PROJECT REVIEW PLAN
WALLA WALLA RIVER BASIN FEASIBILITY STUDY
WALLA WALLA DISTRICT

1. General

This Project Review Plan (PRP) is a part of the Project Management Plan (PMP) under the QC/QA element in accordance with EC 1105-2-408. This PRP provides guidance to the Project Delivery Team (PDT) on the specific review levels, responsibilities, and process requirements for execution of review on the Walla Walla River Basin General Investigation Study.

2. References

- ER1110-1-105 “Engineering and Design Independent Technical Review, December 31, 2004
- EC1105-2-408 “Peer Review of Decision Documents” dated May 31, 2005 7
- ER 1105-2-100 “Planning Guidance Notebook & Appendices D, F, G & H”
- Northwestern Division Quality Management Plan dated October 28, 2005

2.1 Study Background

The purpose of the Walla Walla River Basin Feasibility Report and Environmental Impact Statement (FR/EIS) is to investigate the feasibility of conducting aquatic ecosystem restoration within the Walla Walla River Basin in the states of Oregon and Washington. The overall scope of the study focuses upon identification and evaluation of a range of actions (plans) that allow natural flows to remain in-stream, thereby improving habitat conditions, passage corridors, and connectivity of the stream for species listed under the Endangered Species Act (ESA); as well as overall water quality improvements in the Walla Walla River.

2.2 Study Authority

The WWRBFS/EIS was prepared as an interim response to a Resolution by the Committee on Public Works of the United States Senate, adopted July 27, 1962, which reads:

> *“Resolved by the Committee on Public Works of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the Rivers and Harbors Act of 1902, be, and is hereby, requested to review the Reports on the Columbia River and Tributaries, published as House Document numbered 403, Eighty-Seventh Congress, and other pertinent reports, with a view to determining any modifications of the recommendations contained therein are advisable at this time, with particular reference to further development of land and water resources to meet anticipated regional requirements.*

The investigation will be coordinated with the Department of the Interior, Department of Health, Education and Welfare, the Department of Agriculture, and other interested Federal agencies and the States concerned."

Additionally, in 2007, language was passed in a Water Resource Development Act further describing changes to previous cost share requirements.

SEC. 4074. WALLA WALLA RIVER BASIN, OREGON.

In conducting the study of determine the feasibility of carrying out a project for ecosystem restoration, Walla Walla River basin, Oregon, the Secretary shall—
(1) credit toward the non-Federal share of the cost of the study the cost of work carried out by the non-Federal interest before the date of the partnership agreement for the project if the Secretary determines that the work is integral to the project; and
(2) allow the non-Federal interest to provide the non-Federal share of the cost of the study in the form of in-kind services and materials.

2.3 History

Over the last century, aquatic ecosystem conditions in the Walla Walla River Basin have degraded due to industrial, urban, and rural development. This has resulted in the extirpation of spring Chinook salmon and an ESA listing for summer steelhead and bull trout, as well as a serious decline in both lamprey and mountain whitefish populations. Multiple habitat issues contribute to the inadequacy of life-sustaining aquatic conditions in the basin; most notably a lack of in-stream water volume and flow duration, which has disconnected habitat corridors and resulted in a decrease in migration attraction flows, passage, spawning, or juvenile rearing habitat. Current negative habitat issues include the following:

- Flow Volume – Most rivers in the basin lack sufficient in-stream flow to support the migration, spawning, and juvenile rearing of ESA-listed species (salmon and bull trout).
- Flow Duration – Water is not available in the channels during critical times in salmon and bull trout lifecycle stages.
- Water Quality – The cold, clear water necessary for salmonids and bull trout is not available at all times of the year. Water quality is degraded due to erosion and sedimentation, elevated temperatures, irrigation withdrawals, and returns.
- Water Temperature – Reduced flow volumes in addition to a reduction in riparian vegetation on streams in the basin have resulted in elevated water temperatures, thus confusing the natural migration cues for salmonids and preventing them from fulfilling their life cycles.
- Riparian vegetation – The elimination of riparian vegetation reduces shade and contributes to elevated water temperatures. It also reduces the production of insects available as food for the fish, and eliminates the natural source of nutrients contributed by the recruitment of woody debris and leaf detritus.

