Resilient Columbia Basin Agreement (RCBA) - United States Governments and Six Sovereigns Cold Water Refuge Tributary Projects to Improve and Maintain Cool River Temperatures Memorandum

January 17, 2025

1. Summary

This Memorandum documents the United States Governments (USG) and Washington State, Oregon State, the Nez Perce Tribe, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Confederated Tribes of the Umatilla Indian Reservation's (Six Sovereigns) agreement on identifying and prioritizing projects to cool river temperatures of tributaries that provide cold water refuge (CWR) to migrating salmon and steelhead in the Columbia River as identified in the EPA 2021 Columbia River Cold Water Refuge Plan[1] (EPA CWR Plan). As reflected in Table 1, a total of 34 priority projects in nine CWR tributary basins are identified with an estimated cost of $220 million[2][3]. The projects in Table 1 reflect priority projects within in each basin, but there was no attempt to prioritize projects across basins.

Table 1. Cost summary by basin of priority projects to reduce temperatures in cold water refuge tributaries.

Tributary Basin	# of Projects	Estimated Cost
Wind River	1	$7,000,000
White Salmon River	4	$1,475,000
Hood River	3	$26,000,000
Klickitat River	3	$3,500,000
Deschutes River	3	$8,500,000
Umatilla River	5	$59,500,000
15-Mile Creek[2]	4	$16,000,000
Rock Creek	2	$300,000
Walla Walla River[2]	9	$97,584,000
Total	**34**	**$219,859,000**

2. Background

On December 14, 2023, the Departments of the Army, Interior and Energy, along with other federal agencies including National Oceanographic and Atmospheric Administration (NOAA) and Bonneville

[1] https://www.epa.gov/columbiariver/columbia-river-cold-water-refuges-plan

[2] The Walla Walla River and 15-Mile Creek were not identified as a current CWR in the EPA CWR Plan due to current warm temperatures and low flows. However, both rivers are included in this memo due their high restoration potential and potential to provide CWR in the future.

[3] Estimates are preliminary and were provided by separate sources. Cost estimates will become more accurate and precise as the projects' scope and design become better defined.

Power Administration (BPA) signed a Memorandum of Understanding (MOU) with the Six Sovereigns[4]. As part of that MOU, the United Stated Government (USG) agreed to work with the Six Sovereigns on the following commitment:

> ***Cold Water Refuge.*** *EPA's 2021 Cold Water Refuge Plan identifies various actions to protect cool tributaries and reduce temperatures in specific tributaries to enhance their function as a cold-water refuge. For example, a priority action in in many watersheds is to restore stream riparian areas and geomorphology to cool streams and improve salmon habitat, especially on agricultural lands. These stream restoration projects can be implemented through grant funding and Federal, state, Tribal, and local partnerships. Costs could run to as much as $50 million over 10 years. FWS recognized the need for additional cold water refuge assessments within the Columbia and Snake River basins in the 2020 FWS Biological Opinion and will work with sovereigns and other Federal agencies to identify methods and funding mechanisms to develop the assessments and implementation plans. The USG will work with states and Tribes to agree on a timeline and further refine cost estimates for these projects. In addition to funding from the USG, EPA will partner with the states to assist them in understanding how to leverage EPA Clean Water Act (e.g., State Revolving Fund and Section 319) funding for these same projects. EPA will work to identify thermal pollution, both point source and non- point source, and larger sources of warm water will be investigated and remedied to protect cold water sources and cold water habitat in the mainstem and tributaries to the Columbia River in Oregon and Washington.*

This memorandum summarizes the USG and Six Sovereigns collaborative effort to complete the above underlined text of this task, with the primary focus on identifying priority projects for implementation over the next 10 years with associated estimated costs. The USG and Six Sovereigns recognize that this commitment overlaps with the MOU commitment to develop the RCBA Mid-Columbia River Restoration Plan[5], which is a 10-year action plan to rebuild mid-Columbia salmon and steelhead stocks. These two commitments overlap because most of the natal spawning and rearing rivers of the mid-Columbia stocks are also tributaries that provide cold water refuge at their confluence with the Columbia River and some projects identified in the Mid-Columbia River Restoration Plan will reduce river temperatures. The USG and Six Sovereigns agreed that projects identified as part of this memorandum would be a sub-set of the projects in the Mid-Columbia River Restoration Plan. Lastly, a separate RCBA memorandum was developed to address the MOU commitment to identify and seek funding for 3-5 CWR projects, which includes projects to improve the delta areas of the CWR tributary streams[6].

3. Rivers that Provide Cold Water Refuge to Migrating Salmon in the Columbia River

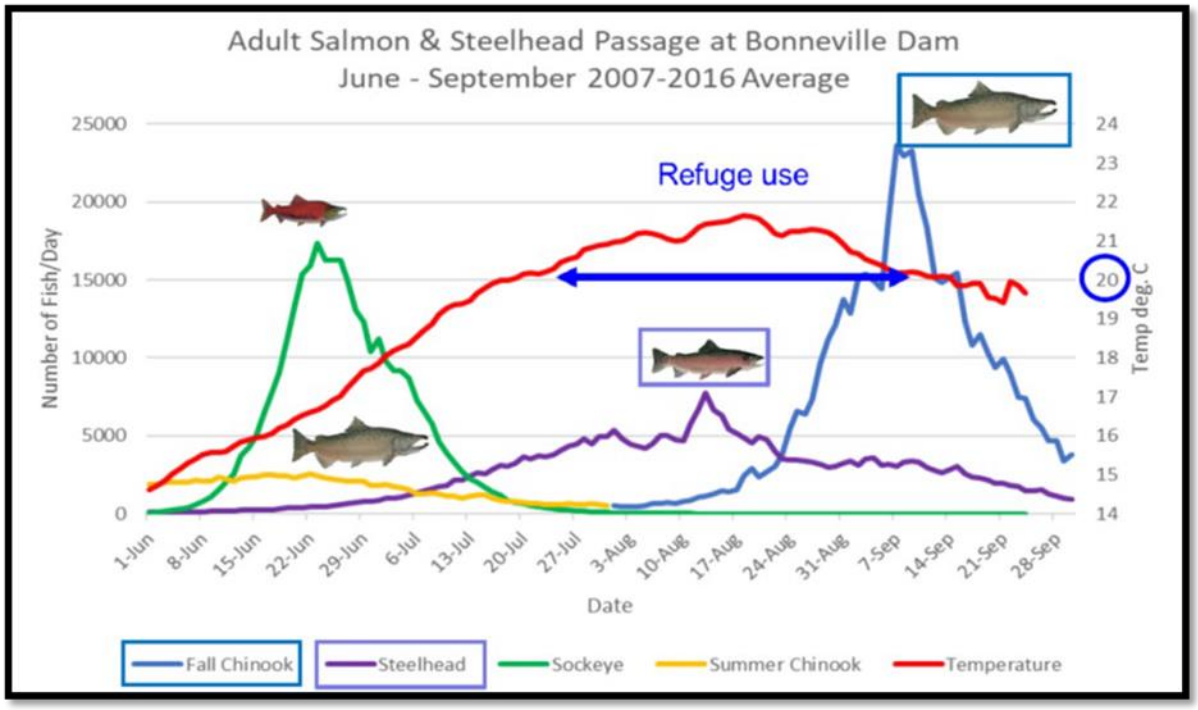
As described in the EPA CWR Plan, adult salmon and steelhead migrating up the Columbia River will use the confluence area and the lower portion of tributaries cooler than the Columbia River to temporarily hold and avoid warm temperatures in the Columbia River. As shown in Figure 1, salmon and steelhead predominantly use CWR when Columbia River temperatures exceed 20°C, which occurs from

[4] https://salmonrecovery.gov/docs/1_Stay_MOU_USG_Comm.pdf
[5] https://salmonrecovery.gov/crtf.html#panel-docs
[6] https://salmonrecovery.gov/docs/Cold_Water_Refuge_Report_July_2024.pdf

approximately mid-July to mid-September on average. Steelhead and Fall Chinook are the primary fish migrating upstream during this time and thus are the primary species that use CWR[7].

