to affected Tribes on major developments relative to Corps and BPA actions related to tribal interests.

5. If formal Treaty negotiations occur, consult with the Tribes to assure that tribal rights and concerns are considered by BPA or the Corps regarding their actions.

6. If formal Treaty negotiations occur, strive to resolve issues and encourage the U.S. government to arrive at decisions that appropriately consider identified tribal concerns.

As organizational structures are set in place by BPA, the Corps, and possibly the U.S. and Canadian governments to discuss issues related to post-2024 Treaty matters, BPA and the Corps will coordinate with the Tribes and discuss mutually acceptable changes in the role of the Tribes in post-2024 matters related to BPA and Corps actions.

Corps and BPA consultation and coordination with the Tribes on post-2024 Treaty matters as set forth herein will be conducted to the extent appropriate and permitted under applicable policies, procedures, laws and regulations including United States principles of international treaty discussions and negotiations and to the extent permitted by the U.S. Department of State.

Population Productivity Benefits Summary

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Population	10-Year Improved Rate	25-Year Improved Rate
Middle Columbia River Steelhead		
All Yakima Steelhead (Mainstem Effects)	1.1	1.17
Deschutes River Eastside Tributaries Summer Steelhead	1.02	1.03
Deschutes River Westside Tributaries Summer Steelhead	1.31	1.62
Hood River Winter Steelhead	2.07	2.3
Klickitat River Steelhead	1.13	1.23
Lower John Day Summer Steelhead	1.6	1.91
Middle Columbia Tributaries Steelhead	2.25	2.38
Middle Fork John Day Summer Steelhead	2.04	2.37
Naches River Summer Steelhead	1.09	1.22
North Fork John Day Summer Steelhead	1.17	1.32
Rock Creek Steelhead	1.2	1.52
Satus Creek Summer Steelhead	1.07	1.14
South Fork John Day Summer Steelhead	1.47	1.52
Toppenish Creek Summer Steelhead	1.13	1.23
Umatilla River Summer Steelhead	1.37	1.74
Upper John Day Summer Steelhead	1.84	2.22
Upper Yakima River Summer Steelhead	1.1	1.22
Walla Walla River Summer Steelhead	1.43	1.9
Snake River Basin Steelhead		
Tucannon River Summer Steelhead	1.08	1.09
Upper Grande Ronde Summer Steelhead	1.28	1.59
Snake River Spring/Summer Chinook		
Tucannon River Spring Chinook	1.04	1.05
Upper Grande Ronde Spring Chinook	1.28	1.59
Upper Columbia River Spring Chinook		
Entiat River Spring Chinook	1.19	1.26
Methow River Spring Chinook	1.01	1.06
Wenatchee River Spring Chinook	1.07	1.11
Upper Columbia River Steelhead		
Entiat River Summer Steelhead	1.13	1.18
Methow River Summer Steelhead	1.02	1.08
Wenatchee River Summer Steelhead	1.06	1.12

Estimated Habitat Quality Improvement and Survival Benefits of MOA Projects on Populations of Listed Salmon and Steelhead

- *3 Treaty Tribe – Action Agency Agreement*
- *April 21, 2008*

The following attached reports and spreadsheets comprise the 3 Treaty Tribes' estimate of habitat quality improvements and survival benefits of the habitat projects included under the MOA:

- Summary Report: *Population Biological Benefits Summary*
- Populations Reports: *Estimated Biological Benefits from Habitat Actions by Watershed/Population*. Show estimated egg-to-smolt productivity improvements by watershed based on estimated watershed function improvements.
- Watershed Reports*: Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed*. Show changes in limiting factor function based on implementation of MOA projects in that watershed
- Project Spreadsheet: *LRT Project X Populations Benefited.* Associates projects with watersheds and populations benefited.

Benefits Analysis:

Benefits were estimated with a method used in an earlier NOAA/Nez Perce assessment of Clearwater habitat. The method conforms to the "Hillman method" which is in use by the action agencies. Tribal biologists considered the positive effects that full implementation of the Tribal MOA projects would have to improve limiting factors at the watershed scale. These estimates were collected and compiled into a database and used to generate the benefit reports. The process of calculating these estimates is as follows:

First, assessments of the improvements to limiting factors for a given watershed are provided from the best professional judgments of local (and in some cases, only Tribal) biologists. Assessments are based on habitat projects included in the MOA that benefit listed salmon and steelhead. The *LRT Project X Populations Benefited* spreadsheet identifies the watersheds and populations associated with each project. [1]

[1] NOTE: The project spreadsheet includes the columns "In BiOp/ Funded (07-09)" and "In PA." A "Y" for yes is indicated in the former if the project / proposal # is identified in the BA's Tributary Habitat Action Tables or the project was otherwise funded for FY07-09. A "Y*" notes a discrepancy in the funding amount. A "N*" notes some funding, but limited (e.g., bridge funding for 2007 only). A "Y" in the "In PA" column indicates that the project is contemplated in the BiOp either specifically or generally (e.g, for out year, habitat restoration efforts in X watershed). This information is included to aid in identification of possible duplicate benefit counting with the BiOp's tributary habitat analysis.

Each limiting factor is weighted proportionally to its overall impact on the population within the watershed. Each limiting factor is estimated at its current function and function in 10 years and 25 years if all MOA actions are implemented to improve habitat. These functions are quantified at a rate that is below a hypothetical non-limited function of 100%. These limiting factor functions are multiplied by their weight and summed for the watershed to produce the overall watershed function (also out of a hypothetical 100% function):

Watershed Function = Σ(Limiting Factor Function * (Limiting Factor Weight/100)).

The example below shows this for summer steelhead in Icicle Creek:

Icicle Creek – Estimated Limiting Factors Function Improvements								
Watershed (WS)	Limiting Factor (LF)	LF_Weight	LF_Funct_Current	LF_Funct_10Year	LF_Funct_25Year	WS_Funct_Current	WS_Funct_10Year	WS_Funct_25Year
Icicle Creek	In-channel Characteristics	35	70	75	80			
	Passage / Entrainment	10	55	55	55			
	Riparian / Floodplain	20	70	75	85			
	Sediment	20	90	92	95			
	Water Quantity – Flow	15	55	55	55			
						70.2	**73.4**	**77.8**

Estimated limiting factor function improvements and combined watershed function improvements are shown in the reports entitled *Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed* (reported by ESU).

Next, the watershed functions are combined to calculate the overall biological egg-to-smolt productivity benefit for a population. All watersheds in a population are weighted according to their intrinsic potential for production, and the overall function for a population is calculated where:

Population Survival = Σ(Watershed Survival * (Watershed Weight/100))).

Because actual egg-to-smolt productivity rates are modeled through more complex means such as EDT or TRT analysis, we did not attempt to estimate these current rates here, but instead simply applied a rate of 1.0 to represent the current rate for each population, and showed 10-yr and 25-yr improvements as percentage increases to productivity above this current rate. In the example below, the Wenatchee River Summer Steelhead population is estimated to show an improved productivity from current conditions of 1.06 (6% improvement) at 10 years and 1.12 (12% improvement) at 25 years, which is derived from the weighted watershed-level benefits of all actions:

Wenatchee River Summer Steelhead – Estimated Egg-to-Smolt Surval Improvements							
Watershed	WS_Surv_Current	WS_Surv_Year10	WS_Surv_Year25	WS_Weight	Pop_Surv_Current	Pop_Surv_Year10	Pop_Surv_Year25
Chiwawa River	91.8	93.4	95.1	18			
Chumstick Creek	67.5	68.5	71.5	5			
Icicle Creek	70.2	73.4	77.8	5			

Wenatchee River Summer Steelhead – Estimated Egg-to-Smolt Surval Improvements							
Watershed	**WS_Surv_Current**	**WS_Surv_Year10**	**WS_Surv_Year25**	**WS_Weight**	**Pop_Surv_Current**	**Pop_Surv_Year10**	**Pop_Surv_Year25**
Little Wenatchee	90.2	92.2	94.2	3			
Mission Creek	43.8	43.8	43.8	5			
Nason Creek	65	72.3	78.8	19			
North Side Tributaries	60	60	60	1			
Peshastin Creek	62.8	76.2	80	15			
Wenatchee River (Lower)	68	68	68	7			
Wenatchee River (Upper + Chiwaukum)	80.5	85.2	90	18			
White River	89.8	91.5	93.2	3			
Population Total:					**1.00**	**1.06**	**1.12**

Estimated egg-to-smolt productivity improvements by watershed based on estimated watershed function improvements and combined population productivity improvement are shown in the reports entitled *Estimated Biological Benefits from Habitat Actions by Watershed/Population* (reported by ESU). The estimated productivity improvements of all populations are then show in the report *Population Biological Benefits Summary.*

Estimated Productivity Benefit from Habitat Actions by Watershed/Population

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

All Yakima Steelhead (Mainstem Effects)

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Lower Yakima River	73.8	81.4	86.2	1.1	1.17

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**All Yakima Steelhead (Mainstem Effects)**	**1.1**	**1.17**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Deschutes River Eastside Tributaries Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Buck Hollow Creek	61.2	61.2	61.2	1	1
Deschutes River (Mainstem Effects)	76.5	85.8	90	1.12	1.18
Trout Creek	33.5	33.5	33.5	1	1

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Deschutes River Eastside Tributaries Summer Steelhead**	**1.02**	**1.03**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Deschutes River Westside Tributaries Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Badger/Boulder/Eagle/Nena/Skookum	47.2	69.8	81.5	1.48	1.73
Beaver Creek	46.6	63	84.2	1.35	1.81
Oak Creek	30	92.5	96.2	3.08	3.21
Shitike Creek	45	77.4	83.6	1.72	1.86
Warm Springs River	84.5	90	94.5	1.07	1.12

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Deschutes River Westside Tributaries Summer Steelhead**	**1.31**	**1.62**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Hood River Winter Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
East Fork Hood River	70	80.8	85.8	1.15	1.23
Middle Fork Hood River	70	80	90	1.14	1.29
Middle Fork Hood River (Clear Branch)	15	80	90	5.33	6
Middle Fork Hood River (Eliot Branch)	10	85	95	8.5	9.5

Total Estimated Improvement for	Hood River Winter Steelhead	Year 10 Impr.	Year 25 Impr.
		2.07	**2.3**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Klickitat River Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Klickitat Canyon	78.8	78.8	78.8	1	1
Lower Klickitat River	51	52.5	52.5	1.03	1.03
Lower Little Klickitat River	61.5	62	63.5	1.01	1.03
Middle Klickitat River	62.4	73.2	80.3	1.17	1.29
Swale Creek	39.2	47.6	53	1.21	1.35
Trout Creek	55.5	60.2	65.8	1.08	1.19
Upper Klickitat River	56.8	66.2	72.8	1.17	1.28
Upper Little Klickitat River	47.4	47.8	48.5	1.01	1.02
Upper Middle Klickitat River	75.8	76.4	77	1.01	1.02
West Fork Klickitat River	90	92	95	1.02	1.06
White Creek	45	52.2	59.2	1.16	1.32

Total Estimated Improvement for Klickitat River Steelhead	**Year 10 Impr.**	**Year 25 Impr.**
	1.13	**1.23**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Lower John Day Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Butte Creek	36.5	62.2	69	1.7	1.89
Pine Creek	68.5	76.2	86.8	1.11	1.27
Pine Hollow	47	64	84	1.36	1.79
Thirtymile Creek	40.5	64.5	77.8	1.59	1.92

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Lower John Day Summer Steelhead**	**1.6**	**1.91**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Middle Columbia Tributaries Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Alder Creek	64.2	69.2	77	1.08	1.2
Glade Creek	62	67	71	1.08	1.15
Major Creek	52.5	61	75.2	1.16	1.43
Pine Creek (Jupiter Cyn to Headwaters)	45.8	54	61.5	1.18	1.34
Pine Creek (Mouth to Jupiter Cyn)	14	95.5	96.2	6.82	6.87
Wood Gulch	63.8	69.2	77.2	1.08	1.21

Total Estimated Improvement for	Middle Columbia Tributaries Steelhead	Year 10 Impr.	Year 25 Impr.
		2.25	2.38

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Middle Fork John Day Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Big Boulder Creek	38	76	88	2	2.32
Big Creek	36	76	93	2.11	2.58
Butte Creek	29.5	57.8	77.8	1.96	2.64
Camp Creek	13.8	65.8	77.5	4.77	5.62
Dead Cow Gulch	17	87	92	5.12	5.41
Granite Boulder Creek	28.2	66.8	86.8	2.37	3.08
Middle Fork John Day River	44.8	80	91	1.79	2.03
Ragged Creek	32.5	61.2	85	1.88	2.62
Rubby Creek	28.5	62	86.5	2.18	3.04
Vincent Creek	47.5	72	90	1.52	1.89
Vinegar Creek	38.2	83.2	88.2	2.18	2.31

Total Estimated Improvement for	**Middle Fork John Day Summer Steelhead**	**Year 10 Impr.**	**Year 25 Impr.**
		2.04	**2.37**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Naches River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Naches River	70.1	76.2	85.3	1.09	1.22

Total Estimated Improvement for	Naches River Summer Steelhead	Year 10 Impr.	Year 25 Impr.
		1.09	**1.22**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

North Fork John Day Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Lower N Fk. JD and tribs (mouth to M Fk.)	36.5	37.3	38.5	1.02	1.05
Mid N Fk. JD and tribs (M Fk. to and including Camas Cr.)	45	56.5	68	1.26	1.51
Upper N Fk. JD and tribs above Camas Cr.	62	72	82	1.16	1.32

