

Application Name: Mill Creek Baseflow Assessment and Springs Inventory

Application Number: 000-0000-22250

By: Walla Walla Basin Watershed Foundation

Offering Type: Open Solicitation

Application Type: Technical Assistance

OWEB Region: Mid Columbia

County: Umatilla

Coordinates: 45.991044,-118.042113

Applicant:

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Budget Summary:

OWEB Amount Requested: \$17,855
Total Project Amount: \$96,349

Administrative Information

Abstract

Provide an abstract statement for the project. Include the following information: 1) Identify the project location; 2) Briefly state the project need; 3) Describe the proposed work; 4) Identify project partners.

The Walla Walla Basin Watershed Council (WWBWC), City of Walla Walla, Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and the Walla Walla Ranger District on the Umatilla National Forest seek funds to locate, map, and describe the surface flow paths and groundwater resources that provide summertime base flows in Mill Creek.

Mill Creek is utilized by ESA-listed Mid-Columbia Steelhead, bull trout, and culturally significant spring Chinook salmon. The upper watershed provides excellent aquatic habitat, but the area is vulnerable to catastrophic fires and other climate-related impacts. Downstream conditions in Mill Creek are far less suitable, with well-documented impairments including seasonal low flow and high water temperature.

Climate models predict changing precipitation and infiltration patterns in the Blue Mountains will reduce water storage and consequently reduce spring production. Mill Creek is a groundwater-dependent system with summer base flows supplied, in large part, by numerous springs emerging from basalt aquifers in the Blue Mountains. The location and status of the watershed's groundwater resources are not well documented. Baseline data describing the current conditions of groundwater resources in the Mill Creek Municipal Watershed are needed to document and understand climate-related impacts on water supplies, protect existing high quality habitat, and guide efforts to reduce the impact of predicted climate changes on native fish.

Location Information

What is the ownership of the project site(s)?

Public land (any lands owned by the Federal government, the State of Oregon, a city, county, district or municipal or public corporation in Oregon)

What agency(ies) are involved?

US Forest Service, Walla Walla Ranger District, City of Walla Walla, project area located on lands ceded by the Confederated Tribes of the Umatilla Indian Reservation

Private (land owned by non-governmental entities)

Not applicable to this project

This grant will take place in more than one county.

List the counties affected:

Umatilla County, Oregon

Wallowa County, Oregon

Walla Walla County, Washington

Columbia County, Washington

Permits

Other than the land-use form, do you need a permit, license or other regulatory approval of any of the proposed project activities?

- Yes
 No

For Details Go to Permit Page

I acknowledge that I am responsible for verifying applicable permits, licenses, and General Authorizations required for the project, and can update information at grant agreement execution.

Yes

Racial and Ethnic Impact Statement

Racial and Ethnic Impact Statement

- The proposed grant project policies or programs could have a disproportionate or unique POSITIVE impact on the following minority persons. (indicate all that apply)
- The proposed grant project policies or programs could have a disproportionate or unique NEGATIVE impact on the following minority persons. (indicate all that apply)
- The proposed grant project policies or programs WILL HAVE NO disproportionate or unique impact on minority persons.

Insurance Information

If applicable, select all the activities that are part of your project - These require a risk assessment tool unless otherwise noted (check all that apply).

- Working with hazardous materials (not including materials used in the normal operation of equipment such as hydraulic fluid)
- Earth moving work around the footprint of a drinking water well
- Removal or alteration of structures that hold back water on land or instream including dams, levees, dikes, tidegates and other water control devices (this does not include temporary diversion dams used solely to divert water for irrigation)
- Applicant's staff or volunteers are working with kids related to this project (DAS Risk assessment tool not required, additional insurance is required)
- Applicant's staff are applying herbicides or pesticides (DAS Risk assessment tool not required, additional insurance is required)
- Insurance not applicable to this project

Additional Information

This project affects Sage-Grouse.

Problem Statement

Describe the watershed problem this Technical Assistance Application seeks to address.

Mill Creek is utilized by ESA-listed Mid-Columbia Steelhead, bull trout, and culturally significant spring Chinook salmon. The upper watershed is a critical area for spawning and rearing native fish and provides a potential avenue for population recovery as the passage barriers in the lower watershed are gradually addressed. Downstream conditions in Mill Creek are far less suitable, with well-documented impairments including seasonal low flow and high water temperature.