Riparian vegetation also stabilizes the stream bank, reducing sedimentation and erosion and maintaining channel geometry.

- Geomorphology – Changes to stream channel geomorphology related to past and current land use practices:
- Shallow Aquifer Draw – Increased draw on the shallow aquifer has resulted in impacts to in-stream and hyporheic flows in the river system, and has impacted homeowners with wells in several locations in the basin.
- Stream Channel Impacts – Natural and human-caused impacts to the stream channels and volumes have resulted in a lack of connectivity in aquatic and riparian habitats, impacting life stages of the target fish species.

2.4 Plan Formulation

This FR/EIS is an attempt to meet the needs of fish species (both ESA-listed and non-ESA listed) in the basin without serious detrimental effects to the irrigated agriculture community.

For this project, three indicator species (spring Chinook salmon, summer steelhead, and bull trout) are used to calculate potential benefits to be realized through restoration projects within the Walla Walla River Basin. However, as stated above, the limiting factor for the majority of potential restoration opportunities is the lack of in-stream flow during critical migration periods.

After establishing management measures that met the goals and objectives of the study, these measures were evaluated for various uses (e.g. hydro-peaking flows, fisheries, and downstream consumption) by incrementally changing the flow of the Walla Walla River and its tributaries. The outcomes of the simulations and flow negotiations typically recommend a range of flows (e.g. seasonal, wet and dry year flows) necessary for fish passage, to provide sufficient in-stream habitat for particular species and life stages, and to ensure that flow-dependent water quality requirements are met (e.g. temperature and dissolved oxygen, which are modeled with other tools) (Stalnaker et al., 1995). In addition, in-stream flows may also be specified to remove excessive fine sediment from the riverbed [flushing flows (Milhous, 1996)].

To complete this evaluation a regional model, PHABSIM, was used. The purpose of the PHABSIM model is to simulate a relationship between stream flow and physical habitat for the various life stages of a fish species. The basic objective of a physical habitat simulation is to obtain a representation of the physical stream so that it may be linked, through biological considerations, to the social, political, and economic world.

Models like PHABSIM (Milhous et al., 1981, and its variants) predict how physical habitat (depth, velocity, substrate and sometimes an index of cover) changes with flow, combines this information with habitat suitability criteria, and develops an index of the amount of habitat available over the range of stream flows.

Ranking each proposed measure additionally considers the reliability of the individual measure, along with its ability to meet or exceed the flow targets during each critical life stage months. These biological outputs are then subjected to a cost effective analysis to screen measures down into alternatives. Alternatives are then carried forward for further evaluation and screening until a final recommendation can be made.

2.5 Alternatives

Although numerous measures were evaluated to meet the goals and objectives of the FR/EIS, four alternatives were carried forward for further evaluation in the FR/EIS: Columbia River Water Exchange, Off-Channel Storage, Irrigation Efficiency, and Shallow Aquifer Recharge. Further details regarding each alternative are contained in the following paragraphs.

- **Columbia River Water Exchange**

  The general concept for the Columbia River Water Exchange measure is to reduce irrigation surface water withdrawals from the Walla Walla River by supplying an alternate source of water directly to irrigation distributions systems, thus leaving more of the natural flows in the river. The alternate source of water for this measure is the Columbia River. Current sources of irrigation water include the surface waters of the Walla Walla River, Touchet River, Mill Creek, and Yellowhawk Creek.

  The water for the exchange will be pumped from a pump station located on the Columbia River near the mouth of the Walla Walla River. It will then be delivered to a total of ten existing points of delivery (POD) operated by the Gardena Farms Irrigation District (GFID), Walla Walla River Irrigation District (WWRID), and the Hudson Bay Irrigation District (HBDIC).

  There are numerous benefits to selecting this alternative. Because flows in the Walla Walla River would be augmented with Columbia River water, water quality and habitat would improve. Flows in the Columbia are much more reliable than those in the Walla Walla River system. Therefore, a bucket for bucket exchange with irrigators has almost no risk in its ability to deliver water during low flow years. Another benefit is that the implementation cost of an exchange pipeline is less then that of a storage reservoir, although in-stream benefits are virtually the same. Lastly, the pipeline runs along existing ditches and roads, and has no major impacts to irrigators or ESA listed species. This reduces that amount of mitigation required by a large-scale project.

