

Yakima River Basin Study

Mainstem Floodplain Restoration Technical Memorandum

U.S. Bureau of Reclamation

Contract No. 08CA10677A ID/IQ, Plan of Study Task 4.14

Prepared by

Anchor QEA
HDR Engineering, Inc



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia-Cascades Area Office



State of Washington
Department of Ecology
Office of Columbia River

February 2011

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1.0 Introduction

This technical memorandum updates recommended approaches to enhancing aquatic habitat for the mainstem floodplain of the Yakima River Basin to include additional detail and justification for reach-level needs and cost. The recommendations were first developed in 2009 by the Habitat Enhancement Subcommittee of the Yakima River Basin Water Enhancement Project (YRBWEP) Workgroup.

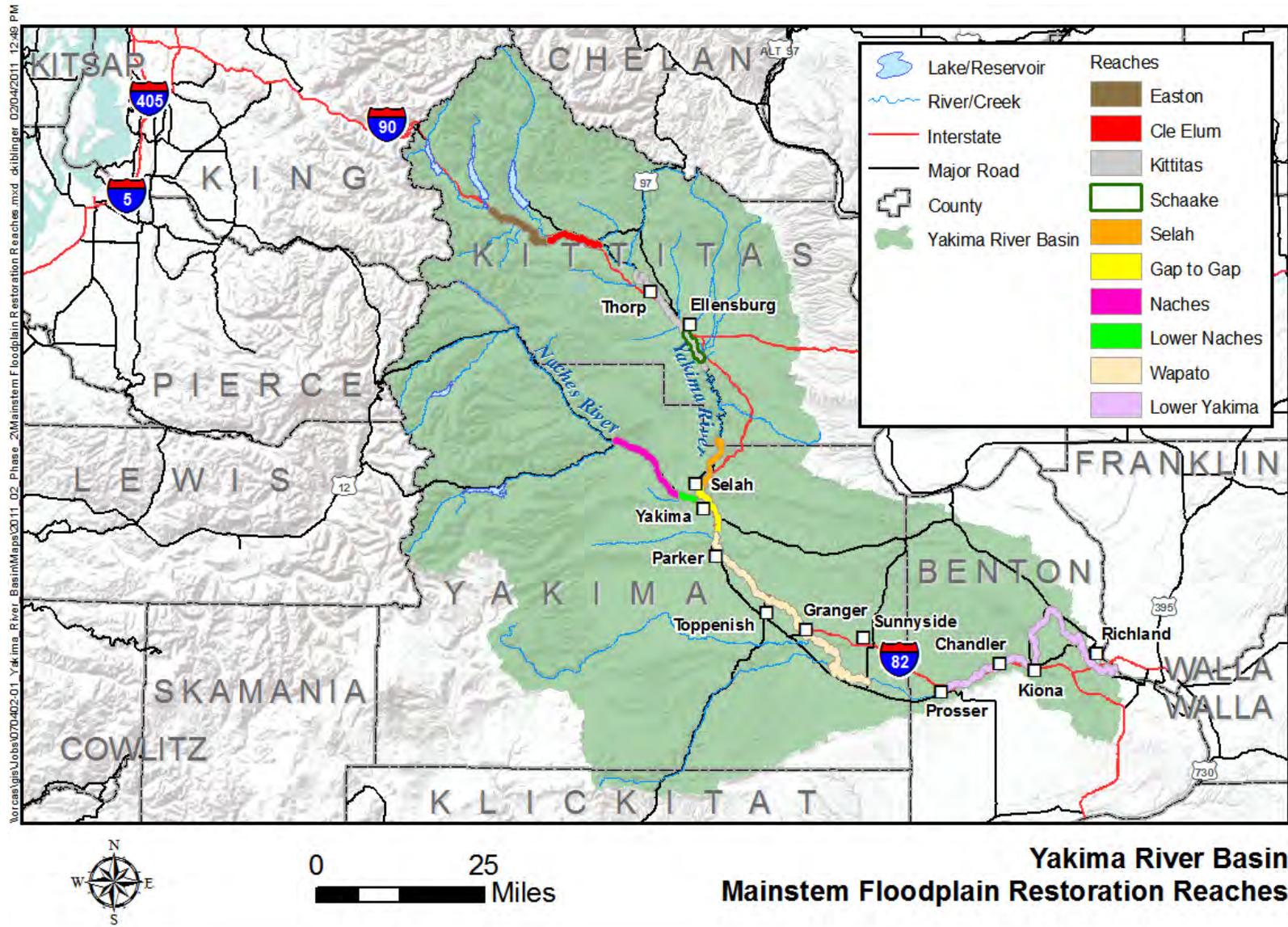
The YRBWEP workgroup organized the Habitat Enhancement Subcommittee in 2009 and asked subcommittee members to develop a recommended programmatic approach to enhancing aquatic habitat within the Yakima Basin. See Volume 1 of the Integrated Plan for a list of subcommittee members. The subcommittee's recommendations built on previous planning efforts.