Figure 2 shows the locations of the 23 tributaries identified in EPA CWR Plan that provide CWR in the Columbia River below the Snake River. Twelve of the CWR tributaries (with purple and green dots) are considered the primary CWR because they provide the vast majority of CWR. Most of the CWR tributaries are in the Columbia Gorge between Bonneville Dam and the Dalles Dam. Table 3 displays the temperature and associated CWR volume provide by each the CWR tributaries.

Figure 1. Salmon and steelhead passage timing and water temperature at Bonneville Dam (DART)



[7] Recent anecdotal evidence from the CTUIR suggests that adult Coho salmon may also use CWR during their upstream Columbia River migration in the early fall.

Figure 2. Location of tributaries providing cold water refuge in the Lower Columbia River identified in the EPA Cold Water Refuge Plan.

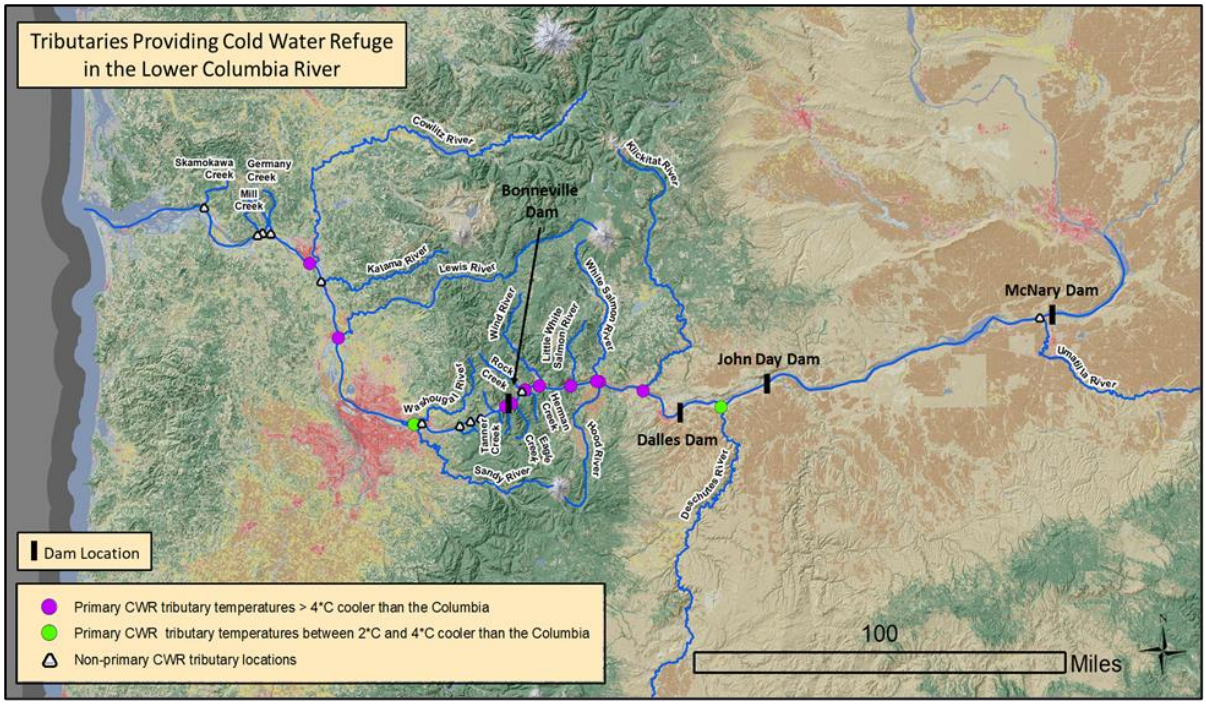


Table 2. Current stream temperatures and associated CWR volumes of the CWR tributaties identified in the EPA Cold Water Refuge Plan.

Tributary Name	River Mile	August Mean Mainstem Temperature (DART)	August Mean Tributary Temperature (NorWeST)	August Mean Temperature Difference	August Mean Tributary Flow (NHD & USGS*)	Plume CWR Volume (> 2°C Δ)	Stream CWR Volume (> 2°C Δ)	Total CWR Volume (> 2°C Δ)
		°C	°C	°C	cfs	m^3	m^3	m^3
Skamokawa Creek (WA)	30.9	21.3	16.2	-5.1	23	450	1,033	1,483
Mill Creek (WA)	51.3	21.3	14.5	-6.8	10	110	446	556
Abernethy Creek (WA)	51.7	21.3	15.7	-5.6	10	81	806	887
Germany Creek (WA)	53.6	21.3	15.4	-5.9	8	72	446	518
Cowlitz River (WA)	65.2	21.3	16.0	-5.4	3634	870,000	684,230	1,554,230
Kalama River[2] (WA)	70.5	21.3	16.3	-5.0	314*	14,000	27,820	41,820
Lewis River (WA)	84.4	21.3	16.6	-4.8	1291*	120,000	493,455	613,455
Sandy River (OR)	117.1	21.3	18.8	-2.5	469	9,900	22,015	31,915
Washougal River[1] (WA)	117.6	21.3	19.2	-2.1	107*	740	32,563	33,303
Bridal Veil Creek (OR)	128.9	21.3	11.7	-9.6	7	120	0	120
Wahkeena Creek (OR)	131.7	21.3	13.6	-7.7	15	220	0	220
Oneonta Creek (OR)	134.3	21.3	13.1	-8.2	29	820	54	874
Tanner Creek (OR)	140.9	21.3	11.7	-9.6	38	1,300	413	1,713
Eagle Creek (OR)	142.7	21.2	15.1	-6.1	72	2,100	888	2,988
Rock Creek[1] (WA)	146.6	21.2	17.4	-3.8	47	530	1,178	1,708
Herman Creek (OR)	147.5	21.2	12.0	-9.2	45	168,000	1,698	169,698
Wind River (WA)	151.1	21.2	14.5	-6.7	293	60,800	44,420	105,220
Little White Salmon River (WA)	158.7	21.2	13.3	-7.9	248*	1,097,000	11,661	1,108,661
White Salmon River (WA)	164.9	21.2	15.7	-5.5	715*	72,000	81,529	153,529
Hood River (OR)	165.7	21.4	15.5	-5.9	374	28,000	0	28,000
Klickitat River (WA)	176.8	21.4	16.4	-5.0	851*	73,000	149,029	222,029
Deschutes River (OR)	200.8	21.4	19.2	-2.2	4772*	300,000	580,124	880,124
Umatilla River[1] (OR)	284.7	20.9	20.8	-0.1	87*	0	10,473	10,473

[1] Only provides intermittent cold water refugia; CWR volume represents volume when river is greater than 2°C colder than Columbia River.
[2] Tidally influenced and may be inaccessible during low tides.

4. EPA Cold Water Refuge Plan Recommended Actions

To provide a sufficient amount of CWR to support migration salmon and steelhead in the Columbia River (and attain the State of Oregon's CWR water quality criteria), EPA concluded that the current cool temperatures and flow of the primary CWR tributaries need to be maintained and the Umatilla River needs to be cooler with more flow to provide more CWR. The Umatilla River was considered important to provide more CWR because it's the only CWR in the long reach between John Day Dam and McNary Dam. EPA explained that climate change has and will continue to warm the CWR tributaries and the Columbia River; therefore, actions to cool tributary temperatures for all CWR tributaries is important to counteract climate change.

The EPA CWR Plan recommends reliance on an array of current regulatory programs (e.g., state forest practice rules, local land use and critical area protections, and water use) to prevent human activities from warming the CWR tributaries along with implementation of restoration projects to help cool and augment flow in CWR tributaries. Types of restoration projects include: 1) restoring riparian vegetation to provide river shading; 2) restoring stream morphology and floodplain connectivity to reduce channel widths and create pools and groundwater connectivity; and 3) restoring summer river flows that are more resistant to warming and increase CWR volume.