  Some disadvantages also exist with a Columbia River exchange option. To begin with, the annual operation and maintenance costs for exchange are significant. The amount of power required to pump water through approximately 38 miles of pipeline is enormous. In addition, the project sponsor does not own any of the land through which the pipeline would run. There are many land owners and orchards that would be impacted by this project, although none require relocation. A further disadvantage is the restriction placed on getting water rights from the Columbia River, which include a “no net loss” policy as well as limited summer appropriations. Therefore, restrictions would need to be waived for the exchange project to go forward. The final disadvantage is that, while in-stream flows can be protected through the State of Oregon, there is no legal instrument that would protect flows once it crosses into Washington State. This is very problematic because of Washington’s relinquishment laws. If a Washington water right holder does not use water available to them for beneficial use in a subsequent 5 year period, they lose the water right. Therefore, the water Oregon leaves in-stream would have to be used by Washington irrigators or they would lose their water rights, thus discounting any benefits this section of river could have realized upon implementation of this project.

- **Off-Channel Storage**

The construction of an offsite storage reservoir, or reservoirs, was considered as a way to meet the goals and objectives of this study. With this concept, water from the mainstem Walla Walla River would be diverted and stored when in excess of in-stream flow needs, and delivered to local irrigators in lieu of in-stream flow withdrawals. Water exchanged with the irrigators would be equal to the amount of water left in-stream (bucket for bucket exchange). Water from the storage reservoir would be conveyed to an irrigation dispersal point for distribution.

A primary benefit of this alternative is capturing water in the basin that would normally be passed downstream during high flow events in winter and early spring. This allows for demand to be met for in-stream habitat conditions as well as regional irrigation needs. Another benefit is improved water quality, manifested by decreasing water temperatures in the mainstem of the Walla Walla River through increasing flow levels. Additionally, a storage reservoir is a fairly self-sufficient system. Because of the location of the two potential storage sites, gravity can be used to fill and empty the reservoir the majority of the time, creating significant savings in pumping costs and the long-term operations and maintenance required for this project. A storage reservoir also has little risk of not realizing benefits. Some amount of carry over is calculated to account for the 30-year historic water flows, and dam sizes were optimized to account for the variability of water flows. In the simplest terms, water can be carried over in high flow years to aid in the lower flow years.

Other benefits revolve around the process and protection of in-stream flows. Under current water law in Oregon, offsite storage requires only minor rule changes to allow project implementation. Implementation of offsite storage also allows for the in-stream flows to be protected, and any water left in the river is protected by Oregon water law.

With these benefits come disadvantages. As discussed, dam sizes were optimized to meet demand. If the 30-year hydrographic changes in the future, there may not be enough water for storage purposes and, therefore, project demand would not be met. The reliability of the reservoir is also questionable. Because the system is reliant on Walla Walla River flows alone, subsequent low flow years do not allow the reservoir to fill and, therefore, cannot support the demand. Typically, the reliability of the project ranges from 60 to 85%, depending on in-stream flow targets. The second disadvantage to this option is the cost of building the storage dams. While operation and maintenance costs have been optimized based on project location, the cost to build a reservoir is significant. There are no ESA issues within the storage footprint and therefore, mitigation is minimal for the Pine Creek sites. However, building a reservoir in the Pine Creek location prevents irrigators using Pine Creek water from getting this water, and water will need to be supplied to these irrigators. While another disadvantage is the potential for home owners to be relocated, each of these home owners has been heavily involved in this project. It appears that all relocations will occur in a timely fashion and without a lot of resistance. By far the largest disadvantage, as with exchange, is that there is no legal instrument to protect flows once they cross into Washington State, and Washington irrigators would be forced to use the flows or face losing their water right.