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**North Fork John Day Summer Steelhead**	**1.17**	**1.32**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Rock Creek Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Luna Gulch	65.5	70.5	76	1.08	1.16
Quartz Creek	40.5	51.2	70	1.26	1.73
Rock Creek (Bickleton Road to Headwaters)	38	47.5	66.8	1.25	1.76
Rock Creek (Mouth to Bickleton Road)	35.8	45.5	59	1.27	1.65
Squaw Creek (including Harrison Creek)	65.5	70.5	76	1.08	1.16

Total Estimated Improvement for Rock Creek Steelhead	Year 10 Impr.	Year 25 Impr.
	1.2	**1.52**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Satus Creek Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Satus Creek	75	80	85.8	1.07	1.14

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Satus Creek Summer Steelhead	1.07	1.14

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

South Fork John Day Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
South Fork John Day River	53	78	80.4	1.47	1.52

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
South Fork John Day Summer Steelhead	1.47	1.52

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Toppenish Creek Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Toppenish Creek	63	71	77.8	1.13	1.23

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Toppenish Creek Summer Steelhead	1.13	1.23

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Umatilla River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Birch Creek	36	55.8	73	1.55	2.03
Meacham Creek	37.5	55.5	74.5	1.48	1.99
Umatilla above McKay Creek	43	53	63	1.23	1.47
Umatilla below McKay Creek	43	53	63	1.23	1.47

Total Estimated Improvement for Umatilla River Summer Steelhead	Year 10 Impr.	Year 25 Impr.
	1.37	**1.74**

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Upper John Day Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Canyon Creek	10	12	13	1.2	1.3
John Day River	33	53	66	1.61	2
Strawberry Creek	14.5	62.5	70.5	4.31	4.86

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Upper John Day Summer Steelhead	1.84	2.22

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Upper Yakima River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Upper Yakima River	61.6	67.6	75.4	1.1	1.22

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Upper Yakima River Summer Steelhead	1.1	1.22

ESU: Middle Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Walla Walla River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Mill Creek	25	56	76	2.24	3.04
Touchet Below Forks	30	38	48	1.27	1.6
Touchet N & S Forks	32	38	56	1.19	1.75
Walla Walla below Forks	28	40	54	1.43	1.93
Walla Walla N & S forks	56	61	66	1.09	1.18

Total Estimated Improvement for Walla Walla River Summer Steelhead

Year 10 Impr.	Year 25 Impr.
1.43	**1.9**

Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed

Future improvements to limiting factors are estimates from the best professional judgement of tribal biologists, assuming the implementation of all tribal habitat actions in the MOA. Limiting factors are weighted as to their relative importance in order to calculate watershed improvements.

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
All Yakima Steelhead (Mainstem Effects)							
Lower Yakima River	Ecologic – Community	80	85	90	**73.8**	**81.4**	**86.2**
	In-channel Characteristics	70	75	80			
	Passage / Entrainment	100	100	100			
	Pools	90	91	92			
	Riparian / Floodplain	70	75	80			
	Sediment	70	75	80			
	Side Channel Reconnection	80	82	85			
	Water Quality – Chemistry	80	90	92			
	Water Quality - Temperature	70	80	85			
	Water Quality - Toxics	80	90	92			
	Water Quantity – Flow	50	70	80			
	Watershed - Hydrology	75	85	90			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Deschutes River Eastside Tributaries Summer Steelhead							
Buck Hollow Creek	In-channel Characteristics	60	60	60	**61.2**	**61.2**	**61.2**
	Water Quality - Temperature	65	65	65			
	Water Quantity – Flow	60	60	60			
Deschutes River (Mainstem Effects)	Riparian / Floodplain	75	85	90	**76.5**	**85.8**	**90**
	Sediment	85	90	90			
Trout Creek	In-channel Characteristics	35	35	35	**33.5**	**33.5**	**33.5**
	Riparian / Floodplain	25	25	25			
	Water Quantity – Flow	40	40	40			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Deschutes River Westside Tributaries Summer Steelhead							
Badger/Boulder/Eagle/Nena/Skookum	In-channel Characteristics	40	65	85	**47.2**	**69.8**	**81.5**
	Passage / Entrainment	90	95	100			
	Riparian / Floodplain	35	70	80			
	Watershed - Hydrology	65	70	80			
Beaver Creek	In-channel Characteristics	40	60	75	**46.6**	**63**	**84.2**
	Sediment	55	70	85			
	Water Quality – Chemistry	50	60	95			
	Water Quality - Temperature	30	50	85			
	Water Quality - Toxics	50	65	95			
Oak Creek	Passage / Entrainment	0	100	100	**30**	**92.5**	**96.2**
	Riparian / Floodplain	40	90	95			
Shitike Creek	In-channel Characteristics	40	80	85	**45**	**77.4**	**83.6**
	Riparian / Floodplain	35	55	60			
	Water Quality – Chemistry	70	80	85			
	Water Quality - Temperature	60	70	80			
Warm Springs River	In-channel Characteristics	85	90	95	**84.5**	**90**	**94.5**
	Riparian / Floodplain	80	90	90			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Hood River Summer Steelhead							
West Fork Hood River	In-channel Characteristics	75	80	85	**75**	**80**	**85**

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Hood River Winter Steelhead							
East Fork Hood River	In-channel Characteristics	70	80	85	**70**	**80.8**	**85.8**
	Riparian / Floodplain	70	85	90			
Middle Fork Hood River	In-channel Characteristics	70	80	90	**70**	**80**	**90**
Middle Fork Hood River (Clear Branch)	Passage / Entrainment	15	80	90	**15**	**80**	**90**
Middle Fork Hood River (Eliot Branch)	Passage / Entrainment	10	85	95	**10**	**85**	**95**

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Klickitat River Steelhead							
Klickitat Canyon	Ecologic – Community	80	80	80	**78.8**	**78.8**	**78.8**
	Sediment	90	90	90			
	Watershed - Hydrology	75	75	75			
Lower Klickitat River	Ecologic – Community	30	30	30	**51**	**52.5**	**52.5**
	In-channel Characteristics	40	40	40			
	Passage / Entrainment	90	90	90			
	Pools	60	60	60			
	Riparian / Floodplain	30	35	35			
	Sediment	90	90	90			
	Side Channel Reconnection	20	30	30			
	Water Quality - Temperature	80	80	80			
	Water Quantity – Flow	90	90	90			
	Watershed - Hydrology	90	90	90			
Lower Little Klickitat River	Ecologic – Community	80	80	80	**61.5**	**62**	**63.5**
	In-channel Characteristics	60	60	60			
	Pools	80	80	80			
	Riparian / Floodplain	60	60	65			
	Sediment	70	75	80			
	Water Quality - Temperature	70	70	70			
	Water Quantity – Flow	50	50	50			
	Watershed - Hydrology	60	60	65			
Middle Klickitat River	Ecologic – Community	30	50	60	**62.4**	**73.2**	**80.3**
	In-channel Characteristics	60	70	80			
	Passage / Entrainment	95	95	95			
	Pools	70	80	85			
	Riparian / Floodplain	60	70	80			
	Sediment	90	90	90			
	Side Channel Reconnection	70	85	90			
	Water Quality - Temperature	90	90	90			
	Watershed - Hydrology	80	82	85			
Swale Creek	Ecologic – Community	40	45	50	**39.2**	**47.6**	**53**
	In-channel Characteristics	20	30	40			
	Pools	10	30	40			
	Sediment	80	85	90			
	Water Quality - Temperature	70	70	70			
	Water Quantity – Flow	60	60	60			
	Watershed - Hydrology	90	90	90			
Trout Creek	In-channel Characteristics	60	70	80	**55.5**	**60.2**	**65.8**