The EPA CWR Plan recommends implementation of the above types of projects that are identified in salmon recovery plans (e.g., NOAA Mid-Columbia Steelhead Recovery Plan). Implementing such projects would result in a "dual benefit" of improving salmon rearing habitat (cooler temperatures and habitat complexity) in the project area as well as cool the river to improve the CWR provided at its confluence with the Columbia River. Thus, this is why projects identified in section 5 below are a sub-set of projects listed in the RCBA Mid-Columbia River Restoration Plan.

5. Temperature Projects in CWR Tributary Basins

This section summarizes priority temperature reduction projects in nine basins to help maintain and augment CWR for migrating salmon and steelhead in the Columbia River along with providing localized temperature and habitat benefits within the basins to support salmon recovery. The projects were identified by members of the Six Sovereigns with local stream restoration knowledge within each basin. The projects in the tables below include the RCBA Mid-Columbia River Restoration Plan project identification code for cross reference.

Included in the basin sections below are figures highlighting tributary riparian areas with the potential for increased river shading from the EPA CWR Plan and figures highlighting river valley floors with the potential for floodplain re-connection and re-establishment of floodplain functions generated by EPA using USGS and USFS GIS data layers. These figures provide a course level identification of areas with high restoration potential to reduce stream temperatures. Specific restoration project areas, however, rely on local assessment and detailed information within the basins.

5.1. Wind River

The Wind River is a primary CWR in the EPA CWR Plan. One priority temperature reduction project is identified in the Wind River as shown in Table 3. This project is a macrolevel project with multiple site level projects to be determined. Figure 3a shows the riparian shade difference between the current condition and the potential maximum in the Wind River with high potential restoration areas highlighted in yellow circles. Figure 3b highlights unconfined river channels in the basin where floodplain re-connection projects may be feasible. Many of the site level projects associated with this project are anticipated to be in these highlighted areas.

Table 3. Priority temperature reduction projects in the Wind River basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
55	YNF & USFS	**Wind River** Habitat Restoration and Fish Passage	Floodplain Reconnection and LWD, improved fish passage	$7,000,000
			Total Cost	$7,000,000

Figure 3a. Wind River shade difference between potential maximum and current shade.

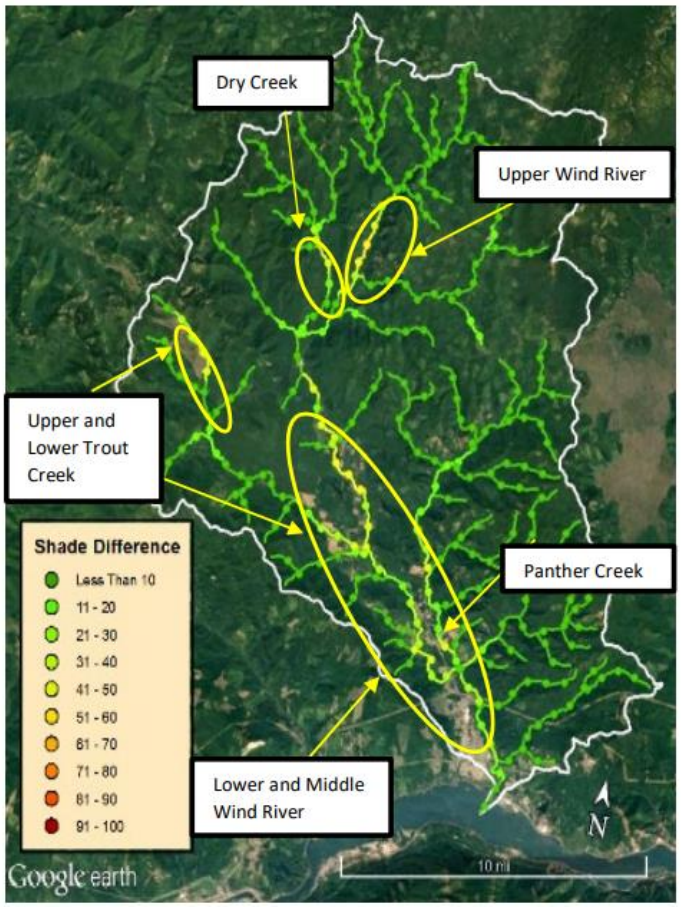
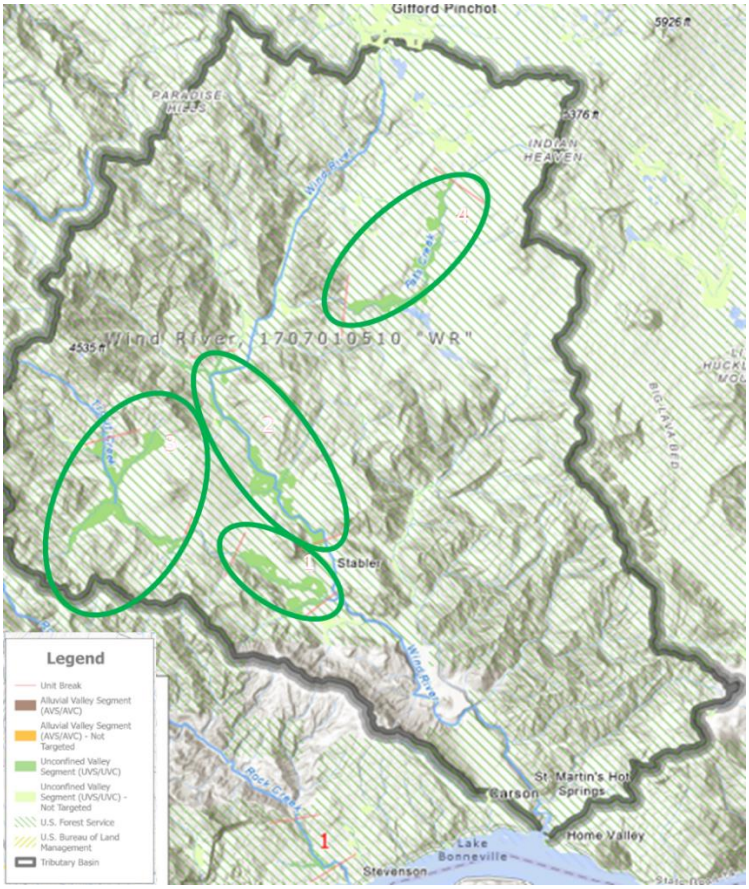


Figure 3b. Wind River alluvial/unconfined river valley segments.



5.2. White Salmon River

The White Salmon River is a primary CWR in the EPA CWR Plan. Four priority temperature reduction projects are identified in the White Salmon River as shown in Table 4. Figure 4a shows the riparian shade difference between the current condition and the potential maximum in the White Salmon River with high potential restoration areas highlighted in yellow circles. Figure 4b highlights the alluvial/unconfined river channels in the basin where floodplain re-connection projects may be feasible. The Rattlesnake project in listed in Table 4 is anticipated to be in these highlighted areas.

Table 4. Priority temperature reduction projects in the White Salmon basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
232	YNF	**Buck Creek** Headwater storage and Instream Structure Restoration	Enhance headwater storage to increase low summer flows. Restoration of wood will increase rearing habitat through the formation of pools, improve sediment sorting, and provide for greater habitat complexity.	$370,000
238	YNF	**White Salmon** lower mainstem Riparian Vegetation and in-channel structure enhancement	Monitor and enhance riparian vegetation; place LWD on margins as appropriate and feasible. Must address removal of wood by boaters through education and management.	$425,000
245	YNF	**White Salmon** mainstem Municipal and Irrigation Withdrawal - Source Change	Pursue moving City of WS and WSID from Buck Creek water withdrawls to mainstem White Salmon River water source.	$500,000
248 (also 262)	YNF	**Rattlesnake Creek** Headwater Restoration	Restore wetlands, floodplain connectivity and other water-holding capacity on the plateau (i.e. check dams to capture sediments and elevate streambed). Assess watershed conditions, road effects on sediment inputs and peak flows. [Grazing management/fencing options need to be addressed for long term solution to impacts.] This could be broken out into multiple projects.	$180,000
			Total Cost	$1,475,000

Figure 4a. White Salmon River shade difference between potential maximum and current shade.