For planning purposes, earth embankment dams were considered for construction of the reservoirs. Roller compacted concrete dams were considered but, at the time, were more expensive and carried the same amount of risk as the earth embankment structures, Roller compacted concrete dams were, therefore, removed from further consideration. Under the earth embankment scenario, a single system of pipeline, pump station, and discharge structures were discussed. Each reservoir, including the dam site, would encompass over 300 acres. The dam alignments would span Pine Creek Valley, and a water intake would be constructed at Cemetery Bridge to withdraw water from the Walla Walla River for reservoir fill.

- **Irrigation Efficiency**

  Irrigation efficiency includes improving the efficiency with which irrigation water is conveyed and utilized within the Walla Walla River Basin. The intent of irrigation efficiency is to reduce irrigation water withdrawals from the mainstem in-stream flows of the Walla Walla River by reducing irrigation water lost through inefficient irrigation practices, seepage and evaporation, consolidation of systems, or by reducing or eliminating tailwater discharges. The quantity of conserved water would remain in the river.

  Five irrigation districts within the basin were invited to participate, based on their potential to provide irrigation efficiency benefits when and where needed, and in sufficient quantity to support the planning objectives. Four irrigation districts chose to participate: Gardena Farms Irrigation District #13 (GFID), Walla Walla River Irrigation District (WWRID), Touchet Irrigation District (East Side No. 6 and West Side No. 5), and Hudson Bay Irrigation District (HBDIC). Dayton Irrigation

District chose not to participate. The Study Team did not invite the participation of other irrigation districts in the basin that had little or no potential to support the Planning Objectives, primarily because of location.

Further discussions with the four irrigation districts revealed that only one, WWRID, stated support for a system that would save water through efficiency. The other three districts indicated they were not willing to reduce withdrawals for a more efficient delivery system. Therefore, only WWRID was further evaluated for its potential to meet in-stream flow levels.

One of the benefits of irrigation efficiency is that water currently being diverted and lost to seepage is now available for in-stream flow. This is a direct benefit to the mainstem Walla Walla River. The second advantage is that efficiency would be implemented through current canals and ditches, thus minimizing impacts to ESA-listed species or land owners.

The disadvantages of irrigation efficiency are, however, substantial. First, water has been over appropriated in both states. Even the most efficient water delivery system is not able to provide the necessary water to irrigators so that in-stream goals can be met. Secondly, the aquifer in the region is declining at a significant pace. Lining or piping irrigation canals and ditches takes more water away from the aquifer, thereby further enhancing its decline. Thirdly, agreements would need to be created between the irrigations districts and the non-federal sponsor, and those agreements would need to be coordinated and approved through state water masters. This is a very complicated process which could require years to implement, thus increasing the risk of benefit realization. Fourth, since water has been over appropriated in both states, many water right holders currently do not get their full paper water right. Irrigation districts may be unwilling to negotiate water savings for in-stream flow use since they are not currently getting their lawful right. Another disadvantage is the timing of the saved water is critical to meeting project goals and objectives. Saving water in March does not benefit the project because there are plenty of in-stream flows in March and little irrigation demand. As with storage and exchange, the biggest disadvantage is that there is currently is no legal instrument in place to protect in-stream flow as it crosses borders. Again, with the use or lose policies in the state of Washington, water saved for in-stream flow purposes by Oregon irrigators is not protected as it crosses state lines.

- **Shallow Aquifer Recharge**

Geology dictates the size, shape and characteristics of aquifers. In the Walla Walla River Basin, the Walla Walla Valley and Blue Mountains are formed from fractured Columbia Basin basalt overlain with a layer of gravels, sands, and silts over 200 feet thick in places. These geologic layers result in two primary aquifers; the gravel aquifers and the basalt aquifer. The shallow gravel aquifer is actually several aquifers located within the alluvium, gravels, loess and other sediments that lie on top of the basalt. For the purpose of this report, all the gravel aquifers will be lumped into the term Shallow Aquifer. The basalt aquifer is recharged high in the Blue Mountains. Water entering the basalts in the mountains flows west through fractures toward the Columbia River, and eventually joins the river on its journey to the Pacific Ocean. Above the basalts, another aquifer lies, fed by rainfall and snowmelt on the foothills of the Blue Mountains and infiltration from the rivers, streams, and creeks traversing the valley floor.