Climate models predict changing precipitation and infiltration patterns in the Blue Mountains will reduce water storage and consequently reduce spring production. Mill Creek is a groundwater-dependent system with summer base flows supplied, in large part, by numerous springs emerging from basalt aquifers in the Blue Mountains. The location and status of the watershed's groundwater resources are not well documented. Baseline data describing the current conditions of groundwater resources in the Mill Creek Municipal Watershed are needed to document and understand climate-related impacts on water supplies, protect existing high-quality habitat, and guide efforts to reduce the impact of predicted climate changes on native fish.

The following reports/studies describe the predicted climate changes for the Blue Mountains region and provide recommendations to increase resiliency:

- A 2005 Stewart et al. article in the Journal of Climate shows that snowmelt-derived streamflow across western North America has shifted 1-4 weeks earlier than in the 1950s and concludes that adverse effects of this trend merit increased basin-specific assessments of climate impacts on water supplies (p 1154).
- A 2008 USFS Springs Inventory Report for the Umatilla National Forest (Johnson and Clifton) states the need to evaluate time-dependent groundwater patterns in the region (p 14). The proposed project to collect baseline data will allow for temporal analysis.
- The 2017 USFS publication titled Climate Change Vulnerability and Adaptation in the Blue Mountains Region describes predicted climate change impacts and makes adaptation recommendations. Increased ambient temperatures will alter water supply timing and availability, causing decreased summer low flows and increased water temperatures. Adaptations related to flow and temperature include protecting groundwater and springs to maintain summer base flows (p. vii). The authors state that information about the role of groundwater budgets is needed to determine the adaptive capacity of groundwater-dependent ecosystems (p. 257).
- In a 2018 USFS report titled Potential effects of climate change on riparian areas, wetlands, and groundwater-dependent ecosystems in the Blue Mountains, Dwire, et al. state that an understanding of groundwater resources is limited and additional inventories and protection of groundwater-dependent ecosystems are needed to promote adaptation and resiliency (p. 51).

Does this project address one or both of the following:

Habitat needs for one or more Endangered Species Act-listed species and/or species of concern

Concerns identified on 303(d) listed streams

No

Project History

Continuation - Are you requesting funds to continue work on a project previously funded by OWEB?

- Yes
 No

Resubmit - Have you submitted, but were not awarded an OWEB application for this project before?

- Yes
 No

Phased - Is proposed work in this application a phased technical assistance project?

- Yes
 No

Plans

Salmon

Will this project benefit salmon or steelhead?

- Yes
 No

- ✓ Middle Columbia River - Steelhead
✓ Middle Columbia River spring-run - Chinook Salmon

How will the resulting technical assistance project benefit salmon or steelhead or their habitat?

The proposed springs inventory and baseflow assessment will benefit bull trout, spring Chinook salmon, and Mid-Columbia steelhead by providing resource managers with the data needed to understand, plan for, and adapt to climate-related impacts on water supply, instream habitat, and water temperature in Mill Creek and downstream in the Walla Walla River. Reduced supply of the cool, clean water provided to Mill Creek by its upgradient basalt springs would exacerbate the seasonal water temperature and low flow impairments documented by the Walla Walla Subbasin Plan and state and federal regional recovery plans for bull trout, chinook salmon, and steelhead. Findings concerning the status and condition of the watershed's groundwater sources will allow local managers to document trends and, as needed, develop resiliency plans to reduce the climate change-driven impacts on Mill Creek's native fish species.

Is the proposed technical assistance activity(ies) identified in a local assessment or other plan?

- Yes
 No

List the name of the assessment or plan being implemented by this project. The description must include the purpose of the plan.

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Walla Walla Subbasin Plan, Northwest Power, and Conservation Council, 2004

Mill Creek is identified as a principal tributary to the Walla Walla River. Upper Mill Creek is utilized by bull trout and is considered near-pristine habitat prioritized for protection (p.66). Habitat suitability in lower Mill Creek is limited by flow and temperature impairment.