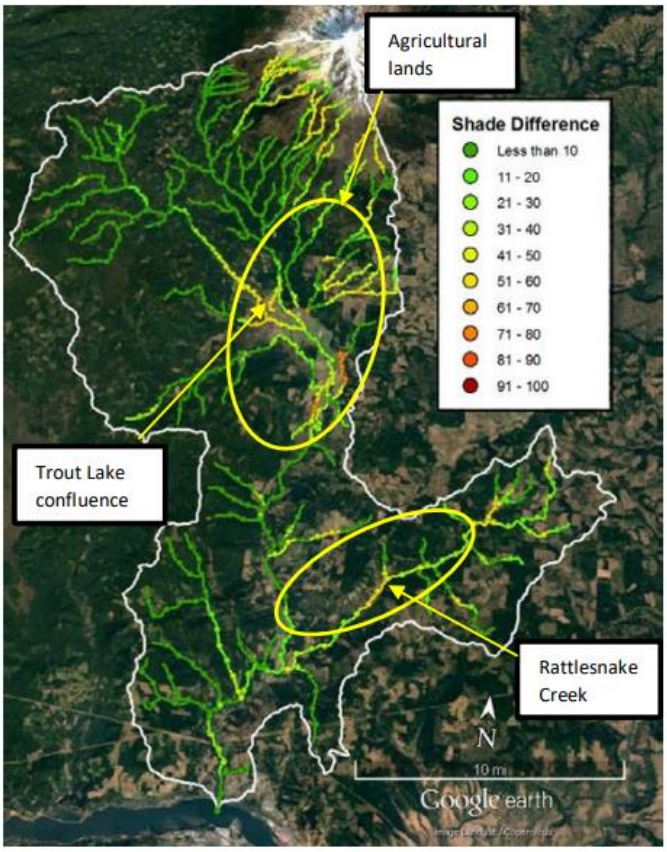
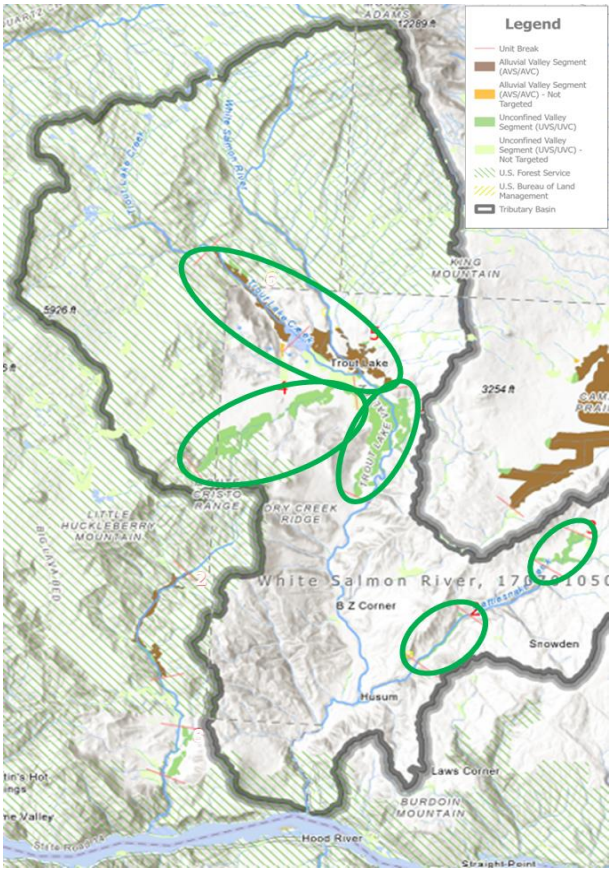


Figure 4b. White Salmon River alluvial/unconfined river valley segments.



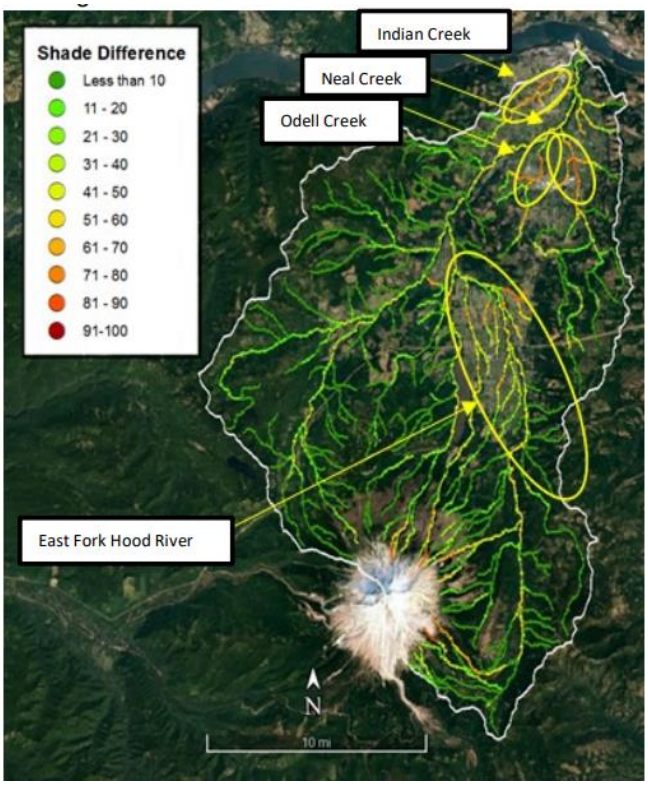
5.3. Hood River

The Hood River is a primary CWR listed in the EPA CWR Plan. Three priority temperature reduction projects are identified in the Hood River as shown in Table 5. Figure 5a shows the riparian shade difference between the current condition and the potential maximum in the Hood River with high potential restoration areas highlighted in yellow circles. The three projects in Table 5 align with these areas for high restoration potential.

Table 5. Priority temperature reduction projects in the Hood River basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
300.01 (updated)	CTWS/HR Partnership	**Powerdale Corridor** - Phases 2-4 Habitat Enhancement Projects	Hood River mainstem projects (RM 0.5-2.0) to improve aquatic habitat and ecological functions that support ESA-listed salmon and steelhead populations, as well as other native fish that utilize the mainstem. Project objectives include restoring off-channel rearing and spawning habitat and reducing peak flows in the mainstem by re-establishing floodplain and side channel connectivity.	$10,000,000
New	CTWS/HR Partnership	**Lower East Fork** Phases 2-4 Habitat Enhancement Projects	Restore 4 miles of the Lower East Fork Hood River by adding large wood structures for pool development and habitat diversity, along with floodplain and side channel habitat reconnection. Incudes the installation of a fish screen that meets criteria at the head gate of the diversion, shortening the current bypass reach by one half of a mile and allowing for greatly increased salmonid accessibility and habitat resilience by keeping more water in stream and improving water quality (temperature and turbidity).	$6,000,000
300.06 (updated)	CTWS/HR Partnership	**EFID Irrigation Modernization** Streamflow Restoration Project	These irrigation modernization projects would design and implement East Fork Irrigation District's piping and endspill elimination of the Dukes Valley Canal, the Chipping sublateral, and the Chamberlin sublateral. EFID's infrastructure is located within the Lower East Fork Hood River Watershed. The reach of the Lower East Fork below the EFID diversion has high biological benefit from water conservation in the basin. Together these projects will replace approximately 8 miles of non-pressure rated pipe with pressure-rated HDPE pipe, install approximately 14 pressure-reducing stations, and legally protect up to 6 cfs instream. Leaving more water in the bypass reach and eliminating endspills will significantly improve thermal impacts in the basin.	$10,000,000
			Total Cost	$26,000,000

Figure 5a. Hood River shade difference between potential maximum and current shade.



5.4. Klickitat River

The Klickitat River is a primary CWR in the EPA CWR Plan. Three priority temperature reduction projects are identified in the Klickitat River as shown in Table 6. Figure 6a shows the riparian shade difference between the current condition and the potential maximum in the Klickitat River with high potential restoration areas highlighted in yellow circles. Figure 6b highlights the alluvial/unconfined river channels in the basin where floodplain re-connection projects may be feasible. The upper Klickitat projects in listed in Table 6 are anticipated to be in high restoration potential unconfined river channel valley segments of the upper Klickitat River basin.