Based on an evaluation of the aquifer and the mainstem of the river, significant channel losses (losing reach) start at Nursery Bridge and extend down to McCoy Bridge and the State line. In low water years, the losing reach extends even further downstream. There is a shallow groundwater constriction just below Touchet, so the potential future losing reach could extend downstream to Touchet. A total aquifer recharge is needed to stabilize the aquifer in the proximity of the Walla Walla River channel. This needed recharge, in order for such a project to realize in-stream flow benefits, appears to be approximately 15,000 acre-feet annually. This number has been derived based on several sources of information. Pre-1950, the aquifer was relatively stable according to reports and recorded spring flows. During this time, the Little Walla Walla River flowed year-round, contributing about 5,000 acre-feet of annual recharge. One estimate of the increase in irrigation withdrawals in the same period is roughly 10,000 acre-feet annually.

2.6 Estimated Costs

Alternative's implementation costs range from approximately 9 million for irrigation efficiency to 325 million the off channel storage reservoirs.

2.7 Project Delivery Team

The project delivery team for the WWRBFS/EIS is located mostly in Walla Walla District. Real-estate support and help with the CE/ICA were performed outside of the district.

Discipline	Name	Contact Information
Plan Formulation	Margie McGill	(509) 527-7615
Environmental Specialist	Red Smith	(509) 527-7244
Fishery Biologist	Karen Zelch	(509) 527-7247
	Jason Achziger	(509) 527-7262
Wildlife Biologist	Fred Higginbotham	(509) 527-7236
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Civil Engineer	Richard Turner	(509) 527-7625
Cost Engineer	Carl Bender	(509) 527-7542
Hydrologist	Steve Hall	(509) 527-7550
Hydraulic Engineer	Ryan Laughery	(509) 527-7252

Discipline	Name	Contact Information
Structural Engineer	Bob Hollenbeck	(509) 527-7547
Mechanical Engineer	Chuck Palmer	(509) 527-7571
Real-estate Specialist	Joe Duncan	(206) 764-3746
Office of Counsel	Theresa Hampson	(509) 527-7709

3.0 Review Requirements

The Agency Technical Review (ATR) and Independent External Peer Review (IEPR) are a component of the Project Management Plan. They represent a process that assures quality products for the Walla Walla River basin Feasibility Study (WWRBFS), General Investigation (GI) Feasibility Study. This ATR defines the roles of each member on the study and technical review teams. The ATR is governed by the Northwestern Division (NWD) Quality Assurance plan. The basis for the Quality Assurance Plan is the NWD Quality Management Plan. Those plans have been developed under the guidance of the Planning Center of Expertise. The Quality Assurance Plan will be followed in verifying that the project Quality Control process operates as planned.

The major products to be reviewed by the technical review team are the Feasibility Report and related NEPA documents. Under the provisions of Corps of Engineers policy, as detailed in EC1105-2-408 dated May 31, 2005, the ATR will be conducted by specialists from organizations outside of the district responsible for the study. Agency Technical Review will be conducted for all decision documents and will be independent of the technical production of the project.

3.1 Levels of Review

Initial Quality Control QC review is handled within the Section or Branch performing the work or by staff when it involves in-kind services. Additional QC has been performed by the PDT and supervisors of PDT members during the course of completing the Feasibility Study. The detailed checks of computations and methodology are performed at the District level, and the processes for this level of review are well established.

Agency Technical Review (ATR) is required for this General Investigation Feasibility Study. This type of review is typically performed by experts at another Corps District, Division, Lab or CX. Reviews at this level are coordinated by the Planning Center of Expertise. Review of projects that are primarily flood damage reduction in nature, are coordinated by the Corps Flood Risk Management Center of Expertise. Review comments are generally documented, processed and resolved through the Dr. Checks software package.

The highest level of review, typically reserved for projects with a potential implementation cost of over $45,000,000, is the Independent External Peer Review, or IEPR. The review is handled outside of the Corps of Engineers, and utilizes preeminent professionals from other agencies, universities and the private sector. Since the total project is well below the $45,000,000 figure, ATR will be the method of formal review for this feasibility study.