In 2009, the subcommittee considered existing efforts for habitat enhancement programs in the basin and, with input from those directly involved in many of these programs, identified unmet needs. The subcommittee developed programmatic recommendations for mainstem floodplain restoration and a tributaries program in the Yakima Basin (2009 Habitat Subcommittee Report) based on identifying and aggregating unmet needs by specific geographic areas.

1.1 Study Area

Updated restoration actions were identified for 10 mainstem Yakima and Naches River reaches: Gap to Gap, Umptanum Road Bridge to Ringer Road, Lower Naches, Naches, Cle Elum, Kittitas, Wapato, Easton, Selah, and Lower Yakima. The geographical locations of these reaches are provided in Figure 1 and explained in further detail in Section 3.0.

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Yakima Basin Study

Figure 1. Yakima River Basin Mainstem Floodplain Restoration Reaches

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1.2 Planning Objectives

The Habitat Enhancement Subcommittee identified the following objectives for restoring physical and biological processes in the mainstem Yakima River Basin:

Physical Processes:

- Sediment transport and storage
- Sediment deposition/erosion
- Maintenance of channel and flow conveyance
- Hyporheic exchange
- Flood/drought management regime
- Maintenance of tributary connections with mainstem reaches

Biological Processes:

- Habitat connectivity
- Nutrient cycling and water quality
- Riparian forest turnover
- Structural diversity
- Protect unique environments

2.0 Summary of Findings

In 2010, the Habitat Enhancement Subcommittee held four meetings/workshops (two in Yakima County and two in Kittitas County) to develop a more detailed report of mainstem floodplain restoration enhancements, building on the 2009 preliminary recommendations. The subcommittee identified more specific improvements in the mainstem reaches of the Yakima and Naches Rivers, using geographic information system mapping and local knowledge to identify reach features and restoration opportunities. Worksheets were developed to characterize action areas, summarize reach-wide primary goals, identify actions needed, and estimate associated costs for each reach. The updated mainstem floodplain habitat enhancement program totaled approximately \$280 million.

As part of this process, Kittitas County Conservation District also shared with the subcommittee updated tributary habitat actions and costs for the upper Yakima River portion of the basin. Some additional bull trout-related actions for tributaries were also identified. The updated tributary habitat enhancement program, including the 2009 letter with identified projects from North Yakima Conservation District and the updated 2010 Kittitas County Conservation District letter are provided in Appendix A. The updated tributary enhancement program totaled approximately \$180 million.

The total cost of the habitat enhancement program to be included in the Yakima Basin Integrated Water Resources Management Plan, combining mainstem floodplain and tributary habitat actions, is estimated at \$460 million.

2.1 Expected Benefits from Habitat Enhancements

The Habitat Enhancement Subcommittee expects the proposed habitat program to significantly improve prospects for recovering fish populations to levels that are resilient to catastrophic events and the potential impacts of climate change. The program would accelerate ongoing efforts to protect existing high-value habitats, improve fish passage, enhance flows, improve habitat complexity, and reconnect side channels and off-channel habitat to stream channels.

Fish habitat enhancement actions would help create improved spawning, incubation, rearing, and migration conditions for all salmonid species in the Yakima Basin; implement key strategies described in the Yakima Subbasin Plan (May 2004); and complete most of the actions described in the Yakima Steelhead Recovery Plan (August 2009).

The subcommittee expects no negative impacts on total water supply available. Some of the proposed actions may increase tributary flows into the mainstem Yakima River, which would result in a small increase in total water supply available. Mainstem Yakima and Naches river operations would continue to serve existing Reclamation contracts. If new sources of water are developed within the basin, the increased water supply and management flexibility would be used to support fisheries management objectives, such as enhancing adult migration in the summer and smolt outmigration in the spring for all anadromous species, including reintroduced species.

Collectively, the actions in this program would make significant progress toward meeting delisting goals for Endangered Species Act-listed steelhead and bull trout. It should also significantly increase Chinook production (native Chinook stocks are not listed). Coho and sockeye were not considered ESA-listed species because they were extirpated in the Yakima Basin and will be reintroduced from a stock not indigenous to the basin. More specific benefits from habitat enhancements and other Integrated Plan actions are characterized in Volume 2 technical memorandum, *Fish Benefits Analysis* (Reclamation 2011).

2.2 Habitat Enhancement Implementation

The implementation approach would be tailored to utilize existing organizations, review processes and plans, as applicable. Reclamation and Ecology may establish an advisory group similar to the YRBWEP Conservation Advisory Group to help develop a more detailed approach to how and when projects would be funded.

Early mainstem floodplain improvements could include channel and habitat restoration in the Yakima River near Ellensburg and between Selah and Union Gap, and on the Naches River. Early actions for the tributary program could include completion of screening and passage at diversions in the middle and upper Yakima Basin, bull trout habitat improvements and management actions, and implementation of the Toppenish Creek Corridor program, which is focused on separating the creek from irrigation canals and restoring floodplain habitat.