Table 6. Priority temperature reduction projects in the Klickitat River basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
208	YNF	**Upper Klickitat** - Channel Complexity/floodplain reconnection	Work will restore ecosystem characteristics and processes and address priority factors identified as limiting salmonid production in the Klickitat Subbasin Plan as well as the Klickitat Lead Entity Salmon Recovery Strategy. The core EDT reach that encompasses project sites ranks third overall in the Klickitat subbasin in restoration potential for combined performance of steelhead and spring Chinook. Project work addresses most of the top limiting factors identified for the reach. Proposed activities build upon the experience of recent LWD-based habitat projects completed in upper reaches of Klickitat River and its tributaries.	$650,000
209	YNF	**Upper Klickitat** - floodplain reconnection/water storage	Work will focus on reconnecting Upper Klickitat Meadows to provide additional groundwater recharge. Climate modeling suggests a 40% reduction in streamflow in the Upper Klickitat by the end of the century.	$350,000
New	YNF	**Snyder Creek** Channel Reconstruction and Floodplain Reconnection	Restore floodplain connectivity to lower 2 miles of tributary	$2,500,000
			Total Cost	$3,500,000

Figure 6a. Klickitat River shade difference between potential maximum and current shade.

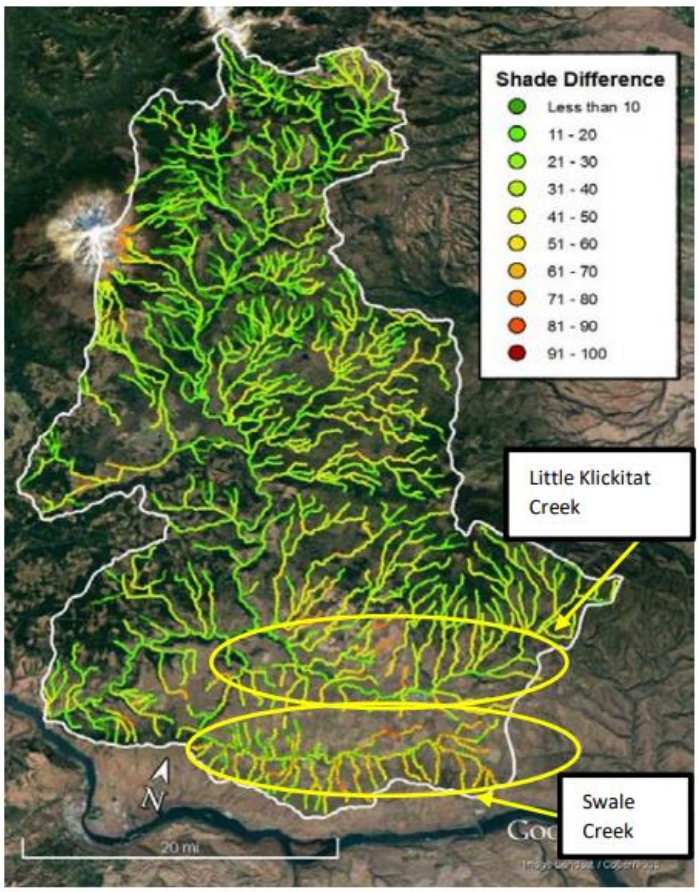
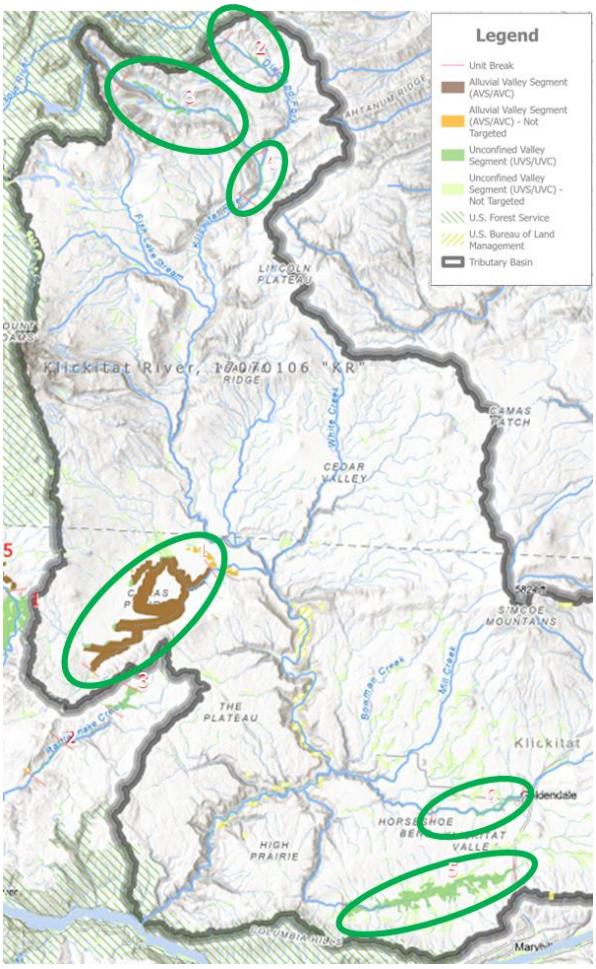


Figure 6b. Klickitat River alluvial/unconfined river valley segments.



5.5. Deschutes River

The Deschutes River is a primary CWR in the EPA CWR Plan. Three priority temperature reduction projects are identified in the Deschutes River as shown in Table 7. Figure 7a shows the riparian shade difference between the current condition and the potential maximum in the Deschutes River with high potential restoration areas highlighted in yellow circles. Figure 7b highlights the alluvial/unconfined river channels in the basin where floodplain re-connection projects may be feasible. The first two projects listed in Table 7, which are identified as near-term priority actions in the Mid-Columbia River Restoration Plan, align well with the areas with high restoration potential.

Table 7. Priority temperature reduction projects in the Deschutes River basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
71*	Oregon, CTWSRO	Lower Deschutes Tributary Habitat Enhancement Project	This project will: 1) restore instream flows in **Trout Creek** and **Buck Hollow Creek**; and 2) address the Jones Canyon Ford Crossing in the Lower Deschutes. Habitat restoration efforts over the last twenty years in Trout Creek have improved riparian and in-channel habitat conditions, however low instream flows during the summer season remain a primary limiting factor for steelhead rearing, migration, and survival.	$2,500,000
72*	CTWSRO	Warm Springs Reservation Watershed Enhancement Project	This project will protect and stabilize watersheds on the Warm Springs Reservation, including the **Warm Springs River**, **Shitike Creek and their tributaries**, through integrated restoration actions including: removal of problem roads to address sediment and water quality issues and/or disturbance to floodplain-riparian function, improving fish passage through culvert and barrier removal or remediation, improving aquatic habitat through instream and/or floodplain wood placement, and maintaining and enhancing wet meadow habitats.	$5,000,000
New	Oregon	Lower Deschutes Post-wildfire Riparian Enhancement below sherars falls	The entire **Lower Deschutes River** below from Sherars Falls to the confluence with the Columbisa River has cumulatively burned and many cases buned repeatedly. This project would focus on ripariian retoration throughout that reach	$1,000,000
			Total Cost	$8,500,000
* - Mid-Columbia Near Term Priority Action				

Figure 7a. Deschutes River shade difference between potential maximum and current shade.