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Trout Creek	Passage / Entrainment	80	80	80	**55.5**	**60.2**	**65.8**
	Pools	70	75	75			
	Riparian / Floodplain	50	55	65			
	Sediment	50	55	60			
	Watershed - Hydrology	50	50	50			
Upper Klickitat River	Ecologic – Community	30	50	60	**56.8**	**66.2**	**72.8**
	In-channel Characteristics	50	60	65			
	Passage / Entrainment	90	90	90			
	Pools	70	80	85			
	Riparian / Floodplain	50	60	70			
	Sediment	60	65	70			
	Side Channel Reconnection	60	70	80			
	Water Quality - Temperature	80	80	80			
	Watershed - Hydrology	60	65	70			
Upper Little Klickitat River	Ecologic – Community	60	60	60	**47.4**	**47.8**	**48.5**
	In-channel Characteristics	50	50	50			
	Passage / Entrainment	85	85	85			
	Pools	70	70	70			
	Riparian / Floodplain	30	30	30			
	Sediment	65	65	65			
	Side Channel Reconnection	0	0	0			
	Water Quality – Chemistry	70	70	70			
	Water Quality - Temperature	40	40	40			
	Water Quantity – Flow	50	50	50			
	Watershed - Hydrology	50	55	65			
Upper Middle Klickitat River	Ecologic – Community	70	70	70	**75.8**	**76.4**	**77**
	In-channel Characteristics	85	85	85			
	Pools	85	85	85			
	Riparian / Floodplain	75	75	75			
	Sediment	90	92	94			
	Watershed - Hydrology	70	75	80			
West Fork Klickitat River	Sediment	90	92	95	**90**	**92**	**95**
White Creek	Ecologic – Community	80	85	85	**45**	**52.2**	**59.2**
	In-channel Characteristics	40	50	60			
	Passage / Entrainment	60	80	90			
	Pools	35	35	35			
	Riparian / Floodplain	30	40	55			
	Sediment	50	55	70			
	Water Quality - Temperature	60	65	65			
	Watershed - Hydrology	50	55	60			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Lower John Day Summer Steelhead							
Butte Creek	Passage / Entrainment	45	65	70	**36.5**	**62.2**	**69**
	Riparian / Floodplain	35	60	70			
	Water Quality - Temperature	30	65	70			
	Water Quantity – Flow	25	55	65			
Pine Creek	Riparian / Floodplain	85	90	95	**68.5**	**76.2**	**86.8**
	Watershed - Hydrology	55	65	80			
Pine Hollow	In-channel Characteristics	45	60	80	**47**	**64**	**84**
	Riparian / Floodplain	50	70	90			
Thirtymile Creek	Passage / Entrainment	35	75	90	**40.5**	**64.5**	**77.8**
	Pools	45	60	70			
	Riparian / Floodplain	45	70	80			
	Sediment	55	65	70			
	Water Quality - Temperature	45	55	75			
	Water Quantity – Flow	40	55	60			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Middle Columbia Tributaries Steelhead							
Alder Creek	In-channel Characteristics	65	70	80	**64.2**	**69.2**	**77**
	Riparian / Floodplain	60	65	75			
	Sediment	60	65	70			
	Water Quality - Temperature	60	65	70			
	Watershed - Hydrology	70	75	80			
Glade Creek	Ecologic – Community	75	80	80	**62**	**67**	**71**
	In-channel Characteristics	70	75	80			
	Riparian / Floodplain	65	70	75			
	Sediment	60	65	70			
	Water Quality - Temperature	65	70	75			
	Water Quality - Toxics	65	70	70			
	Watershed - Hydrology	50	55	60			
Major Creek	In-channel Characteristics	40	50	70	**52.5**	**61**	**75.2**
	Pools	40	50	70			
	Riparian / Floodplain	65	75	85			
	Sediment	65	70	80			
	Water Quality - Temperature	70	75	80			
	Watershed - Hydrology	70	75	80			
Pine Creek (Jupiter Cyn to Headwaters)	In-channel Characteristics	60	65	70	**45.8**	**54**	**61.5**
	Sediment	70	75	75			
	Water Quality - Temperature	80	85	85			
	Watershed - Hydrology	35	45	55			
Pine Creek (Mouth to Jupiter Cyn)	In-channel Characteristics	70	75	80	**14**	**95.5**	**96.2**
	Passage / Entrainment	5	100	100			
	Water Quality - Temperature	60	65	70			
	Watershed - Hydrology	65	70	75			
Wood Gulch	In-channel Characteristics	60	70	80	**63.8**	**69.2**	**77.2**
	Riparian / Floodplain	50	60	75			
	Sediment	60	65	70			
	Water Quality - Temperature	60	65	70			
	Watershed - Hydrology	75	75	80			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Middle Fork John Day Summer Steelhead							
Big Boulder Creek	In-channel Characteristics	40	80	90	**38**	**76**	**88**
	Pools	35	70	85			
Big Creek	In-channel Characteristics	40	80	95	**36**	**76**	**93**
	Pools	30	70	90			
Butte Creek	In-channel Characteristics	35	55	75	**29.5**	**57.8**	**77.8**
	Pools	25	60	80			
Camp Creek	In-channel Characteristics	50	70	85	**13.8**	**65.8**	**77.5**
	Passage / Entrainment	0	70	75			
	Pools	20	45	85			
	Water Quality - Temperature	10	60	75			
	Water Quantity – Flow	25	45	65			
Dead Cow Gulch	Pools	15	85	90	**17**	**87**	**92**
	Riparian / Floodplain	20	90	95			
Granite Boulder Creek	Passage / Entrainment	30	65	85	**28.2**	**66.8**	**86.8**
	Pools	25	70	90			
Middle Fork John Day River	In-channel Characteristics	35	90	95	**44.8**	**80**	**91**
	Riparian / Floodplain	55	90	95			
	Water Quality – Chemistry	60	85	90			
	Water Quality - Temperature	45	75	90			
	Water Quantity – Flow	55	75	85			
Ragged Creek	In-channel Characteristics	35	60	85	**32.5**	**61.2**	**85**
	Pools	25	65	85			
Rubby Creek	In-channel Characteristics	30	65	85	**28.5**	**62**	**86.5**
	Pools	25	55	90			
Vincent Creek	In-channel Characteristics	55	75	90	**47.5**	**72**	**90**
	Pools	30	65	90			
Vinegar Creek	In-channel Characteristics	40	85	90	**38.2**	**83.2**	**88.2**
	Pools	35	80	85			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Naches River Summer Steelhead							
Naches River	Ecologic – Community	90	92	95	**70.1**	**76.2**	**85.3**
	In-channel Characteristics	70	75	85			
	Passage / Entrainment	85	90	95			
	Pools	70	75	80			
	Riparian / Floodplain	60	65	75			
	Sediment	70	75	85			
	Side Channel Reconnection	70	75	80			
	Water Quality – Chemistry	95	95	95			
	Water Quality - Temperature	80	85	90			
	Water Quality - Toxics	98	98	98			
	Water Quantity – Flow	40	55	75			
	Watershed - Hydrology	70	77	92			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
North Fork John Day Summer Steelhead							
Lower N Fk. JD and tribs (mouth to M Fk.)	In-channel Characteristics	40	40	40	**36.5**	**37.3**	**38.5**
	Passage / Entrainment	30	30	30			
	Riparian / Floodplain	40	42	45			
	Sediment	40	42	45			
Mid N Fk. JD and tribs (M Fk. to and including Camas Cr.)	In-channel Characteristics	40	50	60	**45**	**56.5**	**68**
	Passage / Entrainment	50	70	90			
	Riparian / Floodplain	40	50	60			
	Sediment	50	60	70			
	Water Quality - Temperature	50	60	70			
Upper N Fk. JD and tribs above Camas Cr.	In-channel Characteristics	60	70	80	**62**	**72**	**82**
	Passage / Entrainment	70	80	90			
	Riparian / Floodplain	60	70	80			
	Sediment	60	70	80			
	Water Quality - Temperature	60	70	80			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Rock Creek Steelhead							
Luna Gulch	In-channel Characteristics	70	75	80	**65.5**	**70.5**	**76**
	Riparian / Floodplain	70	75	80			
	Sediment	60	65	75			
	Water Quality - Temperature	60	65	70			
	Water Quality - Toxics	65	70	75			
	Watershed - Hydrology	60	65	70			
Quartz Creek	In-channel Characteristics	40	55	70	**40.5**	**51.2**	**70**
	Riparian / Floodplain	40	50	70			
	Sediment	70	80	85			
	Water Quality - Temperature	60	65	75			
	Watershed - Hydrology	30	40	65			
Rock Creek (Bickleton Road to Headwaters)	In-channel Characteristics	35	45	55	**38**	**47.5**	**66.8**
	Riparian / Floodplain	40	50	70			
	Sediment	75	80	85			
	Water Quality - Temperature	60	65	75			
	Watershed - Hydrology	30	40	65			
Rock Creek (Mouth to Bickleton Road)	Ecologic – Community	60	65	70	**35.8**	**45.5**	**59**
	In-channel Characteristics	25	40	60			
	Riparian / Floodplain	30	40	60			
	Water Quality – Chemistry	70	75	80			
	Water Quality - Temperature	50	55	55			
	Water Quantity – Flow	40	45	50			
Squaw Creek (including Harrison Creek)	In-channel Characteristics	70	75	80	**65.5**	**70.5**	**76**
	Riparian / Floodplain	70	75	80			
	Sediment	60	65	75			
	Water Quality - Temperature	60	65	70			
	Water Quality - Toxics	65	70	75			
	Watershed - Hydrology	60	65	70			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Satus Creek Summer Steelhead							
Satus Creek	Ecologic – Community	90	92	95	**75**	**80**	**85.8**
	In-channel Characteristics	85	90	95			
	Passage / Entrainment	90	100	100			
	Pools	80	85	90			
	Riparian / Floodplain	65	70	80			
	Sediment	85	90	95			
	Side Channel Reconnection	80	85	90			
	Water Quality – Chemistry	85	92	95			
	Water Quality - Temperature	70	75	80			
	Water Quality - Toxics	98	98	99			
	Water Quantity – Flow	60	65	75			
	Watershed - Hydrology	60	63	70			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
South Fork John Day Summer Steelhead							
South Fork John Day River	In-channel Characteristics	70	85	87	**53**	**78**	**80.4**
	Riparian / Floodplain	45	90	95			
	Water Quality - Temperature	60	80	80			
	Water Quantity – Flow	45	45	45			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Toppenish Creek Summer Steelhead							
Toppenish Creek	Ecologic – Community	90	92	95	**63**	**71**	**77.8**
	In-channel Characteristics	50	60	70			
	Passage / Entrainment	65	75	75			
	Pools	70	75	80			
	Riparian / Floodplain	55	60	70			
	Sediment	50	55	65			
	Side Channel Reconnection	70	75	80			
	Water Quality – Chemistry	82	87	92			
	Water Quality - Temperature	65	75	85			
	Water Quality - Toxics	95	96	97			
	Water Quantity – Flow	40	60	70			
	Watershed - Hydrology	70	75	80			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Umatilla River Summer Steelhead							
Birch Creek	In-channel Characteristics	40	60	80	**36**	**55.8**	**73**
	Passage / Entrainment	50	75	90			
	Riparian / Floodplain	20	35	50			
	Sediment	40	55	70			
	Water Quality - Temperature	30	50	70			
Meacham Creek	In-channel Characteristics	40	60	80	**37.5**	**55.5**	**74.5**
	Riparian / Floodplain	30	50	70			
	Sediment	50	60	80			
	Water Quality - Temperature	40	55	70			
Umatilla above McKay Creek	In-channel Characteristics	50	60	70	**43**	**53**	**63**
	Riparian / Floodplain	40	50	60			
	Sediment	40	50	60			
	Water Quality - Temperature	40	50	60			
Umatilla below McKay Creek	In-channel Characteristics	50	60	70	**43**	**53**	**63**
	Riparian / Floodplain	40	50	60			
	Sediment	40	50	60			
	Water Quality - Temperature	40	50	60			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Upper John Day Summer Steelhead							
Canyon Creek	Passage / Entrainment	10	12	13	**10**	**12**	**13**
John Day River	In-channel Characteristics	5	25	30	**33**	**53**	**66**
	Passage / Entrainment	40	60	75			
Strawberry Creek	Passage / Entrainment	10	70	75	**14.5**	**62.5**	**70.5**
	Water Quantity – Flow	25	45	60			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Upper Yakima River Summer Steelhead							
Upper Yakima River	Ecologic – Community	80	85	90	**61.6**	**67.6**	**75.4**
	In-channel Characteristics	60	65	70			
	Passage / Entrainment	70	75	75			
	Pools	70	75	80			
	Riparian / Floodplain	40	45	55			
	Sediment	80	82	87			
	Side Channel Reconnection	70	75	80			
	Water Quality – Chemistry	90	92	95			
	Water Quality - Temperature	80	85	90			
	Water Quality - Toxics	95	96	97			
	Water Quantity – Flow	40	55	75			
	Watershed - Hydrology	40	45	55			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Walla Walla River Summer Steelhead							
Mill Creek	In-channel Characteristics	25	60	80	**25**	**56**	**76**
	Passage / Entrainment	25	60	80			
	Riparian / Floodplain	25	40	60			
Touchet Below Forks	In-channel Characteristics	25	30	40	**30**	**38**	**48**
	Passage / Entrainment	50	70	80			
	Riparian / Floodplain	25	30	40			
Touchet N & S Forks	In-channel Characteristics	25	30	50	**32**	**38**	**56**
	Passage / Entrainment	60	70	80			
	Riparian / Floodplain	25	30	50			
Walla Walla below Forks	In-channel Characteristics	25	35	50	**28**	**40**	**54**
	Passage / Entrainment	50	70	80			
	Riparian / Floodplain	20	30	45			
Walla Walla N & S forks	In-channel Characteristics	50	55	60	**56**	**61**	**66**
	Passage / Entrainment	80	85	90			
	Riparian / Floodplain	50	55	60			

ESU: Middle Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years

Estimated Productivity Benefit from Habitat Actions by Watershed/Population

ESU: Snake River Spring/Summer Chinook

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Tucannon River Spring Chinook

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Tucannon River	55.6	57.8	58.5	1.04	1.05

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Tucannon River Spring Chinook**	**1.04**	**1.05**

ESU: Snake River Spring/Summer Chinook

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Upper Grande Ronde Spring Chinook

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Catherine Creek	44	54	70	1.23	1.59
Mid Grande Ronde River and tribs	28	36	44	1.29	1.57
Upper Grande Ronde River and tribs	34	44	54	1.29	1.59

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Upper Grande Ronde Spring Chinook**	**1.28**	**1.59**

Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed

Future improvements to limiting factors are estimates from the best professional judgement of tribal biologists, assuming the implementation of all tribal habitat actions in the MOA. Limiting factors are weighted as to their relative importance in order to calculate watershed improvements.

ESU: Snake River Spring/Summer Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Tucannon River Spring Chinook							
Tucannon River	Barriers and Screens	95	96	96	**55.6**	**57.8**	**58.5**
	Floodplain confinement	67	70	70			
	Habitat diversity (LWD)	50	50	50			
	High water temperature	34	34	34			
	High water turbidity	50	65	70			
	Low stream flow	85	86	88			
	Riparian degradation	44	44	44			

ESU: Snake River Spring/Summer Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Upper Grande Ronde Spring Chinook							
Catherine Creek	In-channel Characteristics	40	50	70	**44**	**54**	**70**
	Riparian / Floodplain	50	60	70			
	Water Quality - Temperature	40	50	70			
Mid Grande Ronde River and tribs	In-channel Characteristics	25	35	45	**28**	**36**	**44**
	Riparian / Floodplain	35	45	55			
	Sediment	25	30	35			
	Water Quality - Temperature	25	30	35			
Upper Grande Ronde River and tribs	In-channel Characteristics	40	50	60	**34**	**44**	**54**
	Riparian / Floodplain	40	50	60			
	Sediment	30	40	50			
	Water Quality - Temperature	20	30	40			

ESU: Snake River Spring/Summer Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years

Estimated Productivity Benefit from Habitat Actions by Watershed/Population

ESU: Snake River Basin Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Tucannon River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Tucannon River	57.8	62.4	63	1.08	1.09

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Tucannon River Summer Steelhead	**1.08**	**1.09**

ESU: Snake River Basin Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Upper Grande Ronde Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Catherine Creek	44	54	70	1.23	1.59
Mid Grande Ronde River and tribs	28	36	44	1.29	1.57
Upper Grande Ronde River and tribs	34	44	54	1.29	1.59

Total Estimated Improvement for	Year 10 Impr.	Year 25 Impr.
Upper Grande Ronde Summer Steelhead	1.28	1.59

Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed

Future improvements to limiting factors are estimates from the best professional judgement of tribal biologists, assuming the implementation of all tribal habitat actions in the MOA. Limiting factors are weighted as to their relative importance in order to calculate watershed improvements.

ESU: Snake River Basin Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Tucannon River Summer Steelhead							
Tucannon River	Barriers and Screens	95	96	96	**57.8**	**62.4**	**63**
	Floodplain confinement	60	70	70			
	Habitat diversity (LWD)	40	50	50			
	High water temperature	65	65	65			
	High water turbidity	60	65	70			
	Low stream flow	95	96	97			
	Riparian degradation	44	44	44			

ESU: Snake River Basin Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Upper Grande Ronde Summer Steelhead							
Catherine Creek	In-channel Characteristics	40	50	70	**44**	**54**	**70**
	Riparian / Floodplain	50	60	70			
	Water Quality - Temperature	40	50	70			
Mid Grande Ronde River and tribs	In-channel Characteristics	25	35	45	**28**	**36**	**44**
	Riparian / Floodplain	35	45	55			
	Sediment	25	30	35			
	Water Quality - Temperature	25	30	35			
Upper Grande Ronde River and tribs	In-channel Characteristics	40	50	60	**34**	**44**	**54**
	Riparian / Floodplain	40	50	60			
	Sediment	30	40	50			
	Water Quality - Temperature	20	30	40			

ESU: Snake River Basin Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years

Estimated Productivity Benefit from Habitat Actions by Watershed/Population

ESU: Upper Columbia River Spring Chinook

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Entiat River Spring Chinook

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Entiat River (Lower)	48.2	61.4	65.2	1.27	1.35
Entiat River (Middle - Stillwater)	65.4	77.2	81.9	1.18	1.25
Mad River	90.8	97.1	98.9	1.07	1.09

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Entiat River Spring Chinook**	**1.19**	**1.26**

ESU: Upper Columbia River Spring Chinook

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Methow River Spring Chinook

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Beaver/Bear Creek	62.9	65.1	67.6	1.03	1.07
Black Canyon - Squaw Creek	80.3	81.9	82.9	1.02	1.03
Chewuch River (Lower)	72.3	75	76.8	1.04	1.06
Chewuch River (Upper)	81.5	81.5	81.5	1	1
Goat Creek/ Little Boulder Creek	68	68	68	1	1
Gold/Libby Creek	67.2	71.2	75	1.06	1.12
Methow River (Lower, to Carlton)	84.1	85	87.5	1.01	1.04
Methow River (Middle, Carlton to Weeman Br)	64	66.8	71.8	1.04	1.12
Methow River (Middle, Weeman Br to Lost R)	90.5	95.1	95.3	1.05	1.05
Methow River (Upper - Early Winters/Lost)	87.6	89.3	92.2	1.02	1.05
Twisp River (Lower)	50.5	53	55	1.05	1.09
Twisp River (Upper)	85.5	89	93.8	1.04	1.1
Wolf Creek / Hancock Creek	50.5	56.2	61.8	1.11	1.22

Total Estimated Improvement for	**Methow River Spring Chinook**	**Year 10 Impr.**	**Year 25 Impr.**
		1.01	**1.06**

ESU: Upper Columbia River Spring Chinook

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Wenatchee River Spring Chinook

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Chiwawa River	91.8	93.4	95.1	1.02	1.04
Chumstick Creek	67.5	68.5	71.5	1.01	1.06
Icicle Creek	70.2	73.4	76	1.05	1.08
Little Wenatchee	90.2	92.2	94.2	1.02	1.04
Mission Creek	43.8	43.8	43.8	1	1
Nason Creek	65	72.3	78.8	1.11	1.21
North Side Tributaries	60	60	60	1	1
Peshastin Creek	59.8	75.5	79.2	1.26	1.32
Wenatchee River (Lower)	68	68	68	1	1
Wenatchee River (Upper + Chiwaukum)	80.5	85.2	90	1.06	1.12
White River	89.8	91.5	93.2	1.02	1.04

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Wenatchee River Spring Chinook**	**1.07**	**1.11**

Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed

Future improvements to limiting factors are estimates from the best professional judgement of tribal biologists, assuming the implementation of all tribal habitat actions in the MOA. Limiting factors are weighted as to their relative importance in order to calculate watershed improvements.