3.0 Mainstem Floodplain Restoration Reaches

General actions of the recommended habitat enhancement program for mainstem floodplain restoration include excavation and grading, modified infrastructure, riparian restoration (core and fringe), instream habitat restoration, protection through easements and acquisitions, and levee setbacks.

Reaches were organized into three tiers. Each reach was placed in its respective tier based on the timing and scheduling of the proposed restoration efforts. These include the following:

- Tier I elements: Ready to proceed. (Gap to Gap, Umptanum Road Bridge to Ringer Road (Schaake), Lower Naches, and Naches Reaches)
- Tier II elements: Existing planning efforts underway. Projects in this tier move forward based on integration with the Integrated Plan water projects and land use and land availability opportunities. (Cle Elum, Kittitas, Wapato, Easton, and Selah Reaches)
- Tier III elements: Need to have program flexibility because some projects could be scheduled later depending on priorities, readiness to proceed, and new information developed over time. (Lower Yakima Reach)

The assessment of mainstem floodplain restoration needs was updated through more detailed reach analyses. This section summarizes key restoration needs identified by the Habitat Enhancement Subcommittee for each Yakima and Naches River mainstem floodplain restoration reach.

Reach actions and associated budgets were developed to estimate the habitat enhancement program funding level and direction. Budgeting assumptions are provided in Appendix B. Cost estimates developed for individual reaches are planning-level estimates based on December 2010 price levels, and would be updated during detailed restoration planning and design. The recommended actions and estimated costs for each reach are summarized below.

Easton Reach: This reach is between Easton and the Cle Elum River confluence (approximately 12 miles in length). Total cost for recommended restoration actions is estimated at \$23 million. Goals and restoration actions for this reach include:

- Widen six bridge crossings to improve channel complexity.
- Provide five engineered logjams within a 1-mile section on the lower part of this reach to improve in-channel habitat functionality.
- Protect floodplain and riparian lands through approximately 110 acres of property easements and acquisitions distributed throughout the entire reach.
- Expand side channel area in the upper and lower reaches through 0.75 miles of levee setbacks.

Cle Elum Reach: This reach is between the Cle Elum River and the Teanaway River (approximately 10 miles in length). Total cost for recommended restoration actions is estimated at \$44 million. Goals and restoration actions for this reach include:

- Upgrade and lengthen I 90 bridges and relocate Teanaway Bridge to improve channel complexity.
- Provide five engineered logjams from the interchange pond to 1 mile downstream, 14 logjams from the Cle Elum confluence to approximately 2.7 miles downstream (to the edge of south Cle Elum), and install large woody debris in the side channel south of Cle Elum for 0.5 mile, totaling approximately 4 miles of in-channel habitat improvements.
- Protect floodplain and riparian lands through approximately 500 acres of property acquisitions distributed throughout the entire reach.
- Reestablish side channels and connect ponds and wetlands through 1.5 miles of levee setbacks.

Kittitas Reach: This reach is between Thorp and Yakima Canyon, excluding the Schaake property (approximately 14 miles in length). Total cost for recommended restoration actions is estimated at \$40 million. Goals and restoration actions for this reach include:

- Widen two bridge crossings to improve channel complexity.
- Relocate Cascade Irrigation District headworks to allow levee setback.
- Install large woody debris in 5 miles of side channels and install six engineered rootwads to revegetate and restore instream habitat and add channel complexity to restore natural water regime.
- Protect riparian lands and floodplain through approximately 1,200 acres of easements and acquisitions.
- Provide approximately 60 acres of riparian restoration to improve side channel area and processes.
- Reconnect floodplain and provide for channel migration and associated habitat improvements through 1.5 miles of levee setbacks.

Umptanum Road Bridge to Ringer Road (Schaake): This reach was not further evaluated in the Basin Study because it is part of an ongoing restoration design effort funded by Reclamation. Funding for implementation was assumed at \$7.5 million, based upon input from the subcommittee.

Selah Reach: This reach is between Roza Diversion Dam and Selah Gap (approximately 8 miles in length). Total cost for recommended restoration actions is estimated at \$2 million. Goals and restoration actions for this reach were based upon making modest improvements to the significantly altered floodplain and aquatic habitat, and include:

- Protect approximately 30 acres of riparian lands through easements to retain side channel area and process.
- Protect and restore the connection with Wenas Creek.
- Remove levee and connect lower pond at Selah Gap.

Gap to Gap Reach: This reach is between Selah Gap and Union Gap (approximately 8 miles in length). Total cost for recommended restoration actions is estimated at \$43 million. Goals and restoration actions for this reach include:

- Modify waste water treatment plant outfall, Wapato Dam, diversion headgates, and bridges to restore floodplain process, sediment transport processes, and natural water regime.
- Install large woody debris in 6.5 miles of instream habitat and restore approximately 60 acres of riparian habitat to protect the connection with Ahtanum Creek.
- Retain or expand side channel area and process by restoring 3 miles of new side channels and 3.7 miles of levee and dike setbacks.