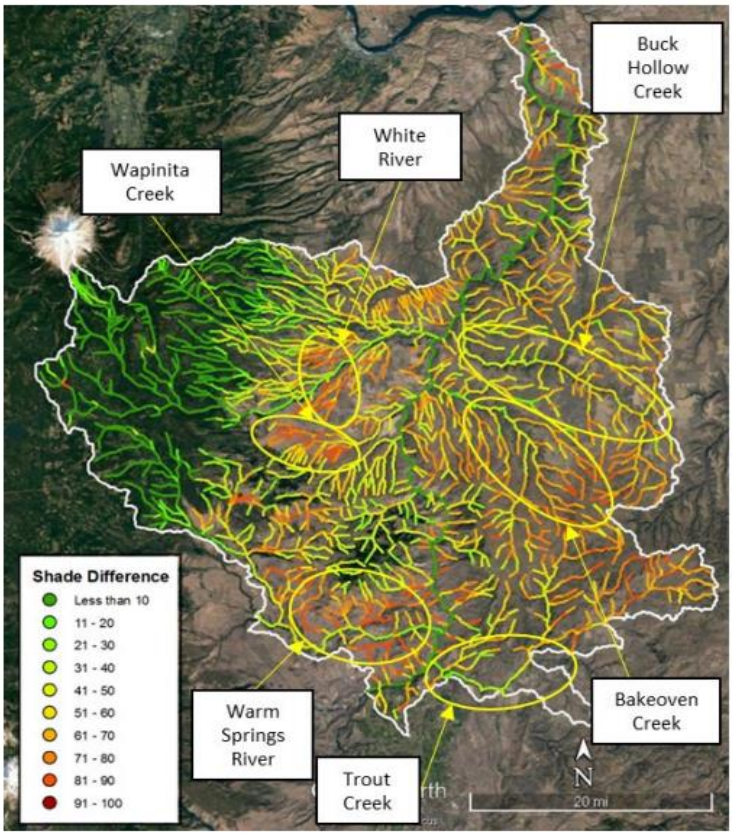
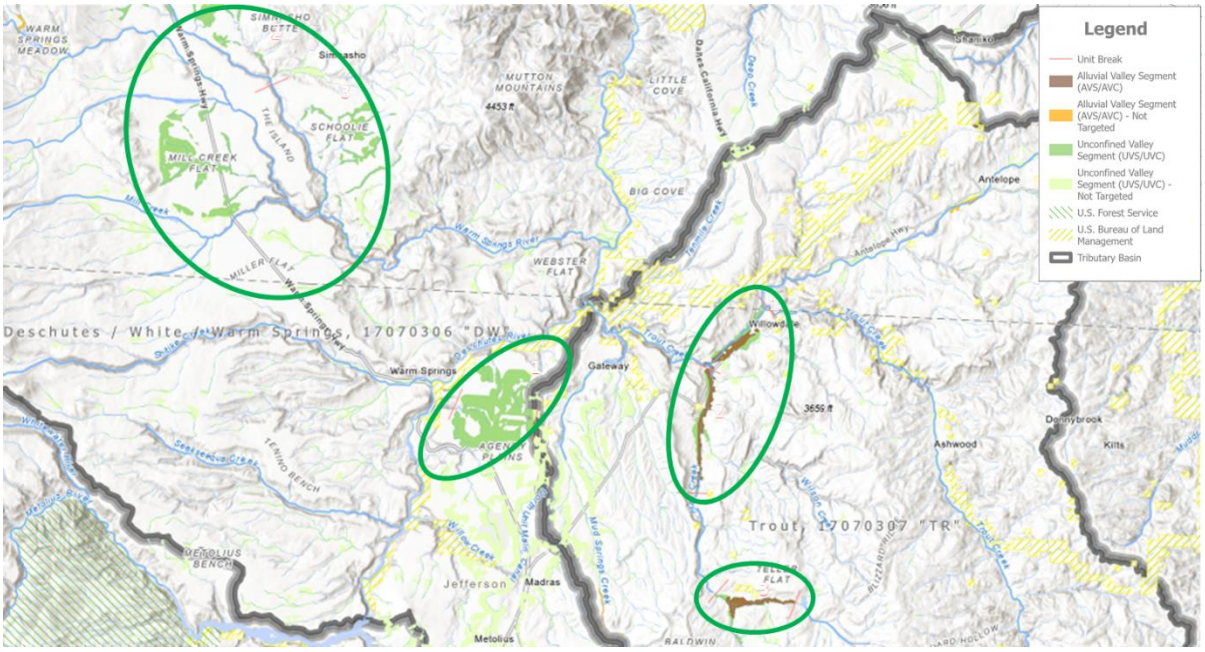


Figure 7b. Deschutes River alluvial/unconfined river valley segments.



5.6. Umatilla River

The Umatilla River is a primary CWR in the EPA CWR Plan. Five priority temperature reduction projects are identified in the Umatilla River as shown in Table 8. Figure 8a shows the riparian shade difference between the current condition and the potential maximum in the Umatilla River with high potential restoration areas highlighted in yellow circles. Figure 8b highlights the alluvial/unconfined river channels in the basin where floodplain re-connection projects may be feasible. The UmaBirch project, which is a Mid-Columbia Restoration Plan near term priority action, is in an area with alluvial floodplain downstream of the City of Pendleton with high restoration potential. The other four projects align well with high restoration potential area, which will include the selection of specific project locations for habitat and riparian projects.

A project not included in Table 8, but likely the most important project to increase summer flow and reduce river temperatures in the Lower Umatilla River and increase CWR, is the CTUIR water rights claim settlement and associated additional basin water exchange. The settlement/water exchange is anticipated to be congressionally funded, and therefore is not included in this project list.

Table 8. Priority temperature reduction projects in the Umatilla River basin

Mid-C ID#	Source	Project	Project Description	Estimated 2026 Cost	Estimated 10-year Cost
5	CTUIR	Habitat Restoration	Design and Implementation of Habitat Restoration Projects	$6,000,000	$26,500,000
100*	CTUIR	UmaBirch Conservation and Floodplain Restoration	Conservation-Habitat Restoration-Water Acquisition; UmaBirch CE & Habitat Restoration Gap; About 3 miles of floodplain restoration, 948 acres, and 3.5 cfs of water rights.	$6,000,000	$16,000,000
New	CTUIR	Lower Birch Conservation and Floodplain Restoration	Conservation-Habitat Restoration-Water Acquisition; Peterson Estate CE & Habitat Restoration; About 3 miles of stream, 235 acres, and 4.3 cfs water rights	$1,500,000	$10,000,000
New	CTUIR	Umatilla River Reach UM32 Floodplain & Passage Restoration	Buckaroo Creek Confluence & FEMA Acquisition Levee Removal		$4,000,000
New	CTUIR	Reservation Watershed Conservation & Riparian Restoration	Focused Floodplain-Riparian Buffer Treatments to meet ESA, CWA&TMDL's	$300,000	$3,000,000
			Total Cost	$13,800,000	$59,500,000
* - Mid-Columbia Near Term Priority Action					

Figure 8a. Umatilla River shade difference between potential maximum and current shade.