3.2 Agency Technical Review

Pursuant to EC1105-2-408, the ATR will be completed by another District office. Currently Northwestern Division and its planning boards are facilitating discussions to form the appropriate ATR team and team lead. Given the significant Ecosystem Restoration component to this study, coordination with the appropriate PCX for Ecosystem Restoration is recommended.

As a result, the ATR would focus on the following and be facilitated through Dr. Checks.

- Review of the planning process and criteria applied.
- Review of the methods of preliminary analysis and design.
- Compliance with client, program and NEPA requirements.
- Completeness of preliminary design and support documents.
- Technical completeness of assumptions, analysis, and decisions.
- Spot checks for interdisciplinary coordination.

The cost of the ATR was estimated to be about $50,000. It should be noted that the ultimate ATR budget will depend upon the ultimate project scope and the level and complexity of the review process.

3.2 Independent External Peer Review

Additionally, the IEPR for this Feasibility Report study will be assigned by the Planning Center of Expertise (PCX) for Ecosystem Restoration Projects.

It is anticipated that the ATR Team Review Process began after the ATR Team is assigned, and initially covered the models and assumptions used in the analysis.

The external peer review is planned for the draft final FR/EIS for the following reasons:

(a) the innovative idea of addressing in stream flow (which is synonymous with habitat for western streams where water is critical),
(b) the potential combinations of measures,
(c) environmental importance of the project area, with ESA listed species and
(d) to ensure the continued public/agency trust of the Corps hydrologic and hydraulic modeling for the without-project condition and expectation of the preferred alternative.

3.2.1 Scientific Information

Based upon the self-evaluation by the PDT, it is likely that the Corps report to be disseminated will contain influential scientific information. This project is innovative in that it would be supplying in stream flows as a way of providing habitat and also addressing the primary limiting factor in the river. Legal issues will also be important for this study, as state water law will be a key factor, and there are two states involved (Oregon and Washington).

3.2.2 Timing

The IEPR Review process is envisioned to begin in the early 2010 with an assessment of key models to be used in the evaluation and comparison of alternative plans in this feasibility study. It is currently anticipated that the alternative plans will be evaluated using IWR-Plan Decision Support Software a model developed by IWR. IWR-Plan employs cost effective and incremental cost analysis for decision making.

3.2.3 Review Cost

The cost of the IEPR is estimated to be about $150,000

3.2.4 Review Schedule

Task	Completion Date
1. Develop PRP Plan, to PCX	Completed
2. Identify Regional/National IEPR resources	Feb 2010
3. Recommend IEPR Plan to PCX	Feb 2010
4. PCX Approves & Assigns IEPR Team	March 2010
5. Review of Models	April 2010
6. Alternative Formulation Briefing	April 2010
7. Release draft EIS/FR to Public	April 2010
8. IEPR team conducts review	April – June 2010
9. Provide public comments to IEPR team	June 2010

4.0 Public Comment

Public involvement is anticipated throughout the Feasibility Study. The Sponsor (The Confederated Tribes of the Umatilla Indian Reservation) has already established a relationship with the key stakeholders for this Feasibility Study. It is anticipated that this group will form the nucleus of additional input from the citizens of the region. The public involvement process is expected to occur as follows:

Meet with sponsor and key stakeholders	Ongoing
Public Coordination with Draft EA	FY09 & FY10

5.0 Availability of Public Comment to the Review Team

Summaries of previous meetings, that included public involvement, are available to the Review Team. Public input from the NEPA workshops and the public scoping meetings will be available to the ATR members to ensure that public comments have been considered in the development of the review documents and in the final reports.

While no formal Public Peer Review is included in the current schedule and budget, it is likely that as the study generates alternative plans that there will be interest from Universities along the Front Range in Colorado. Their input and comment will be welcome at the Public Involvement meeting and through individual contacts in specific subject matter areas.

6.0 Schedule

December 2009	Preliminary Selection of Recommended Plan
February 2010	Draft Report to Agency Technical Review (ATR)
March 2010	Draft Report Submitted for AFB
April 2010	AFB
May 2010	Release of Draft FR/EIS
July 2010	ATR Draft Report
August 2010	Submit Report for Approval (HQUSACE)