Snake River Salmon Recovery Plan for Southeast Washington, June 2011.

The plan lists upper Mill Creek as a major spawning area for Mid-Columbia Steelhead. It also states that the bull trout population in Mill Creek is a relatively healthy population (p 365), is genetically distinct from other Walla Walla populations, and should be managed independently (p 358).

Decreased base flows are listed as one of the dominant limiting factors in the Walla Walla headwaters (p154).

Increasing streamflow is one of six recovery strategies (p195).

Middle Columbia Steelhead ESA Recovery Plan, NMFS, 2009

Identifies limiting factors, habitat strategies, and actions by region. The plan lists water temperature as a major limiting factor for Mill Creek steelhead (p.8-78). Recovery strategies listed in section 9 include "enhance hyporheic flows and spring inputs." The proposed project seeks to establish baseline data regarding spring input in order to evaluate vulnerability and guide planning efforts.

Mid-Columbia Recovery Unit Implementation Plan for Bull Trout, USFWS, 2015

P C-62: "Determine appropriate instream flows in Walla Walla River and Mill Creek. In the case of Mill Creek below the City of Walla Walla intake, provide optimal minimum stream flow values for bull trout on a monthly basis to water users and flood control operators. Identify probable lowflow scenarios and prepare an operational plan to minimize impacts."

The cold water spring inputs of the upper Mill Creek watershed are an important contribution to this high functioning ecosystem. Our project will inventory the source waters providing critical bull trout habitat. Results will inform efforts to mitigate climate change impacts that would exacerbate downstream impairments described in the plan including reduced flows, degraded water quality, and increased water temperatures.

Proposed Solution

Goal, Objectives, and Activities

List specific and measurable objectives. Objectives support and refine the goal by breaking it down to steps for achieving the goal. (NOTE: If you quantify your objectives, ensure all numbers match the metrics listed in your selected habitat types.) Provide up to 7 objectives.

Objective #1

Objective

Obtain a permit from the USFS, Walla Walla Ranger District

Describe the project activities. Activities explain how the objective will be implemented.

Obtain a special uses permit from the Walla Walla Ranger District to:

- Access the restricted upper Mill Creek Watershed
- Conduct a a springs inventory by following the USFS Groundwater-Dependent Ecosystems: Level 1 Inventory Field Guide, Inventory Methods of Assessment and Planning

Objective #2

Objective

Develop Sample and Analysis Plan

Describe the project activities. Activities explain how the objective will be implemented.

Coordinate with ODEQ to develop a sample and analyses plan that describes the data collection strategy, data quality goals, and quality control procedures.

Objective #3

Objective

Document locations and characteristics of springs and perennial streams in the project area

Describe the project activities. Activities explain how the objective will be implemented.

The USFS is the landowner and watershed co-manager with the City of Walla Walla. Umatilla National Forest staff will assist with 1) training for groundwater-dependent ecosystem surveys, 2) field data collection, and 3) required clearances/permits.

A list of all known and possible springs and tributaries in the project area will be developed using 1) historical data, available maps, and previously documented sites and 2) analysis of the high-resolution LiDAR outputs to be collected in summer 2022. All sites will then be visited to document location, extent, and characteristics. Field staff will characterize the springs in the project area using the USFS Groundwater-Dependent Ecosystems:

Level I Inventory Field Guide, Inventory Methods for Assessment and Planning United States Department of Agriculture (2012). Gen. Tech. Report WO-86, March 2012 (see document link on Reference page)

These USFS methods are intended to document the location, size, and basic characteristics of ecosystems where groundwater emerges on the ground surface (springs and groundwater-dependent wetlands). The following information will be collected: spring type, geologic structure type, soil types, vegetation, flow rate and pattern, water quality (specific conductance, pH, and dissolved oxygen), disturbance, and water use.

Note, that OWEB will only fund data review, compilation, and springs inventory fieldwork in the Oregon portion of the watershed. See Maps in the uploads section for percentages of the project area located in each state. Our proposed budget reflects these percentages. All Washington work will be funded by match dollars.

Objective #4

Objective

Produce a hydrologic map of the project area

Describe the project activities. Activities explain how the objective will be implemented.