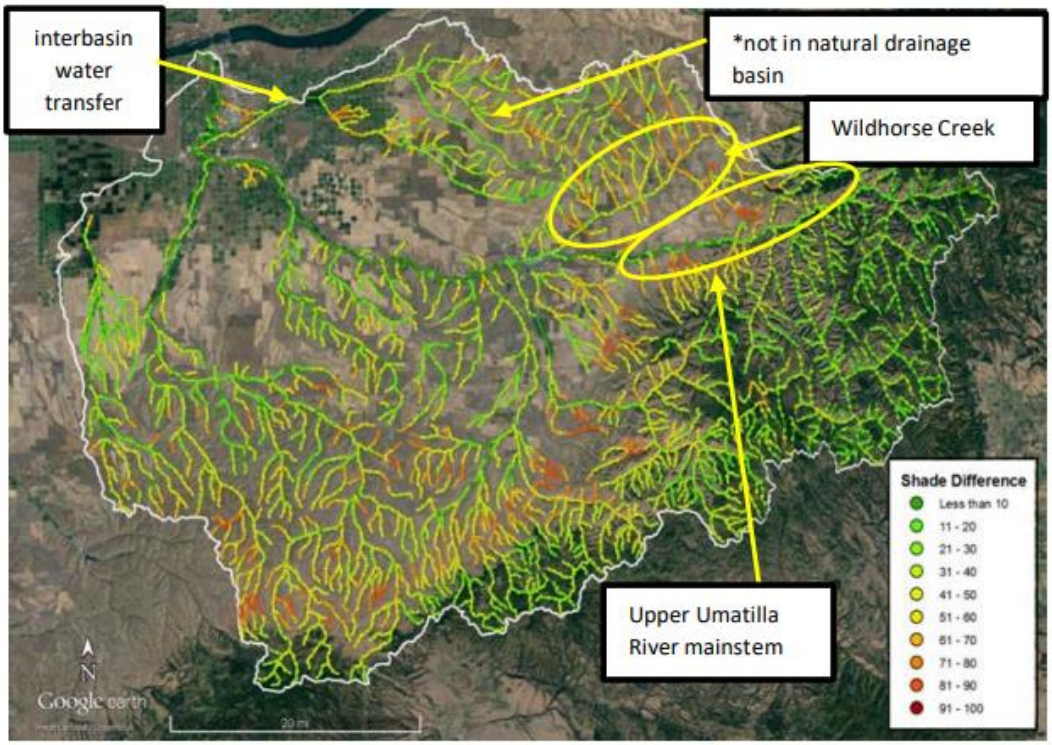
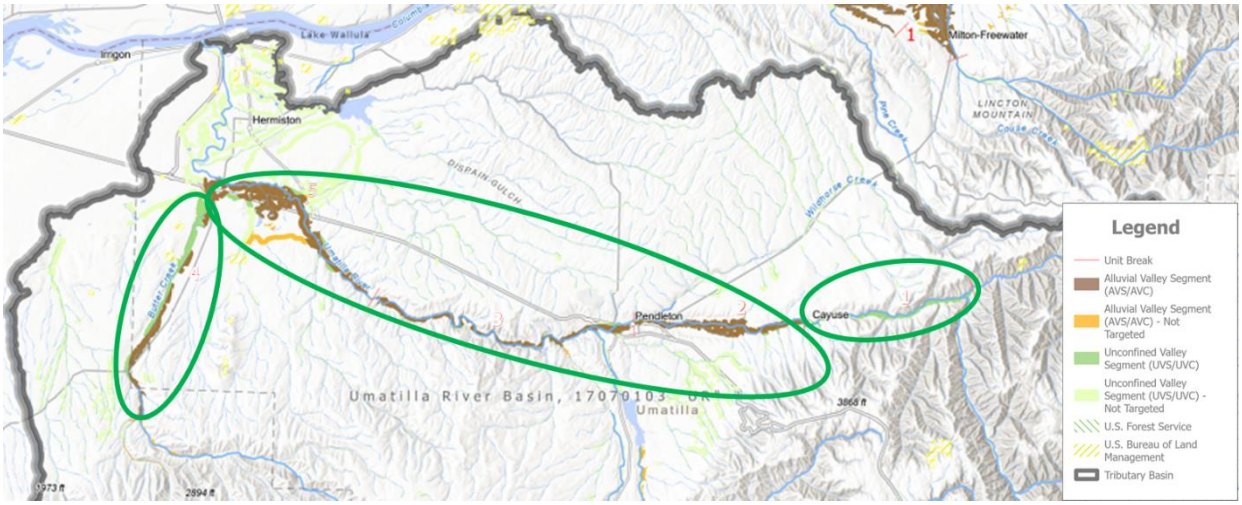


Figure 8b. Umatilla River alluvial/unconfined river valley segments.



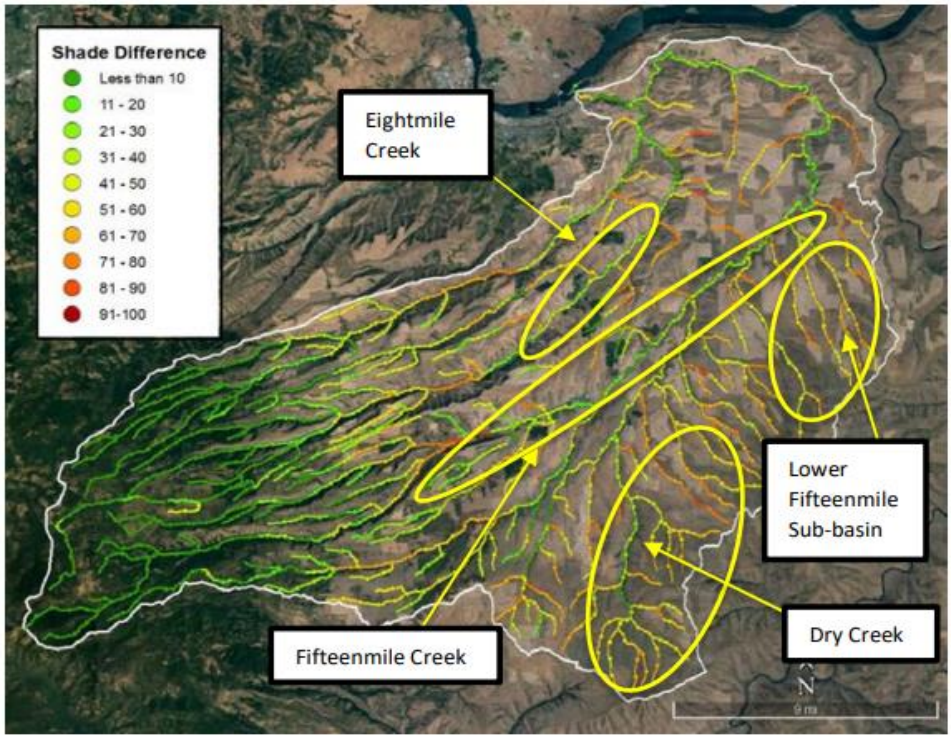
5.7. 15-Mile Creek

The 15-Mile Creek is not identified as a CWR tributary in the EPA CWR Plan. However, the EPA CWR Plan recognized the significant restoration work in 15-Mile Creek for steelhead recovery and included 15-Mile Creek as an example of a tributary that could provide CWR in the future if fully restored. Four priority temperature reduction projects are identified in 15-Mile Creek as shown in Table 9. Figure 9a shows the riparian shade difference between the current condition and the potential maximum in the basin with high potential restoration areas highlighted in yellow circles. Low flows and high temperatures are a significant problem for fish in 15-Mile Creek and these projects address those critical issues and specific project locations for riparian habitat restoration will likely align with the extensive areas with high restoration potential in the basin.

Table 9. Priority temperature reduction projects in the 15-Mile Creek basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
66	Oregon	Fifteenmile Creek Flow and Habitat Restoration	This project would support and expand the ongoing FAST (Fifteenmile Action for Stream Temperature) Project and implement additional flow and steelhead habitat restoration strategies.	$3,500,000
68	Oregon	Underhill Diversion Remediation	Remediate Underhill Diversion and manage irrigation return flows to reduce extreme instream water temperatures and improve water quality.	$1,000,000
324	WS	15 mile restoration	Habitat restoration on Fifteenmile Creek	$6,500,000
New	Oregon	Capacity building - general ag partnerships	Fund QLE to develop local partnerships wiith landowners and agricultural community recruit/plan/fund Water Quaitly/Quntity program /projects through time	$5,000,000
			Total Cost	$16,000,000

Figure 9. 15-Mile Creek shade difference between potential maximum and current shade.



5.8. Rock Creek

Rock Creek is a small CWR listed in the EPA CWR Plan, but it is not a primary CWR. Two priority temperature reduction projects are identified in the Rock Creek as shown in Table 10 to improve habitat and cool the creek temperatures.

Table 10. Priority temperature reduction projects in the Rock Creek basin.