Naches Reach: This reach is between the Naches River confluence with the Tieton River and State Route 12 Twin Bridges (approximately 15 miles in length). Total cost for recommended restoration actions is estimated at \$20 million. Goals and restoration actions for this reach include:

- Install large woody debris in 2 miles of instream habitat to enhance connection with Tieton River and restore sediment transport processes.
- Provide approximately 320 acres of riparian restoration to improve side channel area and processes.
- Restore natural water regime, where possible.
- Protect riparian lands and floodplain through 1,000 acres of easements and acquisitions.
- Reconnect floodplain and provide for channel migration and associated habitat improvements through 1.25 miles of levee setbacks.

Lower Naches Reach: This reach is between the State Route 12 Twin Bridges and the confluence with the Yakima River (approximately 4 miles in length). Total cost for recommended restoration actions is estimated at \$15 million. Goals and restoration actions for this reach were based upon making modest improvements to the significantly altered floodplain and aquatic habitat, and include:

- Retain or expand side channel area and process by excavating the existing Ranney Well and lower Cowiche Creek and relocating Fruitvale and Old Union diversions to the Nelson Dam diversion.
- Restore floodplain and sediment transport processes and natural water regime by opening side channel and restoring approximately 20 acres of riparian habitat.
- Protect and restore the connection with Cowiche Creek.

Wapato Reach: This reach is between Union Gap and Mabton (approximately 38 miles in length). Total cost for recommended restoration actions is estimated at \$65 million. Goals and restoration actions for this reach include:

-
- Widen three bridges to improve channel complexity.
 - Connect existing publically owned land into contiguous blocks of protected property.
 - Extend spring and summer period of side channel connection.
 - Protect or acquire approximately 5,100 acres, including privately owned land in the active channel zone.
 - Increase frequency and size of cottonwood recruitment events.
 - Install five engineered rootwads in 25 miles of instream habitat and restore approximately 1,000 acres of riparian habitat to protect function and extent of riverine wetlands in lower portion of reach and habitat complexity in main and side channels.

Lower Yakima Reach: This reach is between Prosser and the mouth of the Yakima River (approximately 26 miles in length). Total cost for recommended restoration actions is estimated at \$9 million. Goals and restoration actions for this reach include:

- Modify infrastructure around mouth of river to improve sediment transport function and floodplain processes.
- Install 20 engineered logjams in 3 miles of instream habitat to improve in-channel habitat functionality.
- Protect floodplain and riparian lands through approximately 300 acres of property easements and acquisitions.

Table 1 summarizes the Habitat Enhancement Subcommittee’s recommendation for restoration actions on the mainstem reaches of the Yakima and Naches Rivers.

Table 1. Mainstem Floodplain Restoration Elements of Recommended Habitat Enhancement Program

Program Element	Recommended Funding Level¹ (millions)	Geographic Area	Improvements	Comments
Tier I – Ready to Proceed	\$42.9	Gap to Gap: from Selah Gap to Union Gap	Restore 3 miles new side channels	None
			Modify WWTP outfall, bridges, Wapato Dam and diversion headgates	
			Restore 60 acres riparian habitat	
			Restore 6.5 miles instream habitat (e.g., large woody debris)	
			Protect 121+ acres through conservation easement and acquisition	
			Set back 3.7 miles of levees and dikes	
	\$7.5	Umptanum Rd. Bridge to Ringer Rd. (Schaake)	Floodplain levee setback and channel restoration, floodplain restoration and property acquisition (Schaake)	Washington Department of Fish and Wildlife boat launch; includes Schaake property.
	\$15.3	Lower Naches: from SR 12 Twin Bridges to confluence with Yakima	Excavate Ranney Well and lower Cowiche Creek and relocate Fruitvale and Old Union diversions	Includes Lower Cowiche, Eschbach area, upstream levees, Yonker and Glead diversions. Connected to Wapatox project.
			Modify Nelson Dam	
			Restore 20 acres riparian habitat	
			Open side channel to improve instream habitat	
			Protect agricultural lands through easements	
	\$20.0	Naches: from confluence with Tieton River to SR 12 Twin Bridges	Restore 2.5 miles new side channels	None
			Restore 320 acres riparian habitat	
			Restore 2 miles instream habitat (e.g., large woody debris)	
			Protect 1,000 acres through conservation easement and acquisition	
			Set back 1.25 miles of levees and dikes	

¹ Provide for flexibility in allocating funding to additional project sponsors beyond Reclamation to leverage existing implementation capacities.