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Entiat River Spring Chinook							
Entiat River (Lower)	Ecologic – Community	80	85	90	**48.2**	**61.4**	**65.2**
	In-channel Characteristics	15	50	50			
	Passage / Entrainment	90	90	90			
	Riparian / Floodplain	25	35	50			
	Sediment	70	72	75			
	Side Channel Reconnection	10	15	15			
	Water Quality – Chemistry	80	80	80			
	Water Quality - Temperature	80	83	90			
	Water Quantity – Flow	80	80	80			
Entiat River (Middle - Stillwater)	Ecologic - Community	75	80	85	**65.4**	**77.2**	**81.9**
	In-channel Characteristics	60	75	80			
	Passage / Entrainment	93	93	93			
Mad River	In-channel Characteristics	90	97	99	**90.8**	**97.1**	**98.9**
	Passage / Entrainment	98	98	98			

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Methow River Spring Chinook							
Beaver/Bear Creek	Ecologic - Community	80	83	85	**62.9**	**65.1**	**67.6**
	In-channel Characteristics	60	65	70			
	Passage / Entrainment	68	68	68			
	Riparian / Floodplain	60	70	85			
	Sediment	75	75	75			
	Water Quantity – Flow	40	40	40			
Black Canyon - Squaw Creek	In-channel Characteristics	90	93	93	**80.3**	**81.9**	**82.9**
	Passage / Entrainment	91	91	91			
	Pools	90	90	90			
	Riparian / Floodplain	80	85	90			
	Water Quantity – Flow	50	50	50			
Chewuch River (Lower)	Ecologic - Community	80	85	90	**72.3**	**75**	**76.8**
	In-channel Characteristics	55	65	70			
	Passage / Entrainment	88	88	88			
	Riparian / Floodplain	55	55	55			
	Sediment	90	90	90			
	Water Quality - Temperature	80	80	80			
	Water Quantity – Flow	75	75	75			
Chewuch River (Upper)	Ecologic - Community	85	85	85	**81.5**	**81.5**	**81.5**
	In-channel Characteristics	80	80	80			
	Riparian / Floodplain	80	80	80			
	Sediment	80	80	80			
Goat Creek/ Little Boulder Creek	In-channel Characteristics	50	50	50	**68**	**68**	**68**
	Passage / Entrainment	70	70	70			
	Pools	80	80	80			
	Water Quantity – Flow	80	80	80			
Gold/Libby Creek	Ecologic - Community	80	80	80	**67.2**	**71.2**	**75**
	In-channel Characteristics	45	55	60			
	Passage / Entrainment	95	100	100			
	Pools	45	45	45			
	Riparian / Floodplain	45	55	75			
	Water Quantity – Flow	80	80	80			
Methow River (Lower, to Carlton)	Ecologic - Community	70	70	80	**84.1**	**85**	**87.5**
	In-channel Characteristics	93	93	93			
	Pools	85	85	85			
	Water Quality - Temperature	70	72	80			
	Water Quantity – Flow	93	95	95			

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Methow River (Middle, Carlton to Weeman Br)	Ecologic - Community	70	70	75	**64**	**66.8**	**71.8**
	In-channel Characteristics	55	60	65			
	Passage / Entrainment	70	70	70			
	Pools	60	65	75			
	Water Quantity – Flow	75	75	75			
Methow River (Middle, Weeman Br to Lost R)	Ecologic - Community	90	95	95	**90.5**	**95.1**	**95.3**
	In-channel Characteristics	85	95	95			
	Water Quality - Temperature	95	96	98			
	Water Quantity – Flow	95	95	95			
Methow River (Upper - Early Winters/Lost)	Ecologic - Community	90	95	95	**87.6**	**89.3**	**92.2**
	In-channel Characteristics	85	85	85			
	Passage / Entrainment	98	98	98			
	Riparian / Floodplain	75	80	90			
	Sediment	90	90	95			
Twisp River (Lower)	Ecologic – Community	80	85	90	**50.5**	**53**	**55**
	In-channel Characteristics	55	65	70			
	Passage / Entrainment	55	55	55			
	Pools	55	55	55			
	Riparian / Floodplain	55	65	75			
	Sediment	80	80	80			
	Water Quality - Temperature	60	60	60			
	Water Quantity – Flow	20	20	20			
Twisp River (Upper)	Ecologic - Community	80	85	90	**85.5**	**89**	**93.8**
	In-channel Characteristics	93	95	97			
	Riparian / Floodplain	80	85	95			
	Sediment	95	95	95			
	Water Quantity – Flow	95	95	95			
Wolf Creek / Hancock Creek	In-channel Characteristics	40	55	65	**50.5**	**56.2**	**61.8**
	Pools	40	40	40			
	Riparian / Floodplain	50	55	65			
	Water Quantity – Flow	80	80	80			

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Wenatchee River Spring Chinook							
Chiwawa River	Ecologic – Community	85	90	95	**91.8**	**93.4**	**95.1**
	In-channel Characteristics	95	95	95			
	Passage / Entrainment	93	93	93			
	Pools	95	95	95			
	Riparian / Floodplain	93	95	97			
Chumstick Creek	In-channel Characteristics	55	55	55	**67.5**	**68.5**	**71.5**
	Passage / Entrainment	70	70	70			
	Riparian / Floodplain	55	60	75			
	Water Quality – Chemistry	85	85	85			
	Water Quality - Temperature	80	80	80			
	Water Quantity – Flow	70	70	70			
Icicle Creek	In-channel Characteristics	70	75	75	**70.2**	**73.4**	**76**
	Passage / Entrainment	55	55	55			
	Riparian / Floodplain	70	75	85			
	Sediment	90	92	95			
	Water Quantity – Flow	55	55	55			
Little Wenatchee	Ecologic – Community	85	90	95	**90.2**	**92.2**	**94.2**
	In-channel Characteristics	97	97	97			
	Riparian / Floodplain	90	90	90			
	Sediment	95	95	95			
Mission Creek	In-channel Characteristics	20	20	20	**43.8**	**43.8**	**43.8**
	Passage / Entrainment	70	70	70			
	Riparian / Floodplain	55	55	55			
	Sediment	70	70	70			
	Water Quality - Temperature	55	55	55			
	Water Quantity – Flow	20	20	20			
Nason Creek	Ecologic – Community	55	70	80	**65**	**72.3**	**78.8**
	In-channel Characteristics	55	65	75			
	Passage / Entrainment	93	93	93			
	Water Quality - Temperature	80	80	80			
North Side Tributaries	Passage / Entrainment	60	60	60	**60**	**60**	**60**
Peshastin Creek	In-channel Characteristics	55	75	80	**59.8**	**75.5**	**79.2**
	Passage / Entrainment	93	98	98			
	Water Quality - Temperature	98	98	98			
	Water Quantity – Flow	20	40	45			
Wenatchee River (Lower)	In-channel Characteristics	60	60	60	**68**	**68**	**68**

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Wenatchee River (Lower)	Water Quality - Temperature	80	80	80	**68**	**68**	**68**
	Water Quantity – Flow	70	70	70			
Wenatchee River (Upper + Chiwaukum)	In-channel Characteristics	80	85	90	**80.5**	**85.2**	**90**
	Passage / Entrainment	90	90	90			
White River	Ecologic – Community	80	85	90	**89.8**	**91.5**	**93.2**
	In-channel Characteristics	95	95	95			

ESU: Upper Columbia River Spring Chinook

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years

Estimated Productivity Benefit from Habitat Actions by Watershed/Population

ESU: Upper Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Entiat River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Entiat River (Lower)	48.2	61.4	65.2	1.27	1.35
Entiat River (Middle - Stillwater)	72.4	77.2	81.9	1.07	1.13
Mad River	90.8	97.1	98.9	1.07	1.09

		Year 10 Impr.	Year 25 Impr.
Total Estimated Improvement for	**Entiat River Summer Steelhead**	**1.13**	**1.18**

ESU: Upper Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Methow River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Beaver/Bear Creek	62.9	65.1	67.6	1.03	1.07
Black Canyon - Squaw Creek	80.3	81.9	82.9	1.02	1.03
Chewuch River (Lower)	72.3	75	76.8	1.04	1.06
Chewuch River (Upper)	81.5	81.5	81.5	1	1
Goat Creek/ Little Boulder Creek	68	68	68	1	1
Gold/Libby Creek	67.2	71.2	75	1.06	1.12
Methow River (Lower, to Carlton)	82.8	83.8	86.2	1.01	1.04
Methow River (Middle, Carlton to Weeman Br)	64	66.8	71.8	1.04	1.12
Methow River (Middle, Weeman Br to Lost R)	90.5	93.6	95.3	1.03	1.05
Methow River (Upper - Early Winters/Lost)	75	80	90	1.07	1.2
Twisp River (Lower)	50.5	53	55	1.05	1.09
Twisp River (Upper)	85.5	89	93.8	1.04	1.1
Wolf Creek / Hancock Creek	50.5	56.2	61.8	1.11	1.22

Total Estimated Improvement for	**Methow River Summer Steelhead**	**Year 10 Impr.**	**Year 25 Impr.**
		1.02	**1.08**

ESU: Upper Columbia River Steelhead

Estimates of future improvements to population egg-to-smolt productivity are based on estimated watershed improvements from the implementation of all tribal habitat actions in the MOA. Population improvements are standardized where 1.0 = the current production rate. For example a productivity improvement of 1.54 = 54% improvement over current conditions. Watersheds are weighted according to their relative importance.

Wenatchee River Summer Steelhead

Watershed	Est. Future Function for Watershed (Calculated from all Limiting Factors)			Estimated Future Productivity	
	Current	10-Yr Est.	25-Yr Est.	10-Yr Impr.	25-Yr Impr.
Chiwawa River	91.8	93.4	95.1	1.02	1.04
Chumstick Creek	67.5	68.5	71.5	1.01	1.06
Icicle Creek	70.2	73.4	77.8	1.05	1.11
Little Wenatchee	90.2	92.2	94.2	1.02	1.04
Mission Creek	43.8	43.8	43.8	1	1
Nason Creek	65	72.3	78.8	1.11	1.21
North Side Tributaries	60	60	60	1	1
Peshastin Creek	62.8	76.2	80	1.21	1.27
Wenatchee River (Lower)	68	68	68	1	1
Wenatchee River (Upper + Chiwaukum)	80.5	85.2	90	1.06	1.12
White River	89.8	91.5	93.2	1.02	1.04

Total Estimated Improvement for Wenatchee River Summer Steelhead	**Year 10 Impr.**	**Year 25 Impr.**
	1.06	**1.12**

Estimated Benefits to Primary Limiting Factors (PLFs) from Habitat Actions by Population and Watershed

Future improvements to limiting factors are estimates from the best professional judgement of tribal biologists, assuming the implementation of all tribal habitat actions in the MOA. Limiting factors are weighted as to their relative importance in order to calculate watershed improvements.