Use field inventory data, LiDAR, and GIS feature data to develop a hydrologic map of the project area, including mapping the extent of perennial and intermittent streams, seeps, springs, and wetland areas. ArcGIS will be used in conjunction with ArcGIS Hydro tools to create a geodatabase of geographic information that will document the current conditions of springs that provide the summer base flow in the upper Mill Creek watershed. The final hydrologic map will cover the upper Mill Creek subwatershed above the City of Walla Walla Municipal intake located in HUC 170701020201. The OWEB-funded mapping efforts will be for the Oregon portion of the watershed only. See map in uploads showing percentage of project area located in each state. Budget reflects these percentages. All Washington work will be completed with match funding.

Objective #5

Objective

Submit and share data

Describe the project activities. Activities explain how the objective will be implemented.

Submit springs inventory data to the SpringsOnline Database hosted by the Springs Stewardship Institute of the Museum of Northern Arizona.

Submit water quality data to ODEQ for inclusion in the AWQMS database.

Submit all newly documented spring locations for inclusion in the National Hydrography Dataset.

Summarize results and present to project partners: USFS, City of Walla Walla, and Confederated Tribes of the Umatilla Indian Reservation.

State your project goal. A goal statement should articulate desired outcomes (the vision for desired future conditions) and the watershed benefit.

The purpose of this baseflow assessment is to locate, map, and describe the springs that provide summertime base flows in Mill Creek, a major tributary of the Walla Walla River. Baseline data are needed to document existing conditions and track future trends. Results will help determine the level of vulnerability of the springs to projected climate change impacts and guide the development of resilience strategies to reduce and mitigate negative outcomes for bull trout, spring chinook salmon, and summer steelhead.

List the major project activities and time schedule estimated for completing the technical assistance project and the future restoration project.

Element	Description	Start Date	End Date
Aquatic habitat inventory	USFS staff/contractors will conduct an instream survey of fish habitat in the project area.	7/2022	9/2022
LiDAR data acquisition	Hire qualified vendor to collect LiDAR data in the project area	7/2022	9/2022
Obtain permit	WWBWC will coordinate with the Walla Walla Ranger District of the USFS to obtain a permit granting access to the protected municipal watershed to conduct project activities	11/2022	2/2023
Develop SAP	Coordinate with ODEQ to create a SAP describing sampling design, data quality, and QAQC procedures for the project	11/2022	2/2023
Review and compile existing data	Map existing spring and tributary inputs and develop strategy for field survey work	2/2023	5/2023
Conduct springs inventory	Use USFS protocols to locate and characterize springs and wetlands in the project area	6/2023	10/2023
Create hydrologic map	Use ArcGIS software to map springs, wetlands, and streams in the project area	9/2023	6/2024
Report findings	Summarize results and share with project partners. Submit data to ODEQ and SpringsOnline Databases.	11/2023	6/2024

Element	Q3 2022	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024
Aquatic habitat inventory								
LiDAR data acquisition								
Obtain permit								
Develop SAP								
Review and compile existing data								
Conduct springs inventory								
Create hydrologic map								
Report findings								

Technical Assistance Type

What type of technical assistance do you need in support of future voluntary restoration actions? (choose one)

- Technical Design and Engineering*
 Resource Assessment and Planning -- Details will follow.

Resource Assessment and Planning

Select all of the technical assistance activities you will be doing.

Planning Activities

Assessments/Surveys

Select all the actions you propose to implement to address the problem.

Instream assessments/surveys

Habitat assessments/surveys

Select all of the habitat assessment/survey activities to be conducted.

Riparian condition

Road condition/inventory

Upland habitat conditions

Wetland habitat conditions

Size

Vegetation composition

Vegetation density

Vegetation characteristics

Vegetation extent

Estuarine/nearshore habitat conditions

Invasive species

Other habitat assessments/surveys

Estimated acres of habitat to be assessed/surveyed.

22505

Data Management

Describe how the data will be managed.

Field inventory data will be collected from July to October to minimize the influence of precipitation and snowmelt on the groundwater-dependent ecosystems being surveyed. Field staff will use Rite in the Rain datasheets and field tablets to populate electronic spreadsheets. Scans and electronic duplicates will be made at the end of each field day to limit data losses.