Table 1. Mainstem Floodplain Restoration Elements of Recommended Habitat Enhancement Program (Continued)

Program Element	Recommended Funding Level² (millions)	Geographic Area	Improvements	Comments
Tier II – Existing planning efforts underway ³	\$44.4	Cle Elum: from Cle Elum River to Teanaway River	Modify I-90 bridges and Teanaway Bridge	None
			Restore 4 miles instream habitat (e.g., logjams, large woody debris, etc.)	
			Protect 500 acres through acquisition	
			Set back 1.5 miles of levees and dikes	
	\$39.9	Kittitas: from Thorp to Yakima Canyon, excluding Schaake	Reconnect up to 4 miles new side channels	None
			Modify undersized bridge, railroad crossing, and headworks	
			Restore 60 acres riparian habitat	
			Restore 5 miles instream habitat and add channel complexity (e.g., large woody debris and rootwads)	
			Protect 1,200 acres through conservation easement and acquisition	
			Set back 1.5 miles of levees and dikes	
	\$65.0	Wapato: from Union Gap to Mabton	Restore several miles of side channel	None
			Modify three bridges	
			Restore 1,000 acres riparian habitat	
			Restore 25 miles instream habitat (e.g., rootwads)	
			Protect 5,100 acres through conservation easement and acquisition	
			Set back 10 miles of levees and dikes	
	\$23.1	Easton: from Easton to Cle Elum River confluence	Modify WSDOT I 90, bridges, and railroad river crossing	None
			Restore 1 mile instream habitat (e.g., logjams)	
			Protect 110 acres through conservation easement and acquisition	

² Provide for flexibility in allocating funding to additional project sponsors beyond Reclamation to leverage existing implementation capacities.

³ Projects within this tier move forward based upon integration with Integrated Package water projects, and land use and land availability opportunities.

**Table 1. Mainstem Floodplain Restoration Elements
of Recommended Habitat Enhancement Program (Continued)**

Program Element	Recommended Funding Level⁴ (millions)	Geographic Area	Improvements	Comments
Tier II – Existing planning efforts underway ²	\$2.2	Selah: from Roza Diversion Dam to Selah Gap	Set back 0.75 miles of levees and dikes	None
			Modify gravel pits outlet structure to improve water temperature	
			Restore 30 acres riparian habitat	
			Protect side channels through conservation easement	
Tier III ⁵	\$9.4	Lower Yakima: from Prosser to the mouth	Set back 0.25 mile of levee	None
			Connect wetlands with river	
			Restore 1 mile riparian habitat	
			Improve instream habitat complexity (e.g., logjams)	
Program Management	\$10 (or \$0.50/yr for 20 years)	Not applicable	Protect 400 acres through conservation easement and acquisition	Increased capacity for project management and oversight, initiating design, and administration
			Not applicable	
Total	\$279.7			

⁴ Provide for flexibility in allocating funding to additional project sponsors beyond Reclamation to leverage existing implementation capacities.

⁵ Need to have program flexibility as some Tier III projects could move up and Tier II could move back in time, depending upon priorities, readiness to proceed, and new information developed over time.

4.0 References

1. Ecology. 2009. Yakima River Basin Integrated Water Resource Management Alternative, Final Environmental Impact Statement. Washington State Department of Ecology.
2. HDR Engineering, Inc. 2009. Habitat Subcommittee Report.
3. Yakima Subbasin Fish and Wildlife Planning Board. 2004. Yakima Subbasin Plan.
4. YBFWRB. 2009. Yakima Steelhead Recovery Plan. Yakima Basin Fish and Wildlife Recovery Board.

5.0 List of Preparers

NAME	BACKGROUND	RESPONSIBILITY
ANCHOR QEA		
Kristi Geris	Environmental Planner	Author
Ben Floyd	Managing Planner	Reviewer
Bob Montgomery	Senior Engineer	Reviewer
Tom Menzel	Technical Editor	Technical Writing and Editor
HDR Engineering, Inc.		
Keith Underwood	Senior Fish Biologist	Reviewer

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Appendix A

Updated Tributaries Habitat Enhancement Program

The tributary element of the habitat restoration program was developed in the 2009 Preliminary Integrated Plan recommendation. Costs for individual actions were re-evaluated from the 2009 recommendation, and increased from the estimated \$90.7 million in 2009 to approximately \$180 million in 2010, based on updated values and additional recommended actions.

Modifications to the 2009 recommendation included additional improvements for Wilson/Naneum passage and screening by identifying improvements for four Kittitas Reclamation District North Branch canal and creek crossings. Additional emphasis on bull trout under the headwaters restoration element was also added, including 2 miles of restoration at Gold Creek, lake trout removal, and bull trout reintroduction.

Tributary actions and associated budgets were developed to estimate the habitat enhancement program funding level and direction. Cost estimates for tributary actions were developed at a planning level, and will be updated when detailed restoration planning and design occurs.