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Entiat River Summer Steelhead							
Entiat River (Lower)	Ecologic – Community	80	85	90	**48.2**	**61.4**	**65.2**
	In-channel Characteristics	15	50	50			
	Passage / Entrainment	90	90	90			
	Riparian / Floodplain	25	35	50			
	Sediment	70	72	75			
	Side Channel Reconnection	10	15	15			
	Water Quality – Chemistry	80	80	80			
	Water Quality - Temperature	80	83	90			
	Water Quantity – Flow	80	80	80			
Entiat River (Middle - Stillwater)	Ecologic - Community	75	80	85	**72.4**	**77.2**	**81.9**
	In-channel Characteristics	70	75	80			
	Passage / Entrainment	93	93	93			
Mad River	In-channel Characteristics	90	97	99	**90.8**	**97.1**	**98.9**
	Passage / Entrainment	98	98	98			

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Methow River Summer Steelhead							
Beaver/Bear Creek	Ecologic - Community	80	83	85	**62.9**	**65.1**	**67.6**
	In-channel Characteristics	60	65	70			
	Passage / Entrainment	68	68	68			
	Riparian / Floodplain	60	70	85			
	Sediment	75	75	75			
	Water Quantity – Flow	40	40	40			
Black Canyon - Squaw Creek	In-channel Characteristics	90	93	93	**80.3**	**81.9**	**82.9**
	Passage / Entrainment	91	91	91			
	Pools	90	90	90			
	Riparian / Floodplain	80	85	90			
	Water Quantity – Flow	50	50	50			
Chewuch River (Lower)	Ecologic - Community	80	85	90	**72.3**	**75**	**76.8**
	In-channel Characteristics	55	65	70			
	Passage / Entrainment	88	88	88			
	Riparian / Floodplain	55	55	55			
	Sediment	90	90	90			
	Water Quality - Temperature	80	80	80			
	Water Quantity – Flow	75	75	75			
Chewuch River (Upper)	Ecologic - Community	85	85	85	**81.5**	**81.5**	**81.5**
	In-channel Characteristics	80	80	80			
	Riparian / Floodplain	80	80	80			
	Sediment	80	80	80			
Goat Creek/ Little Boulder Creek	In-channel Characteristics	50	50	50	**68**	**68**	**68**
	Passage / Entrainment	70	70	70			
	Pools	80	80	80			
	Water Quantity – Flow	80	80	80			
Gold/Libby Creek	Ecologic - Community	80	80	80	**67.2**	**71.2**	**75**
	In-channel Characteristics	45	55	60			
	Passage / Entrainment	95	100	100			
	Pools	45	45	45			
	Riparian / Floodplain	45	55	75			
	Water Quantity – Flow	80	80	80			
Methow River (Lower, to Carlton)	Ecologic - Community	70	70	70	**82.8**	**83.8**	**86.2**
	In-channel Characteristics	93	93	95			
	Pools	80	80	80			
	Water Quality - Temperature	70	72	80			
	Water Quantity – Flow	93	95	95			

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Methow River (Middle, Carlton to Weeman Br)	Ecologic - Community	70	70	75	**64**	**66.8**	**71.8**
	In-channel Characteristics	55	60	65			
	Passage / Entrainment	70	70	70			
	Pools	60	65	75			
	Water Quantity – Flow	75	75	75			
Methow River (Middle, Weeman Br to Lost R)	Ecologic - Community	90	95	95	**90.5**	**93.6**	**95.3**
	In-channel Characteristics	85	90	95			
	Water Quality - Temperature	95	96	98			
	Water Quantity – Flow	95	95	95			
Methow River (Upper - Early Winters/Lost)	Riparian / Floodplain	75	80	90	**75**	**80**	**90**
Twisp River (Lower)	Ecologic – Community	80	85	90	**50.5**	**53**	**55**
	In-channel Characteristics	55	65	70			
	Passage / Entrainment	55	55	55			
	Pools	55	55	55			
	Riparian / Floodplain	55	65	75			
	Sediment	80	80	80			
	Water Quality - Temperature	60	60	60			
	Water Quantity – Flow	20	20	20			
Twisp River (Upper)	Ecologic - Community	80	85	90	**85.5**	**89**	**93.8**
	In-channel Characteristics	93	95	97			
	Riparian / Floodplain	80	85	95			
	Sediment	95	95	95			
	Water Quantity – Flow	95	95	95			
Wolf Creek / Hancock Creek	In-channel Characteristics	40	55	65	**50.5**	**56.2**	**61.8**
	Pools	40	40	40			
	Riparian / Floodplain	50	55	65			
	Water Quantity – Flow	80	80	80			

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Wenatchee River Summer Steelhead							
Chiwawa River	Ecologic – Community	85	90	95	**91.8**	**93.4**	**95.1**
	In-channel Characteristics	95	95	95			
	Passage / Entrainment	93	93	93			
	Pools	95	95	95			
	Riparian / Floodplain	93	95	97			
Chumstick Creek	In-channel Characteristics	55	55	55	**67.5**	**68.5**	**71.5**
	Passage / Entrainment	70	70	70			
	Riparian / Floodplain	55	60	75			
	Water Quality – Chemistry	85	85	85			
	Water Quality - Temperature	80	80	80			
	Water Quantity – Flow	70	70	70			
Icicle Creek	In-channel Characteristics	70	75	80	**70.2**	**73.4**	**77.8**
	Passage / Entrainment	55	55	55			
	Riparian / Floodplain	70	75	85			
	Sediment	90	92	95			
	Water Quantity – Flow	55	55	55			
Little Wenatchee	Ecologic – Community	85	90	95	**90.2**	**92.2**	**94.2**
	In-channel Characteristics	97	97	97			
	Riparian / Floodplain	90	90	90			
	Sediment	95	95	95			
Mission Creek	In-channel Characteristics	20	20	20	**43.8**	**43.8**	**43.8**
	Passage / Entrainment	70	70	70			
	Riparian / Floodplain	55	55	55			
	Sediment	70	70	70			
	Water Quality - Temperature	55	55	55			
	Water Quantity – Flow	20	20	20			
Nason Creek	Ecologic – Community	55	70	80	**65**	**72.3**	**78.8**
	In-channel Characteristics	55	65	75			
	Passage / Entrainment	93	93	93			
	Water Quality - Temperature	80	80	80			
North Side Tributaries	Passage / Entrainment	60	60	60	**60**	**60**	**60**
Peshastin Creek	In-channel Characteristics	55	75	80	**62.8**	**76.2**	**80**
	Passage / Entrainment	93	98	98			
	Water Quality - Temperature	98	98	98			
	Water Quantity – Flow	40	45	50			
Wenatchee River (Lower)	In-channel Characteristics	60	60	60	**68**	**68**	**68**

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years
Wenatchee River (Lower)	Water Quality - Temperature	80	80	80	**68**	**68**	**68**
	Water Quantity – Flow	70	70	70			
Wenatchee River (Upper + Chiwaukum)	In-channel Characteristics	80	85	90	**80.5**	**85.2**	**90**
	Passage / Entrainment	90	90	90			
White River	Ecologic – Community	80	85	90	**89.8**	**91.5**	**93.2**
	In-channel Characteristics	95	95	95			

ESU: Upper Columbia River Steelhead

Watershed	Primary Limiting Factors (PLFs)	Estimated Current Function of PLFs	Estimated Future Function		Estimated Current Watershed Function	Est. Future Funct. for Watershed	
			Estimate 10-Years	Estimate 25-Years		Estimate 10-Years	Estimate 25-Years

Population(s)	Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Watershed	Project Type
			Lower Columbia Steelhead			
Hood R Summer Steelhead; HR Winter Steelhead	Existing	199802101	Hood River habitat program	CTWSRO	West Fork Hood River; East Fork Hood River	Habitat
Hood R Summer Steelhead; HR Winter Steelhead	Expanded	199802101	Hood River habitat program	CTWSRO	West Fork Hood River; East Fork Hood River	Habitat
Hood R Summer Steelhead; HR Winter Steelhead	Existing	199802100	Hood River habitat program	CTWSRO	West Fork Hood River; East Fork Hood River	Habitat - Capital
			Mid Columbia Steelhead			
Multiple Mid C. Populations: Lower JD Summer Steelhead; Middle Fork JD Summer Steelhead; North Fork JD Summer Steelhead; South Fork JD Summer Steelhead; Upper John Day Summer Steelhead; Umatilla R. Summer Steelhead; Walla Walla R Summer Steelhead; (NOTE: Also, Upper Grande Ronde Summer Steelhead/ Spring Chinook; Tucannon R. Summer Steelhead/ Spring Chinook;)	Expanded	198710001, 199604601, 199608300, 200003100	CTUIR Ceded Area Tributary Culvert/Passage Assessment, Prioritization and Implementation	CTUIR	All UM, WW, GR, JD Subbasin watersheds	Habitat
Descutes R. Westside Tributaries Summer Steelhead; Descutes R. Eastside Tributaries Summer Chinook	New	New	Deschutes River restoration program	CTWSRO	Warm Springs River; Lower Descutes	Habitat
Lower JD Summer Steelhead	Existing	199802200	Pine Creek wildlife conservation area	CTWSRO	Lower John Day/ Muddy Creek	Wildlife
Lower JD Summer Steelhead	Expanded	199802200	Pine Creek wildlife conservation area	CTWSRO	Lower John Day/ Muddy Creek	wildlife
Middle Fork JD Summer Steelhead	Existing	199801800	John Day Watershed Restoration program	CTWSRO	Strawberry Creek	Habitat
Middle Fork JD Summer Steelhead	Existing	200001500	Oxbow Conservation area	CTWSRO	Camp Creek	Habitat
Middle Fork JD Summer Steelhead	Expanded	200001500	Oxbow Conservation area	CTWSRO	Camp Creek	Habitat
Middle Fork John Day Summer Steelhead	Expanded	199801800	John Day Watershed Restoration program	CTWSRO	Middle Fork John Day River	Habitat - Capital
Middle Fork John Day Summer Steelhead	Existing	199801800	John Day Watershed Restoration program	CTWSRO	Middle Fork John Day River	Habitat - Capital
North Fork JD Summer Steelhead	Existing	200003100	North Fork John Day Basin Anadromous Fish Habitat Enhancement Project	CTUIR	Lower N Fk. JD & tribs, Middle N Fk. JD & tribs, Upper N Fk, JD & tribs.	Habitat
North Fork JD Summer Steelhead	Expanded	200003100	North Fork John Day Basin Anadromous Fish Habitat Enhancement Project	CTUIR	Lower N Fk. JD & tribs, Middle N Fk. JD & tribs, Upper N Fk, JD & tribs.	Habitat
Upper Mainstem JD Summer Steelhead	Existing	200104101	Forrest conservation area	CTWSRO	(Upper) John Day River	Habitat
Upper Mainstem JD Summer Steelhead	Expanded	200104101	Forrest conservation area	CTWSRO	(Upper) John Day River	Habitat
Upper Mainstem JD Summer Steelhead	Expanded	199801800	John Day Watershed Restoration program	CTWSRO	(Upper) John Day River	Habitat
Umatilla R. Summer Steelhead	New	New	Inventory and assess fish habitat, passage and screening needs and develop plan for steelhead reintroduction in Willow Creek, Butter Creek and McKay Creek.	CTUIR	All Willow Subbasin watersheds and Butter and McKay in Umatilla	Habitat
Umatilla R. Summer Steelhead	Existing	198902700	Power Repay Umatilla Basin Project	CTUIR	Umatilla below McKay Creek	Habitat
Umatilla R. Summer Steelhead	Existing	198710001	Umatilla Anad Fish Hab – CTUIR	CTUIR	All Umatilla Subbasin watersheds	Habitat
Umatilla R. Summer Steelhead	Expanded	198710001	Umatilla Anad Fish Hab – CTUIR	CTUIR	All Umatilla Basin watersheds	Habitat
Umatilla R. Summer Steelhead	Existing	198802200	Umatilla Fish Passage Operations	CTUIR	Umatilla below McKay Creek	Habitat

Population(s)	Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Watershed	Project Type
Umatilla R. Summer Steelhead	Existing	199506001	Iskuulpa Watershed Project	CTUIR	Umatilla above McKay Creek	Wildlife
Umatilla River Summer Steelhead (Note: also Walla Walla River Summer Steelhead)	New	New	Instream flow restoration projects, including water rights purchase from willing sellers and development and replacement of water sources for agricultural uses in Umatilla and Walla Walla tributaries.***	CTUIR	All Umatilla and Walla Walla Subbasin watersheds	Habitat - Capital
Walla Walla River Summer Steelhead (Note: also Umatllla Rive Steelhead)	New	New	Instream flow restoration projects, including water rights purchase from willing sellers and development and replacement of water sources for agricultural uses in Umatilla and Walla Walla tributaries.***	CTUIR	All Umatilla and Walla Walla Subbasin watersheds	Habitat - Capital
Walla Walla River Summer Steelhead	Existing	199601100	Walla Walla Juvenile and Adult Passage Improvements (capital)	CTUIR	Walla Walla below Forks and Mill Creek	Habitat - Capital
Walla Walla Summer Steelhead	Existing	199601100	Walla Walla Juvenile and Adult Passage Improvements (expense)	CTUIR	All Walla Walla Subbasin watersheds	Habitat
Walla Walla Summer Steelhead	Existing	199604601	Walla Walla River Basin Fish Habitat Enhancement	CTUIR	All Walla Walla Subbasin watersheds	Habitat
Walla Walla Summer Steelhead	Expanded	199604601	Walla Walla River Basin Fish Habitat Enhancement	CTUIR	All Walla Walla Subbasin watersheds	Habitat
Walla Walla Summer Steelhead	Existing	200003300	Walla Walla River Fish Passage Operations	CTUIR	Walla Walla below Forks	Habitat
Walla Walla Summer Steelhead	Expanded	200003399	Walla Walla River Fish Passage Operations	CTUIR	Walla Walla below Forks	Habitat
Walla Walla (Touchet) Summer Steelhead	Existing	200002600	Rainwater Wildlife Area Operations and Maintenance	CTUIR	Touchet N & S Forks	Wildlife
Walla Walla River (Touchet) Summer Steelhead	Expanded	200002600	South Fork Touchet Watershed Protection and Restoration (capital acquisition)	CTUIR	Touchet N & S Forks	Habitat - Capital
Rock Cr. Steelhead	Expanded	200715600	Rock Creek Fish and Habitat Assessment for the Prioritization of Restoration and Protection.	YN	Rock Cr.	RM&E/ Habitat
Rock Cr. Steelhead	Expanded	200715600	Rock Creek Fish and Habitat Assessment for the Prioritization of Restoration and Protection.	YN	Rock Cr.	RM&E/ Habitat
Klickitat R. Steelhead	Expanded	199705600	Klickitat Watershed Enhancement	YN	All Klickitat Watersheds except Klickitat Canyon	Habitat
Klickitat R. Steelhead	Existing	199705600	Klickitat Watershed Enhancement	YN	All Klickitat Watersheds except Klickitat Canyon	Habitat
Klickitat R. Steelhead	Existing	198812035	YKFP Klickitat Management, Data, and Habitat	YN	All Klickitat Watersheds except Klickitat Canyon	Habitat
Klickitat R. Steelhead (Note: also Yakima Steelhead MPG)	Expanded	198812025	YKFP Management, Data, Habitat	YN	All Klickitat Watersheds except Klickitat Canyon; Upper Yakima, Naches, Toppenish, Stutus; Lower Yakima	Habitat
Yakima Steelhead MPG (Noe: also Klickitat R. Steelhead)	Expanded	198812025	YKFP Management, Data, Habitat	YN	All Klickitat Watersheds except Klickitat Canyon; Upper Yakima, Naches, Toppenish, Stutus; Lower Yakima	Habitat
Yakima Steelhead MPG	Existing	198812025	YKFP Management, Data, Habitat	YN	Upper Yakima, Naches, Toppenish, Status	Habitat
Yakima Steelhead MPG	Existing	199206200	Yakama Nation - Riparian/Wetlands Restoration (acquisition)	YN	Upper Yakima, Naches, Toppenish, Status	Habitat
Yakima Steelhead MPG	Existing	199206200	Yakama Nation - Riparian/Wetlands Restoration (O&M)	YN	Upper Yakima, Naches, Toppenish, Status, Lower Yakima	Wildlife
Yakima Steelhead MPG	Existing	199603501	Yakama Reservation Watersheds Project	YN	Toppenish, Status, Ahtanum, Lower Yakima	Habitat