Compatible data types (flow, water temperature, specific conductance, pH, others) will be uploaded into an Aquatic Informatics AQUARIUS data management system.

All field data sheets will be scanned and stored digitally on the WWBWC's RAID system. Additionally, all field data sheets will be cataloged in a project folder at the WWBWC office.

Geospatial data will be contained in a project file geodatabase, which will be available at the end of the project.

Geospatial data will be managed using ESRI ArcGIS.

Describe how the data will be analyzed and used to inform future voluntary restoration activities.

LiDAR data collected in 2022 (before the OWEB project period) will be analyzed using ArcGIS software to identify areas for a field inventory.

Spring inventory data will be evaluated by comparing results with existing USFS survey results. The Umatilla National Forest hydrologist will assist with data analysis and summarizing results.

To craft sustainable water management strategies and improve the limiting factors for our threatened and endangered aquatic species, Walla Walla basin partners need to know about the status of the year-round sources of Mill Creek water. Our study results will be used to characterize the sources of Mill Creek baseflows and determine their vulnerability to projected climate impacts in the Blue Mountains. Our findings will help us develop strategies to mitigate the groundwater impacts likely to result from projected changes in precipitation patterns. Study results will be provided to basin partners to inform strategies needed to restore watershed function and address habitat conditions currently limiting the success of struggling populations of native fish in Mill Creek and the Walla Walla Watershed.

Explain how the data will be collected. The description should include information on the sampling design.

These USFS methods are intended to document the location, size, and basic characteristics of ecosystems where groundwater emerges on the ground surface (springs and groundwater-dependent wetlands). The following information will be collected: spring type, geologic structure type, vegetation, flow rate and pattern, water quality (water temperature, specific conductance, pH, and dissolved oxygen), disturbance, and water use.

The source water assessment is intended to describe groundwater resources in the Mill Creek Watershed. The USFS GDE Inventory Protocol includes several steps intended to ensure measurements represent groundwater conditions rather than mixed groundwater and precipitation. Page 8 of the guide says, "This field guide was developed to focus on a subset of nonmarine GDEs, specifically springs and groundwater-dependent wetlands (such as fens)". The guide includes decision trees intended to verify groundwater-dependence (Box 1, p 11).

Surveyors evaluate the following to determine groundwater-dependence: 1) presence of perennial water, 2) occurrence on a specific subset of landscape settings (slope break, intersection of a confined aquifer with a slope, stratigraphic change, or along a fault), 3) wetlands associated with a spring, 4) signs of surface inflow, 5) organic, much or peat soils, and 6) saturation after surface inputs are dry and during extended periods with no precipitation (p 11.)

Adherence to the inventory procedures will ensure comparability with existing springs measurements and other groundwater samples. In addition, fieldwork will be conducted from July to October to limit the influence of meteoric water mixing with groundwater. Using weather data from the Milk-Shakes Snotel site, the dates and quantity of precipitation will be documented throughout the field season. Data collected following rain events or snowmelt will be flagged, qualified, and will not be submitted for inclusion in ODEQ's AWQMS database.

Describe the partners engaged in the project, and how communication will occur between the partners.

The project partners have a well-established relationship and have been working together since 2021 coordinating project development and funding applications for the proposed effort. Letters of support from each entity are attached. The project area is located in the Umatilla National Forest, specifically within the Mill Creek Municipal Watershed, which is co-managed by the Walla Walla Ranger District and the City of Walla Walla. The land was ceded in 1855 by the Confederated Tribes of the Umatilla Indian Reservation. The Mill Creek watershed is ecologically and culturally significant to the Tribes, serving an integral role in their First Foods and River Vision.

The Walla Walla Ranger District is supportive of the project, has agreed to issue the permit for land access, and will contribute match funds both cash (\$8,000) and in-kind (staff time). District staff will provide technical assistance with the GDE Inventory and mapping support. District staff will work with Regional Office staff to update the NHD stream and springs layers, based on LiDAR mapping verified with field reconnaissance.