Program elements include:

- Passage and screening projects
- Habitat restoration and enhancement – below reservoirs
- Wilson/Naneum passage, screening, and habitat enhancement
- Headwaters restoration – above Reclamation reservoirs, primarily focused on improving bull trout habitat conditions
- Yakama Nation Reservation screening, passage, and restoration
- Emergent needs fund for acquisition, conservation, and easement opportunities

Table A-1 summarizes the Habitat Enhancement Subcommittee's recommendation for tributary restoration actions in the Yakima River Basin. Project lists developed by the North Yakima and Kittitas County Conservation Districts (see letters attached to the end of this Appendix) aided in development of the tributary restoration needs in the basin. The letters describe the District's unmet needs for tributary projects within their district boundaries. The North Yakima Conservation District needs are from 2009 and are still current. The Kittitas County Conservation District needs were originally submitted in 2009 but updated in October 2010 to incorporate additional identified needs.

Table A-1. Tributaries Habitat Enhancement Program Restoration Elements¹

Program Element	Recommended Funding Level (\$/millions)	Geographic Areas and Improvements	Comments
Passage & Screening Projects	\$4.41	Upper Yakima	None
	\$4.1	Middle Yakima	None
Subtotal	\$8.5		
Habitat Restoration and Enhancement (Below Reservoirs)	\$7.75	Upper Yakima – Habitat restoration: (e.g., fencing plantings, large woody debris, side-channel/ floodplain, nutrient enhancement, instream flow enhancement)	None
	\$5.8	Middle Yakima – Habitat restoration (e.g., fencing plantings, large woody debris, side-channel/ floodplain, nutrient enhancement, instream flow enhancement)	None
Subtotal	\$14.45		
Wilson/Naneum (includes following tributaries: Wilson, Naneum, Coleman, Cherry, Cooke, Caribou, and Parke Creeks) – Passage/Screening	\$27.7	Confirm water management plan/capital improvement plan, upgrade and consolidate diversions. Provide fish passage and instream flow improvements. Provide 4 Kittitas Reclamation (KRD) North Branch canal and creek crossings.	Links to supply fixes (storage and operational improvements and exchanging total water supply available for tributary water). Involves KRD, Ellensburg Water Company, and Cascade Irrigation District along with land owners.
Wilson/Naneum – Habitat	\$1	Instream and riparian habitat improvements, floodplain restoration, and conservation easements	None
Subtotal	\$28.7		
Headwaters Restoration (Above Reclamation Reservoirs)	\$3.75	Headwaters restoration and passage above reservoirs and on USFS lands: roads, culverts, channel improvements, large woody debris and other habitat improvements	Bull trout and anadromous fish emphases
	\$2.5	South Fork Tieton River (primarily new bridge; reroute South Fork to, or near, its historic channel at the mouth)	Bull trout emphasis
	\$2 (\$0.1/yr)	Seasonal task force passage projects ² to ensure unimpeded passage into spawning tributaries above the storage reservoirs	Bull trout emphasis
	\$2	Gold Creek hydrogeology report and restoration design, and 2 miles restoration	Bull trout emphasis
	\$2	Lake trout removal	Bull trout emphasis
	\$2 (\$100,000/yr)	Bull trout reintroduction	None
Subtotal	\$14.25		

Table A-1. Tributaries Habitat Enhancement Program Restoration Elements ¹			
Program Element	Recommended Funding Level (\$/millions)	Geographic Areas and Improvements	Comments
Yakama Nation Reservation Screening/Passage/Restoration	\$80	Implement Toppenish Creek Corridor program	Based on Yakama Nation restoration and capital improvement plan
	\$20	Improve Satus Creek: screening, passage, riparian restoration	None
Emergent Needs Fund: Acquisition/ Conservation Easement Opportunities	\$15 (\$5 million upfront year 1, then \$500,000/yr)	Basin-wide – tributaries	Guidelines: <ul style="list-style-type: none"> • For projects that either fall outside other programs or are particularly time-sensitive • Expect use for acquisitions (fee simple and easement) that need to be completed rapidly • Connected to identified fish benefit/riparian or water right acquisition • Leverage mitigation benefit/project opportunity • Seed money for studies would be administrated by an organization (not yet identified)
Subtotal	\$115		
Total Tributaries Habitat	\$180		
Grand Total (Mainstem and Tributaries)	\$459.7		

Notes:

¹ Provide for flexibility in allocating funding to additional project sponsors beyond Reclamation to leverage existing implementation capacities.

² The function of the task force is to remove recreational dams and to install/remove temporary passage facilities to allow bull trout passage from the reservoirs into the tributaries in low water years.

North Yakima County Conservation District Letter

David Child

YRBWEP Habitat Sub-Committee

September 25, 2009

Re: North Yakima Conservation District, unmet funding for main stem and tributary passage, restoration and protection programs.

Habitat Sub-Committee,

The following narrative expresses unmet funding needs of the NYCD related to our participation within the Yakima Tributary Access and Habitat Program (YTAHP). YTAHP was created by and is a partnership of non-profit, local, state, federal and Tribal entities that address screening, passage and habitat needs related to fish recovery within the Yakima River Basin.