Population(s)	Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Watershed	Project Type
Yakima Steelhead MPG	Existing	199705100	Yakima Basin Side Channels	YN	Upper Yakima, Naches, Toppenish, Status; Lower Yakima	Habitat
Yakima Steelhead MPG	Expanded	199705100	Yakima Basin Side Channels	YN	Upper Yakima, Naches, Toppenish, Status; Lower Yakima	Habitat
		Snake River Steelhead/ Spring Chinook				
Multiple Snake R. Populations; Upper Grande Ronde Summer Steelhead / spring Chinook; Tucannon R. Summer / Spring Chinook; Upper Grand Ronde Spring Chinook (Note, also Lower JD Summer Steelhead; Middle Fork JD Summer Steelhead; North Fork JD Summer Steelhead; South Fork JD Summer Steelhead; Upper John Day Summer Steelhead; Umatilla R. Summer Steelhead; Walla Walla R Summer Steelhead)	Expanded	198710001, 199604601, 199608300, 200003100	CTUIR Ceded Area Tributary Culvert/Passage Assessment, Prioritization and Implementation	CTUIR	All UM, WW, GR, JD Subbasin watersheds	Habitat
Tucannon R. Summer Steelhead/ Cninook	New	New	Protect and Restore Tucannon Watershed	CTUIR	Tucannon River Pataha to Panjab	Habitat
Upper Grand Ronde Summer Steelhead/ Spring Chinook	Existing	199608300	CTUIR Grande Ronde Subbasin Restoration Project	CTUIR	Upper Grande Ronde River and tribs	Habitat
Upper Grand Ronde Summer Steelhead/ Spring Chinook	Expanded	199608300	CTUIR Grande Ronde Subbasin Restoration Project	CTUIR	Upper Grande Ronde River and tribs	Habitat
Upper Grande Ronde Summer Steelhead/ Spring Chinook; possible others (see watershed)	New	New	CTUIR Ceded Area Priority Stream Corridor Covservation and Protection (capital acquisition)	CTUIR	Priority is Upper Grande Ronde but could be in and UM, WW, N. Fk. JD or GR subbasin watersheds	Habitat - Capital
		Upper Columbia Steelhead/ Spring Chinook				
Entiat R. Summer Steelhead / Spring Chinook	New	New	Continue hatchery carcass out planting and/or use of nutrient analogs in mid- and lower Entiat main stem.	YN	Mid and lower Entiat mainstem	Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	Design and build in-channel pool forming structures in main stem Entiat for juvenile rearing and spawning habitat.	YN	Mainstem Entiat	Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	Entiat River - UPA - Lower Entiat River Off-Channel Restoration Project	YN	Lower Entiat	Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	Implement Ecosystem Diagnosis and Treatment (EDT) Alternative 5 related to side-channel options.	YN		Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	Install rock gravel catchers to promote gravel recruitment and spawning gravels on Mad River	YN	Mad River	Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	UPA Entiat Subbasin Riparian Enhancement Program	YN		Habitat
Entiat R. Summer Steelhead / Spring Chinook	New	New	Work with willing landowners to protect larger, undisturbed riparian areas by first pursuing conservation easement, lease, and options other than outright property acquisition	YN		Habitat
Methow R. Summer Steelhead / Spring Chinook	New	New	Add log and rock complexes to identified small tributary channels at key stream locations to reactivate floodplain where appropriate.	YN		Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Assess and inventory mill ponds in Middle Methow River reaches (and others) in relationship to providing additional main stem spawning and rearing habitat (acclimation, off-channel habitat, etc)	YN		Habitat

Population(s)	Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Watershed	Project Type
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Assess potential temperature refugia, (using FLIR and temperature profiles) to identify important summer/winter juvenile rearing areas for future protection and restoration actions.	YN		Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Assess, design and implement Instream structures in various smaller tributary streams	YN		Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	BOR Reach Complex - Modify levees, riparian restoration, LWD recruitment and side channel reconnection with an emphasis in the upper Twisp River Watershed.	YN	Upper Twisp River	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	BOR Reach Complex - Restore Primarily side channel and increase habitat complexity in the Chewuch River.	YN	Chewuch River	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	BOR Reach Complex riparian reconnection / floodplain function - side channel improvements for the Methow River with an emphasis on reaches between Carlton to Weeman Bridge.	YN	Middle Methow - Carlton to Weeman Bridge	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	BOR Reach Complex Side channel reconnection, LWD recruitment, levee removal, riparian restoration with an emphasis in the lower Twisp River.	YN	Lower Twisp	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	BOR Reach complexity and side channel development, Early Winters fan to Gate Creek	YN	Upper Methow - Winters fan to Gate Creek	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Design and implement Engineered Log Jams in the Upper Methow, Early Winters Creek and Lost River; identify areas, to increase and diversify key spawning and rearing habitat.	YN	Upper Methow - Early Winters/ Lost	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Identify, Protect and Restore areas providing thermal refugia in the lower Methow reaches.	YN	Lower Methow	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Protect cottonwood forests, and replant unused riparian agricultural areas where feasible in lower Methow River reaches.	YN	Lower Methow	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Protection Riparian and Floodplain in Middle Methow River with general emphasis from Carlton to Weeman Bridge.	YN	Middle Methow - Carlton to Weeman Bridge	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Restoration 30%+ of lineal stream area - Upper Methow tributaries with emphasis on Wolf Creek and Hancock Springs.	YN	Wolf Creek/ Hancock Springs	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Riparian Floodplain Habitat Protection Program with an emphasis in lower reaches of Methow River.	YN	Lower Methow	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	Riparian Floodplain Habitat Protection Program with an emphasis in upper reaches/tributaries of Methow River.	YN	Upper Methow; Wolf Creek/ Hancock Creek	Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	UPA Project - Programmatic Implementation of Habitat Complexity Projects in the Methow River Subbasin in areas not already identified.	YN		Habitat
Methow R. Summer Steelhead; Methow R. Spring Chinook	New	New	UPA Project - Programmatic Methow Basin Riparian Enhancement and re-establishment with an emphasis in key tributary streams.	YN		Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Add nutrients using hatchery carcasses and/or carcass analogs - 9-watersheds identified	YN	9 Wenatchee watersheds	Habitat

Habitat Projects

ATTACHMENT G

Population(s)	Existing/ Expanded/ New	Proposal #	Proposal Title	Org.	Watershed	Project Type
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Assess, design and build large wood structures for habitat diversity in Upper Wenatchee Watershed.	YN	Upper Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Culvert Replacement (11-13 structures) at private landowner access in Chumstick watershed.	YN	Chumstick Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Culvert replacement Alder Creek and Misc. for Chiwawa Watershed.	YN	Chiwawa Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Culvert replacement Clear Creek (1)	YN	Clear Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Culvert replacement Clear Creek (2)	YN	Clear Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Develop lower Nason Creek Restoration Plan	YN	Nason Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Evaluate NF (National Forest) riparian roads and develop restoration plan in upper Peshastin Watershed.	YN	Peshastin Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Improve Irrigation delivery and use efficiency at Dryden Ditch, Pioneer and Jones/Shotwell (Efficiency)	YN		Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Increase irrigation delivery and on-site efficiencies in Peshastin Creek watershed.	YN	Peshastin Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Increase pool quality and quantity in Nason Creek Watershed by installing in-channel structures.	YN	Nason Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Install stream structures to increase thalwag depth on lower Peshastin Creek.	YN	Peshastin Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	North Road culvert passage: provide year-around passage through North Road culvert on Chumstick Creek.	YN	Chumstick Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Programmatic Riparian Floodplain Habitat Protection Program for Wenatchee Subbasin.	YN	Entire Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Programmatic Side/Off channel reconnections and restoration in the Nason Creek Watershed.	YN	Nason Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Programmatic Stream Bank Restoration in the Icicle Creek Watershed.	YN	Icicle Creek	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Reconnect main stem Wenatchee River side channel at Monitor in Lower Wenatchee Watershed.	YN	Lower Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Reconnect main stem Wenatchee River side channel at Sleepy Hollow in Lower Wenatchee Watershed.	YN	Lower Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Reconnect main stem Wenatchee River side channel Cashmere in Lower Wenatchee Watershed.	YN	Lower Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Replace culverts at Beaver Creek in Upper Wenatchee Watershed.	YN	Upper Wenatchee	Habitat
Wenatchee R. Summer Steelhead / Spring Chinook	New	New	Restoration (on National Forests and Private lands) of riparian and channel conditions to relieve sediment inputs in Chiwawa River Watershed.	YN	Chiwawa Creek	Habitat

Biological Benefits of Hatchery Actions in LRT MOA									
Population	MOA Project Title	Proposed Hatchery Action	Course Screen Categorization	VSP Parameters Positively Affected				Summary of Potential Benefits (L,M,H)	Timeframe to Implement and benefit to be realized
				A	P	SS	D		
Lower Columbia Spring Chinook ESU Hatchery Benefits Summary									
Hood River	**Master plan expansion and tributary weir development for hood river facitlity (Capital & O&M); Hood River Production O&M**	Release up to 200k smolt for harvest augmentation and supplementation. Release up to 200 k smolt from 1 acclimation site in West Fork Hood River.	Group A Category 2	X		X		H -Produce approx. 2000 adults for harvest, brood stock and supplementation Important to maintaining naturally spawning population and tribal harvest opportunities.	Revised Master Plan and HGMP submitted spring, 2008. Parkdale hatchery improvements and one new acclimation site and two trapping facilities proposed to come on line during 2010 Ongoing program releases 125k smolt at 2 sites in West Fork Hood River and 1 site in Rogers Creek
Lower Columbia Steelhead ESU Hatchery Benefits Summary									
Hood River (winter)	**Hood River Production O&M**	Release up to 50k StW smolt for supplementation. Release at one acclimation site in East Fork Hood River and one site in Middle Fork. 2% SAR	Group A Category 3	X		X		H - Produce approx. 1000 adults for harvest and supplementation. Important to maintaining naturally spawning population and tribal/sport harvest opportunities.	Program is on-going

Mid Columbia Steelhead ESU Hatchery Benefits Summary									
Klickitat River	**Klickitat Fishery YKFP Design (Capital & Expense) & O&M**	Construct trap at Lyle Falls to collect local broodstock:Reconstruct Lyle Falls Fishway & Trap to meet Fed and State criteria.	Group A Category 3	X	X	X	X	H- Improves passage at Lyle Falls. Adds monitoring and steelhead broodstock capabilities for a newly developed conservation/integrated hatchery program. Install video digital imagery and PIT tag detection equipment to monitor escapement. Allows collection of wild brood per prudent HSRG/ YKFP protocals.	Design 90% complete. EIS process underway (dEIS issued March 2008). Final EIS and Permitting 0.75 years away. Possible construction mid 2008(9). Steelhead return 3-4 years post implementation.
	Klickitat Fishery YKFP Design (Capital & Expense) & O&M	Klickitat Hatchery Upgrades to reprogram 120,000 Skamania to local origin	Group A Category 3	X	X		X	H - Upgrade existing Klickitat Hatchery infrastructure (circa 1949) to incorporate YKFP/HSRG hatchery reforms for new conservation/integrated steelhead hatchery program using optimal rearing densities, increased adult holding capacity. Benefits allow for phased elimination of Skamania hatchery stock, which will help improve the native stock productivity, while continuing economically vital sports harvest in local community.	Preliminary Assessment completed. Final design, EIS, and permitting within 1.5 years. Full construction over a period of 3 years. Infrastructure to initiate test of initial phase (10+ wild steelhead) anticipated within 2 years. Steelhead return 3-4 years post implementation.
	Klickitat Fishery YKFP Design (Capital & Expense) & O&M	Castile Trap & Counting Station: Construct Castile Falls Counting Station and Trap in newly re-constructed Castile Falls Fishway; Install video digital imagery and PIT tag detection equipment to monitor escapement		X	X	X		H- Augments broodstock collection from Lyle Falls for 1st and 2nd phase of steelhead conservation/integrated hatchery program. Recent fishway improvements at Castille Falls opens apprx. 50 miles of high quality spawning and rearing habitat which will increase abundance and spatial structure.	Design 90% complete. BPA completing NEPA - Categorical Exclusion by 6/07. Tribal water code permits 2-mths. Construction of structure and PIT antenna approximately 4-mths. Steelhead return 3-4 years post implementation.