The City of Walla Walla is supportive of the project, has agreed to grant land access, and expects to provide staff time to assist with locating springs but is unable to commit to a specific quantity of in-kind match at this point in their watershed master planning process. Walla Walla's commitment to water conservation is apparent in the City's investment in new water pipelines, upgrading to a smart utility network, and water-wise outreach material distributed to its citizens.

CTUIR has committed staff time to assist with the groundwater-dependent ecosystem survey and technical staff to assist with data review and analysis.

Communication will occur via email and conference calls. Results and findings will be provided in a meeting of project partners and interested parties.

Complementary Activities

Describe other planning, assessment, or restoration activities occurring within the area where you are collecting data.

LiDAR data acquisition in the project area is scheduled for summer 2022 and will be funded through a grant from the Drinking Water Provider's Partnership (specifically, the WA Dept of Health). Also in summer 2022, the USFS will conduct an aquatic habitat survey in upper Mill Creek and its tributaries. Both LiDAR and habitat survey data will guide the proposed TA project.

The CTUIR has requested a database review of cultural resources in the project area. This will be funded by Bonneville Power Administration, and completed in 2022-2023 prior to the groundwater-dependent ecosystem inventory.

The proposed baseflow study will build on previous assessment and prioritization efforts in the Mill Creek Watershed. In 2017, CTUIR completed the Lower Mill Creek Habitat and Passage Assessment and Strategic Action Plan that looks holistically at the lower portion of the drainage and identifies management actions to restore lost ecological function, Tribal fishing rights, and meet the needs of the surrounding community. The report notes the ecological and cultural significance of the entire Mill Creek watershed, stating it is "integral to the CTUIR's First Foods and River Vision" (p.ES-2). The report also includes maps showing the distribution of summer steelhead (p. 226), spring Chinook salmon (p. 232), and bull trout (p. 236) in the upper watershed.

Since 1999 the City of Walla Walla has utilized aquifer storage and recovery (ASR) to preserve and protect the basalt aquifer and increase water supply resiliency to fire, flood, and drought. Currently, CTUIR and the City are piloting a flow restoration plan for Mill Creek that utilizes ASR to bolster groundwater storage during high flows. This will enable the City to rely more heavily on artificially recharged groundwater for summertime municipal supply and improve instream flows by allocating a portion of their Mill Creek water to an instream water lease for ecological benefit (2021 status report).

For about 15 years Tri-State Steelheaders, the Snake River Salmon Recovery Board, and the Mill Creek Work

Group have collaborated to improve fish passage and habitat conditions in Mill Creek. A fish passage assessment was completed in 2009 and subsequent projects have incrementally improved passage through the flood control channel downstream of our proposed project area (<https://srp.rco.wa.gov/project/320/14912>).

Similar base flow assessments are currently underway in the North and South Fork watersheds of the Walla Walla River.

Describe how this Technical Assistance Application complements those activities.

The baseline data describing the status of groundwater sources supplying Mill Creek summertime baseflows will enable trend monitoring to determine the vulnerability of water supply to climate changes. Large investments of time and funding are being made downstream to improve conditions for aquatic species. The success of those efforts is dependent on an ongoing supply of cool, clean water from Mill Creek's upper watershed. Data-driven strategies are needed to plan for and mitigate climate-related impacts on summertime flow and water temperature. A clearer understanding of source water status and trends is vital as we join basin partners and state agencies to protect existing ecosystem functions and reduce limiting habitat factors for species of concern in the Walla Walla watershed.

Acres of habitat encompassed by this technical assistance planning project.

22505

Miles of stream encompassed by this technical assistance planning project.

32

Wrap-Up

Outcomes

Describe how the proposed technical assistance activities will address the watershed problem identified in the Problem Statement.

Climate science suggests that changing precipitation and infiltration patterns in the Blue Mountains will reduce spring performance. Mill Creek is a groundwater-dependent system with base flows dependent, in large part, on springs emerging from basalt aquifers in its upper watershed. Reduced summertime base flows would likely exacerbate the water temperature impairment documented downstream of the project area. In order to develop data-driven strategies to mitigate climate impacts on Mill Creek base flow and summertime water temperature, baseline data and subsequent trend monitoring are needed. USGS flow data at the City of Walla Walla diversion (located at the lower extent of the project area) document around 50 cfs of summertime flow, yet no springs are shown on the National Hydrography Dataset layer. The proposed base flow assessment seeks to locate and characterize the spring sources and measure flow at tributary inputs in order to evaluate the vulnerability of Mill Creek's base flows to climate changes. Understanding the status of groundwater sources supplying Walla Walla River base flows will allow resource managers to develop projects and strategies to promote climate resilience and protect and enhance aquatic habitat.