Although our focus is on screening/passage/habitat, it should be noted that our work seeks to integrate our project work with many of the items (seven) that the Yakima River Basin Water Enhancement Program is dealing with, such as water conservation. Because of our individual entities unique abilities we can also be called upon to assist in many implementation activities that will be identified in YRBWEP's package.

The following is a list of NYCD tributaries and unmet funding needs. They are numbered. The number 1 item is for near term known needs, those that can be implemented within 1-3 years. The number 2 item is for out year estimated needs. These items can be based on known needs, actions necessary or relevant upon YRBWEP actions or simply brainstorming ideas within NYCD. Item 3 is listed separated and is a near-term 1-3 year need for habitat measures. These measures include in-stream improvements, restoration, bank enhancement, floodplain development and the use of Conservation Easements.

Ahtanum Creek watershed

1. Passage and Screening – \$455,000.00
2. Passage and Screening – \$1,000,000.00 (primarily based on a “Pine Hollow” scenario/bachelor creek).
3. Habitat – \$250,000.00

Wide Hollow Creek Watershed (lower end)

1. Passage and Screening – \$249,000.00
2. Passage and Screening – \$200,000.00 (steep-pass)
3. Habitat – \$25,000.00 in current channel, (? \$500,000.00 relocation of creek).

Cowiche Creek Watershed

1. Passage and Screening – \$1,256,000.00 (includes from mouth to upper watershed).
2. Passage and Screening – \$ 0
3. Habitat – \$2,300,000.00 (primarily Conservation Easements with ready willing and able landowner in upper watershed).

Tieton River Watershed

1. Passage and Screening – \$32,000.00
2. Passage and Screening – \$0
3. Habitat – \$ no figure at this time.

Rattlesnake Creek Watershed

1. Passage and Screening – \$10,000.00
2. Passage and Screening – \$0
3. Habitat – \$ no figure at this time.

Nile Creek Watershed

1. Passage and Screening – \$5,000.00
2. Passage and Screening – \$0
3. Habitat – \$1,000,000.00

Gold Creek Watershed

1. Passage and Screening – \$75,000.00
2. Passage and Screening – \$0
3. Habitat – \$ no figure at this time.

Naches River Area

1. Passage and Screening – \$ no figure at this time.
2. Passage and Screening – \$ no figure at this time.
3. Habitat – \$ no figure at this time, however NYCD would like to discuss a large Conservation Easement program for this area that could include floodplain development with private landowners.

Buckskin Slough Area

1. Passage and Screening – \$0
2. Passage and Screening – \$170,000.00
3. Habitat – \$500,000.00

Taylor Ditch Area (first step is to work with issues related to zoning to develop a mitigated agreement)

1. Passage and Screening – \$100,000.00
2. Passage and Screening – \$0
3. Habitat – \$700,000.00

Note that this should be considered a complete package – 1 and 3 at the same time.

Wenas Watershed (NYCD believes that a comprehensive watershed plan is needed and that there is clear opportunity for YRBWEP action within this watershed.)

1. Passage and Screening – \$50,000.00
2. Passage and Screening – \$250,000.00
3. Habitat – \$250,000.00 without Conservation Easement Program

Blue Slough Area

1. Passage and Screening – \$219,000.00
2. Passage and Screening – \$ 0
3. Habitat – \$ no figure at this time, BOR’s YRBWEP current activities will determine need.

Thank you for the opportunity for the North Yakima Conservation District to provide this list as part of our YTAHP unmet funding needs to your sub-committee process. If you have any questions, please contact me at 509-454-5736 ext 5.

Please remember as you continue to work within the YRBWEP overall process that

Conservation Districts are capable of assisting with many other activities. Don’t hesitate to call upon us.

Sincerely,

Michael Tobin

NYCD Manager

Kittitas County Conservation District Letter

****AMENDED OCTOBER 19, 2010****

David Child

YRBWEP Habitat Sub-Committee

October 19, 2010

Re: Kittitas County Conservation District, unmet funding for main stem and tributary passage, restoration and protection programs.

Habitat Sub-Committee,

The following information is provided in response to your request to the Kittitas County Conservation District (KCCD). I'm following the format established by the North Yakima Conservation District (NYCD). As with NYCD's request, the following request from the KCCD includes screening, passage, and habitat needs. We seek to integrate our project work with many of the items (seven) that the Yakima River Basin Water Enhancement Program is dealing with, such as water conservation. Because of our individual entities unique abilities we can also be called upon to assist in many implementation activities that will be identified in YRBWEP's package.