Mid-C ID#	Source	Project	Project Description	Estimated 10-year Cost
222	YNF	Installation of Posts, LWD, Boulders in 3 of 5 Highly Prioritzed Locations to Provide Increased Habitat Complexity for Juvenile Salmonids	This project will restore floodplain connectivity to increasing floodplain storage, reducing severity of active channel hydraulic conditions during high flows, and potentially restoring low flows to this and downstream reaches. Multiple approaches will be considered: restoration of channel grade and elevation using planform adjustments and natural bedforms, beaver analogues and pond and plug techniques.	$200,000
231	YNF	Small Diameter Wood Placement in documented Perennial Pools to Increase Summer Juvenile Survival	This project will utilize high density wood placements to force flow to either create or maintain pools. Additional cover will aid in over-summer survival.	$100,000
			Total Cost	$300,000

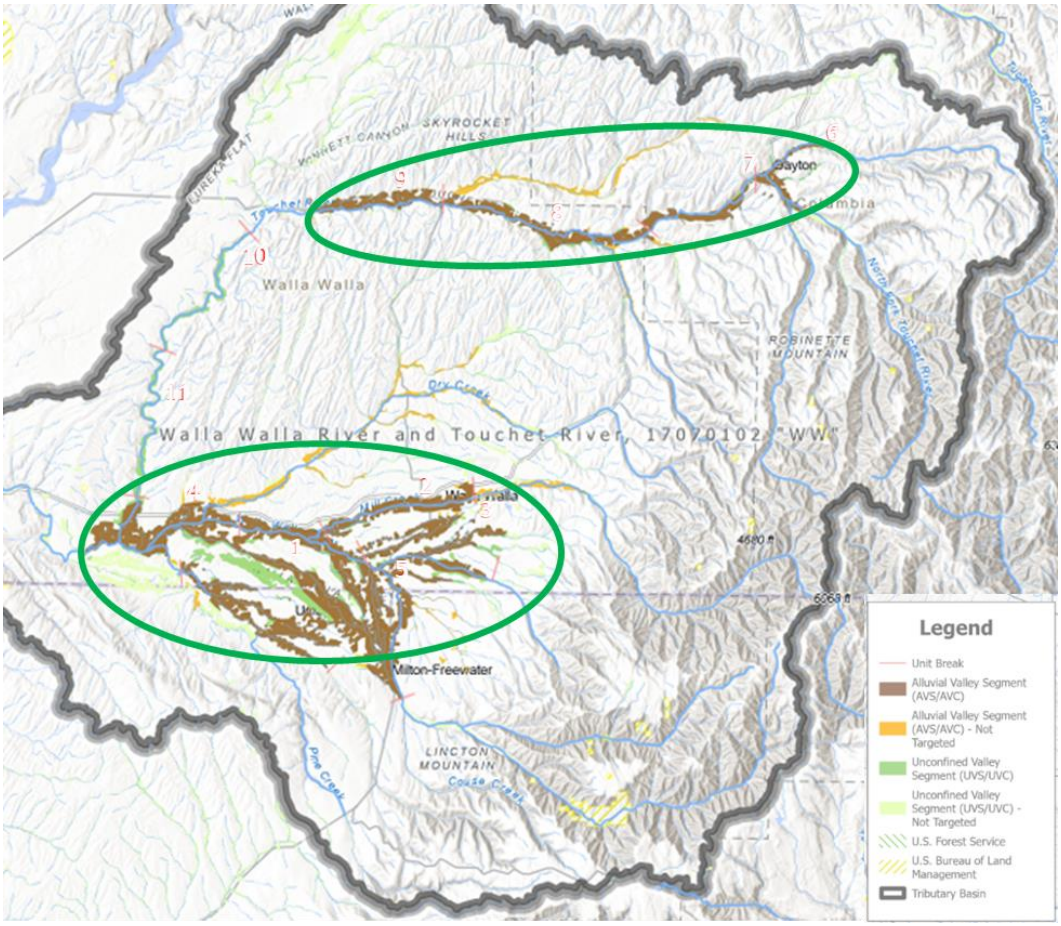
5.9. Walla Walla River

The Walla Wall River is not identified as a CWR tributary in the EPA CWR Plan. However, as part of this work effort, the USG and the six sovereigns recognized the significant restoration investment in the Walla Walla basin for salmon and steelhead recovery and the potential for the Walla Walla River to provide CWR if flows are restored, and river temperatures are cooled. Nine priority temperature reduction projects are identified in the Walla Walla River as shown in Table 11. Figure 10 highlights the alluvial/unconfined river channels in the basin where floodplain re-connection projects may be feasible. As shown in Figure 10, there is extensive alluvial floodplain in the Walla Walla and Touchet Rivers, which highlights the extensive potential for floodplain re-connections in the basin. Several projects in Table 10 involve re-connecting the Walla Walla and Touchet Rivers to their floodplains.

Table 11. Priority temperature reduction projects in the Walla Walla basin.

Mid-C ID#	Source	Project	Project Description	Estimated 2026 Cost	Estimated 10-year Cost
11*	CTUIR	Waluula Floodplain Restoration	Habitat Restoration. USFWS Ownership. Reconnection of 6 miles of the Walla Walla River to approximately 1,500 acres of the historic floodplain	$5,000,000	$30,000,000
13	CTUIR	Tuusi Wana Floodplain Restoration	Conservation-Habitat Restoration-Water Acquisition. Reconnection of 3 miles of the Touchet River floodplain, acquisition of approximately 4 cfs of water rights, and protecting approximately 300 acres in an permanent conservation easement	$5,000,000	$25,000,000
14	CTUIR	Habitat Restoration	Habitat Restoration	$2,500,000	$20,000,000
26	WDFW	Walla Walla River USACE Nursery Reach Ecosystem Restoration General Investigation Study	Conduct geomorphic and ecosystem assessment of the Walla Walla River and develop alternatives for restoring natural river function and process between Milton Free Water, Oregon and confluence of Mill Creek, a distance of approximately 10-miles.		$1,500,000
32	WDFW	Lower and Middle Touchet Floodplain Reconnection and Restoration	Finalize desings and implement floodplain reconnection projects in the Middle and Lower Reaches of the Touchet River		$4,000,000
33	WDFW	Tuusi Wana-Touchet Mainstem Rest and Acq	Implement/construct the nearly completed designs to restore habitat, floodplain, and acquire ~ 4CFS of water on this 4-mile long reach		$2,000,000
30	WDFW	Walla Walla Bridge to Bridge Phase 4 Design	Finalize designs on the last/final phase of the Walla Walla River Bridge to Bridge reach, a distance of several miles of which most is now implemented		$84,000
New	Oregon	Walla Walla River Anchor Project	This will be an identified project resulting from analysis of alternatives completed under the Bi-State flow study and ongoing BOR basin study and is being conducted under the Walla Walla 2050 process		TBD
New	CTUIR, Washington, Oregon	City of Walla Walla Mill Creek Water Plan	Water Acquisition		$15,000,000
			Total Cost	$12,500,000	$97,584,000
* - Mid-Columbia Near Term Priority Action					

Figure 10. Walla Walla River alluvial/unconfined river valley segments.



6. Temperature Projects in other Columbia Basin Tributary Basins

This memorandum focuses on projects in CWR tributary basins identified in the EPA CWR Plan that are also part of RCBA Mid-Columbia River Restoration Plan. Other primary CWR tributary basins identified in the EPA CWR Plan that are not addressed in this memorandum include: the Cowlitz River, Lewis River, Sandy River, Tanner Creek, Eagle Creek, Herman Creek, and the Little White Salmon River. In addition, the RCBA Mid-Columbia River Restoration Plan includes important temperature reduction projects for tributary basins that were not identified as CWR tributaries in the EPA CWR Plan, which include the John Day River and Yakima River basins. Temperature reductions projects in these two basins are important to improve migration, rearing, and spawning conditions for mid-Columbia river salmon and steelhead.

7. Potential Funding Sources

The following is a partial (not exhaustive) listing of potential funding sources for projects identified in this memorandum.

- Clean Water Act Section 319 Grants – EPA pass through funds to states and tribes.
- Clean Water Act State Resolving Funds – EPA pass through funds to states.
- Clean Water Act Columbia Basin Restoration Grants – EPA grants are currently congressionally appropriated for toxic reduction but could include appropriation for temperature projects.

- Northwest Power Act BPA funds for Columbia River Basin Fish and Wildlife Program
- Water Resource Development Act Section 206 USACE CAP studies
- Oregon Watershed Enhancement Board grants including pass through NOAA Pacific Coastal Salmon Recovery Funds
- Washington Salmon Recovery Funding Board grants including pass through NOAA Pacific Coastal Salmon Recovery Funds

8. Contributors

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