Project Management

List the key participants, their roles, and qualifications relevant to the technical assistance activities.

Role	Name	Affiliation	Qualifications	Email	Phone
Project Management, Data collection, analysis, and reporting	Tara Patten	WWBWC Project Manager	8 years' experience with hydrological data collection, analysis, and reporting. 2 years' experience with aquatic habitat inventories. Currently conducting baseflow assessment in the S. Fork Walla Walla watershed using the proposed protocols.	tara.patten@wwbwc.org	(541) 938-2170
Project design, data collection, GIS analysis	Troy Baker	WWBWC Executive Director	BS in Natural Science and extensive GIS training. Troy Baker has over 14 years' experience managing WWBWC's monitoring program including streamflow and water quality sampling, GIS analysis, and database system. Data are available online at www.wwbwc.	troy.baker@wwbwc.org	(541) 938-2170
Financial oversight	Wendy Harris	WWBWC Operations Manager	WWBWC's Operations Manager, has over 13 years' experience overseeing the fiscal activity of WWBWC.	wendy.harris@wwbwc.org	(541) 938-2170

Data review, analysis	Kate Ely	CTUIR Umatilla Basin Hydrologist	Kate has over 26 years' experience in groundwater research and hydrologic assessments in the region.		
Training, data review, analysis	Zig Napkora	Umatilla National Forest Hydrologist	Zig has 30 years' professional hydrology experience with the public and private sectors including extensive geomorphic analysis and stream, riparian-wetland, and spring inventories and monitoring.	zigmund.napkora@usda.gov	(509) 522-6285

Climate Considerations

Briefly describe your understanding of how the characteristics and functions of the watershed where the proposed project will occur are anticipated to change due to climate impacts in the future. In particular, describe how species, habitat, and/or water quality or water quantity variables relevant to the project site location are expected to be affected. Refer to Technical Resources now available on this webpage, if needed:

<https://www.oregon.gov/oweb/resources/Pages/Field-Tech-Guidance.aspx>

Predicted climate impacts to the project area include increasing precipitation as rain and less as snow. Reduced snowmelt and increased runoff during rain events will likely result in less natural recharge of the basalt aquifer. The modeled results include a change to the timing of peak flows and decreased base flow volumes. See the Problem Statement for more detail and references.

How have you accounted for these climate-impact considerations in your project planning, design or implementation? Please describe briefly. See examples listed in the iButton.

Yes, the need for this TA project arose from the climate-related predictions for the Blue Mountains and the potential negative impacts on ESA-listed fish in Mill Creek and, more broadly, in the Walla Walla Basin. The project aims to produce baseline data that will aid resource managers in reducing and mitigating the impacts of climate change on vulnerable native fish populations.

Are there any constraints on your ability to incorporate climate considerations into project planning? For example: Lack of information about climate impacts at the project planning scale; Gaps in understanding or accessing climate-resilient nursery or seed stocks; Lack of methods to quantify mitigation, adaptation, or co-benefits; Uncertainty about how to define a baseline for assessing potential changes; Metrics for climate resilience are not yet defined for the ecosystem.

- Yes
- No

The State of Oregon is committed to identifying ways it can reduce impacts from harmful emissions. While the overall outcomes of OWEB funded projects may have many climate benefits, some necessary activities that occur during projects will result in increased emissions. To help us understand the current situation, please check all of the following that might apply to your project:

- Driving gas-powered automobiles, including trucks and All Terrain Vehicles (ATVs)
- Operating gas-powered machinery other than automobiles (for example, chainsaws or other hand-held equipment)
- Operating gas-powered machinery larger than automobiles (for example, excavators)
- Boats

Other

Not applicable to project activities

Are you considering alternative approaches that could reduce emissions (e.g., use of electric chainsaws or motors)?