The following is a list of KCCD tributaries and unmet funding needs. They are numbered. The number 1 item is for near term known needs, those that can be implemented within 1-3 years. The number 2 item is for out year estimated needs. Although the notations below refer to Passage and Screening, it should be noted that irrigation system delivery and application (pipes and sprinklers) are included in the cost estimates. The hydrology of the Kittitas Valley is complicated by the interactions between the canals and streams. In order to correct barriers or cost effectively remedy unscreened diversions, the irrigation water systems must be addressed. Item 3 is listed separately and is a near-term (1-3 year) need for habitat measures. These measures include in-stream improvements (including flow), restoration, bank enhancement, floodplain development and the use of conservation easements.

Wilson Creek Watershed (includes Wilson, Naneum, Coleman, Cherry, Cooke, Caribou, and Parke Creeks and Badger/Wipple Wasteway)

1. Passage and Screening – \$3,200,000
2. Passage and Screening – \$14,500,000
3. Habitat – \$ 1,000,000.00 (Instream improvements, riparian habitat, floodplain functionality, conservation easements)

Reecer Creek (including Currier Creek) Watershed

1. Passage and Screening – \$750,000.00
2. Passage and Screening – \$200,000.00
3. Habitat – \$ 1,000,000

Dry Creek Watershed

1. Passage and Screening – \$450,000.00
2. Passage and Screening – \$10,000.00
3. Habitat – \$250,000.00

Manastash Creek Watershed

1. Passage and Screening – \$1,175,000 (completion of consolidated diversion pipeline, and removal of the three decommissioned irrigation withdrawals)
2. Passage and Screening – \$0
3. Habitat – \$3,000,000.00 (primarily projects to secure additional in-stream flow in Manastash Creek)

Tanuem Creek

1. Passage and Screening – \$0
2. Passage and Screening – \$0
3. Habitat – \$ no figure at this time.

Swauk Creek Watershed

1. Passage and Screening – \$0
2. Passage and Screening – \$250,000
3. Habitat – \$500,000

Teanaway River Watershed

1. Passage and Screening – \$750,000
2. Passage and Screening – \$0
3. Habitat – \$2,500,000 (primarily instream habitat work to address erosion, riparian habitat, and floodplain function).

Mainstem Yakima River (and Side Channels)

1. Passage and Screening – \$0
2. Passage and Screening – \$250,000
3. Habitat – \$500,000

Thank you for the opportunity for the KCCD to provide this list as part of our YTAHP unmet funding needs to your sub-committee process. If you have any questions, please contact me at 509-925-8585 ext 4.

Please remember as you continue to work within the YRBWEP overall process that Conservation Districts are capable of assisting with many other activities. Don't hesitate to call upon us.

Respectfully,

Anna Lael, District Manager

Appendix B

Mainstem Floodplain Restoration Cost Item Assumptions

Table B-1. Mainstem Floodplain Restoration Cost Item Assumptions		
Item	Units	Unit Cost
Large woody debris pieces placed in structures	Each	\$1,000 ¹
Excavation	Cubic Yard	\$8 ²
Riparian restoration	Square Foot	\$1 ¹
Levee setbacks ³	Mile	High – \$900,000
		Medium – \$750,000
		Low – \$600,000
Clearing and grubbing	Acre	\$5,000 ⁴
Plant removal/control	Acre	\$4,000 ⁵
Seeding	Acre	\$2,500 ⁵
Soil preparation	Acre	\$1,000 ⁵
Protection – easements	Acre	\$5,000 ⁵
Protection – acquisitions	Acre	\$15,000 ⁵
Engineered logjams	Each	\$50,000 ⁵

Notes: (All prices are at December 2010 levels)

- ¹ Assumed value derived from Yakima River Basin Integrated Water Resource Management Alternative Final EIS (2009), Table 5-36, and adjusted per input from subcommittee workgroup.
- ² Assumed value derived from average cost for excavation as reported in the Yakima River Basin Integrated Water Resource Management Alternative Final EIS (2009), Table 5-36; assumed 5 feet deep.
- ³ Assumed values derived from cost for one mile of medium sized levee with 20-foot base and including clearing and grubbing for new levee alignment, subgrade preparation, excavation, haul, placement and compaction, armoring, and restoration of existing levee alignment. If levee base was anticipated to be larger than 20 feet, then high value was used. If anticipated to be smaller than 20 feet then low value was used. Anticipated levee size was based on local knowledge provided by participants at Habitat Subcommittee meetings and associated workshops.
- ⁴ Assumed value derived from Yakima River Basin Integrated Water Resource Management Alternative Final EIS (2009), Table 5-36.
- ⁵ Assumed value based on local knowledge provided by participants at Habitat Subcommittee meetings and associated workshops.

Not all cost estimates for actions identified in the mainstem reaches were developed using the standardized cost elements above. In some cases, project-specific cost estimates were roughly developed or provided based upon input from subcommittee meetings/workshops. These project costs are documented on the mainstem floodplain restoration worksheets. Some reach-specific actions that did not readily lend themselves to standardized cost estimation included bridge replacement of various sizes, engineered rootwads, and minor excavations.

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