Upper Yakima & Naches	**Yakima steelhead - acclimation facilities (Capital and O&M)**	Construct acclimation sites adjacent to habitat improvement areas of emphasis and in tributaries where passage problems have been alleviated	Group A Category 4	X	X	X		M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement and in areas where tributary access has been restored	Acclimation sites may be subject to permitting; NOH adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Program coordination & administration	Program coordination, administration, and data management functions for program implementation	Group A Category1						
	Recondition Wild Steelhead Kelt (and Evaluate their reporductive success)	Continue kelt reconditioning program and investigate reproductive success	Group A Category1	X	X		X	H - reduces high mortalities on repeat spawners and may rapidly increase abundance & productivity of natural spawning population	On-going pilot program. Annual escapements bolstered by 3-5% based on results to date. Long term benefits to be determined from reproductive success study. Study results available in two years for smolt production from reconditioned spawers and 5 years for adult returns.
Umatilla River	**Umatilla Fish Passage Operations*; Umatilla Hatchery Satellite Facilites O&M****	Collect and transport broodstock (*), and provide eggs and acclimate smolts (**) for current program that uses local broodstock to produce 150,000 smolts released at three locations in the mid/upper Umatilla Subbasin		X	X	X	X	H - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions. Also provides significant in-basin harvest.	Ongoing
Walla Walla River	**Walla Walla Steelhead Supplementation Hatchery O&M**	Initiate local broodstock program of 50K smolts - 25K direct stream released in both upper Walla Walla River and Mill Ck		X	X	X	X	H - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions.	Brood could be collected in 2008. F1 returns would begin in 2011, F2 natural smolt emigration would begin in 2013.

Upper Columbia Spring Chinook ESU Hatchery Benefits Summary									
Wenatchee River	**Wenatchee spring Chinook - Chiwawa River & Nason Ck acclimation - operate acclimation facilities (Capital & OM)**	Construct semi-natural acclimation sites in upper Chiwawa River and upper Nason Creek in coordination with anticipated habitat improvements.	Supplementation Group A Category 3	X		X		M- Important in maximizing utilization of available spawning habitat in these 2 basins. Will also enhance spatial structure.	Acclimation sites may be subject to permitting; Adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Wenatchee spring Chinook - Peshastin 100K smolts - operate acclimation facility (Capital & OM)	Develop incubation and rearing for 100k smolts to be released from acclimation sites in Peshastin Creek in coordination with habitat actions. Collect broodstock at Tumwater Dam or Peshastin Cr.	Supplementation Group B Category 3	X		X	X	M- Important in maximizing utilization of available spawning habitat. Will enhance spatial structure and diversity by restoring production to vacant habitat. 100-1,000 natural spawners at current SARs.	Incubation and rearing may be available currently; otherwise, construction could take two years. Acclimation sites may be subject to permitting; Adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Upper Columbia spring Chinook - nutrient supplementation	Use nutrient analogs in upper watershed.	Group A Category 3	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
	Wenatchee spring Chinook - Little Wenatchee 150K smolts - operate (Capital & OM)	Develop incubation and rearing for 150k smolts to be released from acclimation sites in Little Wenatchee River.	Supplementation Group B Category 3	X		X	X	M- Important in maximizing utilization of available spawning habitat. Will enhance spatial structure and diversity by restoring production to vacant habitat. 150-1,500 natural spawners at current SARs.	Incubation and rearing may be available currently; otherwise, construction could take two years. Acclimation sites may be subject to permitting; Adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
Entiat River	**Upper Columbia spring Chinook - nutrient supplementation**	Use nutrient analogs in upper watershed.	Group B Category 4	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.

Methow River	**Methow spring Chinook - Methow, Twisp, Chewuch acclimation - operate facilities (Capital & OM)**	Construct semi-natural acclimation sites adjacent to habitat improvement areas of emphasis in the upper Methow, Twisp, and Chewuch watersheds.	Group B Category 3	X	X	X		M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions.	Acclimation sites may be subject to permitting; NOH adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Upper Columbia spring Chinook - nutrient supplementation	Use nutrient analogs in upper watershed.	Group A Category 3	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
Upper Columbia Steelhead ESU Hatchery Benefits Summary									
Wenatchee River	**Wenatchee steelhead - Wenatchee, Peshastin, Chumstick, Mission acclimation - operate facilities (Capital & OM)**	Construct semi-natural acclimation sites adjacent to habitat improvement areas of emphasis in the upper Wenatchee watershed, Peshatin, Chumstick, and Mission creeks.	Group A Category 3	X	X	X		M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions.	Acclimation sites may be subject to permitting; NOH adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Upper Columbia Steelhead Kelt Reconditioning	Develop kelt reconditioning program using RID, PRD and wild broodstock collections.	Group A Category 4	X			X	H - reduces high mortalities on repeat spawners and may rapidly increase the abundance of natural spawners in the natural escapement	200 wild kelts taken at RIS, PRD, and recovered after use as broodstock may produce 175-575 wild adult offspring at current SARs.
	Upper Columbia steelhead - nutrient supplementation	Use nutrient analogs in upper watershed.	Group A Category 3	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
Entiat River	**Upper Columbia Steelhead Kelt Reconditioning**	Reprogram Entiat NFH to support UCR kelt reconditioning.	Group A Category 2	X			X	H - reduces high mortalities on repeat spawners and may rapidly increase the abundance of natural spawners in the natural escapement	200 wild kelts taken at RIS, PRD, and recovered after use as broodstock may produce 175-575 wild adult offspring at current SARs.

	Upper Columbia steelhead - nutrient supplementation	Use nutrient analogs in upper watershed.	Group A Category 3	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
Methow River	**Upper Columbia Steelhead Kelt Reconditioning**	Develop kelt reconditioning program using Wells and RRD broodstock collections.	Group A Category 3	X			X	H - reduces high mortalities on repeat spawners and may rapidly increase the abundance of natural spawners in the natural escapement	100 wild kelts collected at Wells, RRD, and recovered from broodstock may produce 85-290 wild adult offspring at current SARs.
	Methow steelhead - Methow, Twisp, Chewuch acclimation (Capital and O&M)	Construct semi-natural acclimation sites adjacent to habitat improvement areas of emphasis in the upper Methow, Twisp, and Chewuch watersheds.	Group A Category 3	X	X	X		M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions.	Acclimation sites may be subject to permitting; NOH adults return within 5 yrs of funding, F2 natural smolts emigrate within 7 yrs of funding.
	Methow steelhead - reprogram Winthrop for release of 100k smolts in upper watershed	Reprogram Winthrop NFH on-station release of 100k smolts to acclimated releases in upper watershed	Group B Category 1	X		X		M - distributes hatchery production to natural habitats; increases natural spawner abundance, spatial diversity, and potential for local adaptation.	Adults return to spawning grounds within 1-3 yrs of release; F2 natural smolts emigrate within 5 yrs of initial action.
	Upper Columbia steelhead - nutrient supplementation	Use nutrient analogs in upper watershed.	Group A Category 3	X	X			L - low-cost method to increase food production; intended to increase egg-smolt survival	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
Snake River Spring Chinook ESU Hatchery Benefits Summary									

Upper Grande Ronde	**Snake River Safety Net Program**	Initiate a small scale "safety net" program for these three individual stocks in order to provide a production source in extreme low run years	New project - Not in Coarse Screen list	X		X	X	H - these two populations experienced conditions which necessitated implementation of captive broodstock programs in the 90's and have a TRT A/P rating of "High Risk". By maintaining a small scale captive brood program with each of these stocks it would provide an immediate production source in case run levels return to those observed in the 90's.	All three of these stocks have ongoing captive brood programs associated with them but are in various stages of being phased out. Maintain captive programs at the 100 fish/brood year level.
	Grande Ronde Supplementation Operations and Maintenance	Assist in captive brood par collection and provide in-basin smolt acclimation for partnership project that continues captive broodstock smolt production for Upper Grande Ronde and Catherine Creek until phased out by comanagers.	Safety Net - Group A, Category 2	X		X	X	H - Important to sustaining population and increasing abundance. Benefit is to ESA listed population. This population is at high risk of extinction with low productivity and abundance.	During term of BiOp - First release of juveniles in 2000. F1 return in 2002, F2 adults begin return in 2006-07
	Grande Ronde Supplementation Operations and Maintenance	The MOA Project provides a critical element of the overall actions benefitting this population by collecting broodstock and providing in basin smolt acclimation for partnership project that continues conventional broodstock smolt production for Upper Grande Ronde.	Supplementation - Group A, Category 2	X		X	X	H - Important to sustaining population and increasing abundance. Benefit is to ESA listed population. Increases abundance of fish spawning naturally. Operates weir for collection of conventional broodstock (hatchery and natural) and acclimation facility for juveniles.	During term of BiOp - First release of juveniles in 2000. F1 adults began returning in 2002. F2 adults begin return in 2006-07.

	Grande Ronde Supplementation Operations and Maintenance	The MOA Project provides a critical element of the overall actions benefitting this population by collecting broodstock and providing in basin smolt acclimation for partnership project that implements NEOH.	Supplementation - Group A, Category 3	X		X	X	L to M - increases abundance of UGR production by 10,000. Improves hatchery rearing environment. This project will improve rearing conditions by freeing up space at Lookingglass Hatchery - fish will no longer have to be transported to Bonneville, Irrigon for rearing. Rearing of captive broodstock progeny will also benefit. Increases abundance of fish spawning naturally.	During term of BiOp - Construction complete by 2009. BY09 would return F1 adults in 2013. F2 adults would return in 2015-17
Catherine Creek	**Snake River Safety Net Program**	Initiate a small scale "safety net" program for these three individual stocks in order to provide a production source in extreme low run years	New project - Not in Coarse Screen list	X		X	X	H - these two populations experienced conditions which necessitated implementation of captive broodstock programs in the 90's and have a TRT A/P rating of "High Risk". By maintaining a small scale captive brood program with each of these stocks it would provide an immediate production source in case run levels return to those observed in the 90's.	All three of these stocks have ongoing captive brood programs associated with them but are in various stages of being phased out. Maintain captive programs at the 100 fish/brood year level.
	Grande Ronde Supplementation Operations and Maintenance	Assist in captive brood par collection and provide in-basin smolt acclimation for partner project that continues captive broodstock smolt production for Upper Grande Ronde and Catherine Creek until phased out by comanagers.	Safety Net - Group A, Category 2	X		X	X	H - increases abundance of integrated population and fish spawning naturally, lowers risk of extinction. Benefit is to ESA listed population. This population is at high risk of extinction with low productivity and abundance.	During term of BiOp - First release of juveniles in 2000. F1 return in 2002, F2 adults begin return in 2006-07.

	Grande Ronde Supplementation Operations and Maintenance	The MOA Project provides a critical element of the overall actions benefitting this population by collecting broodstock and providing in basin smolt acclimation for partnership project that implements NEOH.	Supplementation - Group A, Category 3	X		X	X	L to M - increases abundance of CC production by 10,000. Improves hatchery rearing environment. This project will increase production for Lostine stock, improve survival in hatchery rearing environment and keep all rearing of stock in natal basin - instead of being shipped to Bonneville, Irrigon, Lookingglass and back to Lostine. Rearing of captive broodstock progeny will also benefit. Increases abundance of fish spawning naturally.	During term of BiOp - Construction complete by 2009. BY09 would return F1 adults in 2013. F2 adults begin return in 2015-17
	Grande Ronde Supplementation Operations and Maintenance	The MOA Project provides a critical element of the overall actions benefitting this population by collecting broodstock and providing in basin smolt acclimation for partnership project that continues conventional broodstock smolt production for Catherine Creek.	Supplementation - Group A, Category 2	X		X	X	H - increases abundance of integrated population and fish spawning naturally, lowers risk of extinction. Benefit is to ESA listed population. Increases abundance of fish spawning naturally. Operates weir for collection of conventional broodstock (hatchery and natural) and acclimation facility for juveniles.	During term of BiOp - First release of juveniles in 2000. F1 return in 2002, F2 adults begin return in 2006-07.

Lookingglass Creek	**Grande Ronde Supplementation Operations and Maintenance**	The MOA Project may contribute to the overall actions benefitting this population by collecting broodstock for this partnership progam that implements NEOH. NEOH will include about 400,000 more smolts for total program of 1.4M and implements operational improvements that improve hatchery survival. Target use of up to 250,000 of these hatchery parr/smolts for use into Lookingglass Creek using Catherine Creek stock. Constructs new hatchery on Lostine River, modifies Lostine River weir and modifies Imnaha satellite facility.	Supplementation - Group A, Category 3	X		X	X	H - increases abundance of integrated population and fish spawning naturally, reintroduction of Lookingglass population - increases spatial structure of MPG. Increases production 250,000 smolts. Benefit is to ESA listed MPG - reintroduction and restoration of functionally extirpated population.	D - Construction complete by 2009. BY09 would return F1 adults in 2013. F2 adults begin return in 2015-17
Snake River Steelhead ESU Hatchery Benefits Summary									
Average "B" population									
Average "A" population									
	Snake River Kelts (Capital & Expense)	Expand the kelt reconditioning program and research activities into the Snake River	Group A Category1	X	X		X	H - reduces high mortalities on repeat spawners and may rapidly increase abundance & productivity of natural spawning population. Maintains the natural life-history trait.	Based on the on-going Yakima River pilot program results. Annual escapements improvements are estimated at 3-5% . Long term benefits to be determined from reproductive success study.
Snake River Fall Chinook ESU Hatchery Benefits Summary									

Snake River	**Snake River fall Chinook - modify ponds @ Lyons Ferry to improve adult holding**	Modify adult holding ponds at Lyons Ferry Hatchery to increase fall Chinook brood holding capacity and flexibility. LSRCP program. Supported by local co-managers. Submitted by Umatilla.	Group A, Category 3					Facility improvement - should increase hatchery survival. Benefit is to ESA listed population and survival benefits could help achieve mitigation goals	During term of BiOp
Non-ESA Species									
Mid Columbia Spring Chinook ESU Hatchery Benefits Summary									
Klickitat River	**Klickitat Fishery YKFP Design (Capital & Expense) & O&M**	Integrate hatchery reform measures using local broodstock of Spring Chinook		x		x		Integrated spring Chinook production will increase abundance of natural spawwners, associated ecological benefits, and Harvest. Recent fishway improvements at Castille Falls opens apprx. 50 miles of high quality spawning and rearing habitat which will increase abundance and spatial structure.	
Deschutes River	**White River Supplementation program (spring Chinook)**	Raise approx. 300k smolts at WSNFH. Acclimate and release at one site in White River. Assume a SAR of 0.03%	Group B Category 3	X		X		M- Produces 500-1,000 fish for tribal harvest	Acclimation sites may require 2 years for permitiing and construction. Will require construction of additional raceways at WSNFH
Umatilla River	**Umatilla Fish Passage Operations*; Umatilla Hatchery Satellite Facilites O&M****	Collect and transport broodstock (*), and provide eggs and acclimate smolts (**) for current program that uses local broodstock to produce 810,000 smolts released into the upper Umatilla Subbasin		X	X	X	X	H - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions. Also provides significant in-basin harvest.	Ongoing

Walla Walla River	**NEOH Walla Walla Hatchery - Three Step Master Planning Process (capital); NEOH Walla Walla Hatchery - Three Step Master Planning Process (expense); NEOH Walla Walla Hatchery - Three Step Master Planning Process (O&M beginning in 2011); Umatilla Hatchery Satellite Faclities O&M***	Increase CHS program form 250K to 500K - build SFWW Hatchery and transfer program from LWS. Provide eggs and smolt acclimation for program once established (*)		X	X	X	X	H - enhances reintroduction effort for CHS in the Walla Walla Basin by increasing hatchery production available for natural spawning in near pristine habitat that is under seeded. Also anticipate an increase in SARs over existing out of basin direct stream release program by rearing fish in basin at a high water quality facility.	The WW Hatchery Master Plan has identified 2011 as the completion date for the hatchery. Brood year 2011 fish would be released in 2013 with adults returning from 2014-2016.
Columbia River Fall Chinook ESU Hatchery Benefits Summary									
Klickitat River	**Klickitat Fishery YKFP Design (Capital & Expense) & O&M**	of fall Chinook for a segregated hatchery program and transition releases releases into the lower basin to protect high quality spawning and rearing habitat in the mid basin for native spring chinook and steelhead.		x				Fall Chinook rearing and release at WHAF will reduce species interactions and ecological impacts on natural steelhead and spring chinook populations from harvest augmentation production	Transitioned in in later years.
Lower Yakima	**Yakima fall Chinook - JDM move 1.7M URBs from PR to Prosser - operate**	Move 1.7m URB in JDM program from Priest Rapids Hatchery to the Prosser Hatchery and Acclimation Facility	Group B Category 4					Provides proven hatchery facility above McNary Dam to take over John Day Mitigation program that must be removed from PRH when new FERC license issued to Grant Co. PUD.	Immediate

Lower Columbia River Chinook (Bonneville Pool Hatchery Fall Chinook) and Mid-Columbia Upriver Bright Fall Chinook	**John Day Reprogramming and Construction**	This project includes tribal participation in a multibenefit strategy for Columbia River fall Chinook production, ESA hatchery reform, and hydrosystem management including planning, improvements and operations needed to reprogram production at Spring Creek, Little White and Bonneville hatcheries and transition to long term in-place in-kind actions to mitigate impacts of spawning habitat lost from construction of John Day and The Dalles dams.	Group A Category 3	X	X		X	Because BPH Fall Chinook are the most representative of the historical Columbia Gorge tule population whose habitats were inundated by mainstem dams, preserving their genetic resources is an important function of these programs.	Immediate
Umatilla River	**Umatilla Fish Passage Operations*; Umatilla Hatchery Satellite Facilites O&M****	Collect and transport broodstock (*), and provide eggs and acclimate smolts (**) for current program that uses local broodstock to produce 480,000 1+ and 600,000-age smolts released at three locations in the mid/upper Umatilla Subbasin		X	X	X	X	M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions. Also provides in-basin harvest.	Ongoing
Lower Columbia River Coho Salmon									
Klickitat River	**Klickitat Fishery YKFP Design (Capital & Expense) & O&M**	Construct the Wahkiacus Hatchery and Acclimation Facility (WHAF)	Group A Category 1				X	M - Providing acclimation site for 1M coho smolts released pursuant to US v OR agreements will reduce identified straying problem into the lower river ESU by increasing homing fidelity to Klickitat River.	Design 60% complete. NOAA BA complete. Portion of water right obtained. Final design and NEPA permitting 1.5 years away. Construction 2.5 years away.
Mid/ Upper Columbia River Coho Salmon									

Umatilla River	**Umatilla Hatchery Satellite Facilites O&M**	Acclimate smolts(*) for current program produces 1,500,000 smolts released into the mid Umatilla Subbasin		X	X	X	X	M - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions. Also provides in-basin harvest.	Ongoing
Upper Yakima River-Naches River	**Yakima coho production facility (Constructin and O&M)**	Construct one small scale satellite watershed hatchery, with facilities capable of rearing 300,000 coho pre-smolts.	Not reviewed - new project	X		X	X	H - distributes hatchery production to natural habitats capable of supporting natural spawning in conjunction with habitat improvement actions. By having a small satellite facility, coho would be raised from egg to smolt on Upper Yakima River water thus possibly increasing adult returns with full acclimation covering all life stages	Acclimation sites may be subject to permitting; NOH adults return within 18 months. Funding benefit would be realized immediately. Construction in one year, raise fish to smolt the second year and first adult return 3 year.
	Yakima/Naches coho - mobile acclimation units (Capital and O&M)	Develop and deploy a series of small mobile acclimation units capable of holding up to 10,000 coho smolts for up to 4 weeks adjacent to small tributaries	Not reviewed - new project	X		X	X	H - Ability to use mobile acclimation on small tributaries would utilize the higher smolt to smolt and smolt to adult survival for adult spawners. This would be a stream seeding proposal used for 3 generations in each target tributary.	10,000 coho smolts released at each site may produce up to 120 returning adults using current 1.2% SAR for hatchery coho.
	Yakima/Naches coho - nutrient supplementation	Utilize hatchery carcasses to increase productivity in spawning/rearing tributaries.	Not reviewed - new project	X	X			H- Low-cost method to increase food production; intended to increase egg-smolt survival in areas where marine-derived nutrients have been absent for up to 100 years.	Improves overwinter survival of juveniles. Can be implemented immediately, benefits accrue immediately.
	Yakima coho production marking	Mark hatchery smolts to exclude from broodstock as returning adults.	Not reviewed - new project		X		X	M - intended to prevent hatchery-line broodstock collection at upriver capture sites.	Feasibility study can be implemented immediately; results in first year. Program implementation immediate with immediate benefits.

Wenatchee River	**Mid Columbia Coho Restoration (Capital and O&M)**	Implement Broodstock Development Phase II of the Mid-Columbia Coho Restoration Master Plan	Group A Category 1	X	X	X	X	H- Encourage continued local adaptation of the broodstock by moving broodstock capture sites further upstream where stamina and run-timing constrains of the founding stock may be reaching their limits.	We expect the minimum duration of Broodstock Development Phase II to last 4 years. The actual time line will be influence by permitting, the rate of continued selection, and out-of basin factors beyond the control of this program.
	Mid Columbia Coho Restoration (Capital and O&M)	Implement Habitat Restoration Phase of the Mid-Columbia Coho Restoration Master Plan	Group A Category 3	X	X			Will seek funding and implement habitat improvement projects which are expected to improve productivity an capacity for coho salmon. This action will be closely coordinated with the implementation schedule being developed for the UCSRB.	The Habitat Improvement Phase is expected to last 10-15 years. The timeframe to realize the full extent of benefits is unknown but some benefits would be realized immediately.
	Mid Columbia Coho Restoration (Capital and O&M)	Implement the Natural Production Phases (Natural Production Implementation and Natural Production Support phases) of the Mid-Columbia Coho Restoration Master Plan	Group A Category 3	X	X	X	X	Hatchery coho will be introduced into habitat areas predicted by EDT to be the most successful for coho . The Natural Production Phases (Implementation and Support) will focus on decreasing domestication selection and increasing the fitness of Wenatchee coho in the natural environment through furthering local adaptation and naturalization. We will accomplish this through the steady increase of NORs in the broodstock and decrease in hatchery release numbers to ultimate achieve a PNI value greater than 0.50.	The duration of the Natural Production Implementation Phase will last three years. The duration of the Natural production Support Phase is unknown but expected to be no less than 4 generations (12 years)
Methow River	**Mid Columbia Coho Restoration (Capital and O&M)**	Complete Broodstock Development Phase I as described in the Mid-Columbia Coho Restoration Master Plan	Group A Category 1	X	X	X	X	H- This action is designed to develop a Methow broodstock from lower Columbia River coho so that they become increasingly adapted to the longer migration to the Methow River. This phase focuses on elimination reliance on lower Columbia stocks and transitioning to a local broodstock.	BDPI is currently ongoing, the expect duration until this phase is complete is three years.

	Mid Columbia Coho Restoration (Capital and O&M)	Implement Broodstock Development Phase II of the Mid-Columbia Coho Restoration Master Plan	Group A Category 3	X	X	X	X	H- Encourage continued local adaptation of the broodstock by moving broodstock capture sites further upstream where stamina and run-timing constrains of the founding stock may be reaching their limits.	duration of Broodstock Development Phase II to last 4 years. The actual time line will be influence by permitting, the rate of continued selection, and out-of basin factors beyond the control of this program. Benefits will accrue
	Mid Columbia Coho Restoration (Capital and O&M)	Implement Habitat Restoration Phase of the Mid-Columbia Coho Restoration Master Plan	Group A Category 3	X	X			Will seek funding and implement habitat improvement projects which are expected to improve productivity an capacity for coho salmon. This action will be closely coordinated with the implementation schedule being developed for the UCSRB.	The Habitat Improvement Phase is expected to last 10-15 years. The timeframe to realize the full extent of benefits is unknown but some benefits would be realized immediately.
	Mid Columbia Coho Restoration (Capital and O&M)	Implement the Natural Production Phases (Natural Production Implementation and Natural Production Support phases) of the Mid-Columbia Coho Restoration Master Plan	Group A Category 3	X	X	X	X	habitat areas predicted by EDT to be the most successful for coho . The Natural Production Phases (Implementation and Support) will focus on decreasing domestication selection and increasing the fitness of Wenatchee coho in the natural environment through furthering local adaptation and naturalization. We will accomplish this through the steady increase of NORs in the broodstock and decrease in hatchery release numbers to ultimate achieve a PNI value greater than 0.50.	The duration of the Natural Production Implementation Phase will last three years. The duration of the Natural production Support Phase is unknown but expected to be no less than 4 generations (12 years)
Sturgeon									

The Dalles Reservoir	**Sturgeon Master Planning (Capital and Expense)**	Provides for releases of yearling hatchery white sturgeon in years of poor/absent natural recruitment	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	Likely 3-5 years of Master Planning and associated construction efforts necessary prior to initial year of production. Additional 15-20 years of growth by at large fish for fishery benefits and 25+ years for broodstock recruitment.
John Day Reservoir	**Sturgeon Master Planning (Capital and Expense)**	See above The Dalles	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
McNary Reservoir	**Sturgeon Master Planning (Capital and Expense)**	See above The Dalles	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
Ice Harbor Reservoir	**Sturgeon Master Planning (Capital and Expense)**	See above The Dalles	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
Lower Monumental Reservoir	**Sturgeon Master Planning (Capital and Expense)**	See above The Dalles	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
Little Goose Reservoir	**Sturgeon Master Planning (Capital and Expense)**	See above The Dalles	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
Mid Columbia Reservoirs	**Sturgeon Management**	YN effort coordinated with CRITFC sturgeon project. Provides for releases of yearling hatchery white sturgeon in Mid C reservoirs in years of poor/absent natural recruitment	N/A	X	X		X	Augments natural production to provide for continued recruitment to broodstock and stable recruitment to tribal and sport fisheries.	See above
Note: Associated RME Projects have not been identified in the above tables									

ATTACHMENT H
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