Yes

No

Optional: Please explain.

While gas powered vehicles will be used to travel to the boundary of the project area, inside the project area no gas powered equipment will be used.

Budget

Item	Unit Type	Unit Number	Unit Cost	OWEB Funds	External Cash	External In-Kind	Total Costs
Salaries, Wages and Benefits							
Executive Director	Hours	400	\$60.00	\$6,600	\$17,400	\$0	\$24,000
Operations Manager	Hours	150	\$49.00	\$1,470	\$5,880	\$0	\$7,350
Project Manager	Hours	500	\$32.00	\$4,480	\$11,520	\$0	\$16,000
Watershed Technician	Hours	400	\$18.00	\$1,800	\$5,400	\$0	\$7,200
Office Manager	Hours	20	\$39.00	\$304	\$476	\$0	\$780
Community Engagement Specialist	Hours	200	\$26.00	\$507	\$4,693	\$0	\$5,200
Outreach Coordinator	Hours	50	\$29.00	\$0	\$1,450	\$0	\$1,450
Category Sub-total				\$15,161	\$46,819	\$0	\$61,980
Contracted Services							
LiDAR	Each	1	\$25,000.00	\$0	\$25,000	\$0	\$25,000
Cultural Survey	Each	1	\$5,000.00	\$0	\$5,000	\$0	\$5,000
Category Sub-total				\$0	\$30,000	\$0	\$30,000
Travel and Training							
Mileage	Miles	3300	\$0.59	\$753	\$1,178	\$0	\$1,931
Category Sub-total				\$753	\$1,178	\$0	\$1,931
Materials and Supplies							
DO Sensor Cap	Each	1	\$115.00	\$45	\$70	\$0	\$115
Conductivity Standards	Each	1	\$50.00	\$19	\$31	\$0	\$50
pH Standards	Each	1	\$100.00	\$39	\$61	\$0	\$100
Batteries	Each	5	\$10.00	\$19	\$31	\$0	\$50
Waders	Each	3	\$100.00	\$117	\$183	\$0	\$300
Backpacks	Each	2	\$100.00	\$78	\$122	\$0	\$200
Category Sub-total				\$317	\$498	\$0	\$815
Equipment							
			\$0	\$0	\$0	\$0	\$0
Category Sub-total				\$0	\$0	\$0	\$0
Other							
			\$0	\$0	\$0	\$0	\$0
Category Sub-total				\$0	\$0	\$0	\$0
Modified Total Direct Cost Amounts				\$16,231	\$78,495	\$0	\$94,726
Indirect Costs							
Federally Accepted 'de minimis' Indirect Cost Rate (up to 10%)	10%			\$1,624	\$0		\$1,624
Total				\$17,855	\$78,495	\$0	\$96,349

* = OWEB funds excluded from indirect.

Provide context and justification for how your budget was developed. Explain how project costs and/or rates were determined.

The Mill Creek Baseflow Assessment project area is split between Oregon and Washington, 39% and 61% respectively. Personnel, mileage, and materials/supplies expenses have been divided based on these percentages. These costs have then been divided amongst the funding sources for each state. Washington's share will be charged to Washington Department of Health, USFS, and BPA. Oregon's portion will be paid for by grants from OWEB and BPA. The exception to the 39%-61% split is the contracted services. Washington Department of Health will pay 100% of the LiDAR costs. BPA will pay 100% of the cultural survey. Oregon's 39% portion of these costs totals \$11,700. These costs will be a portion of the match funds reported to OWEB. In addition, Oregon's portion of the

mileage and materials/supplies will be wholly charged to OWEB.

Personnel hours for the Mill Creek Baseflow Assessment are based on projects of a similar scope, but at current rates. The Executive Director, Project Manager, and Watershed Technician will conduct the field surveys. In addition, the project manager will be coordinating the LiDAR flight and cultural survey, and prepare all reporting documents with the guidance of the Executive Director. The Operations Manager will assist with contracted services coordination, RFP preparation, and stakeholder and community engagement. The Outreach Coordinator and Community Engagement Specialist will assist with stakeholder coordination. In addition, they will be documenting the project through photos and video to create an outreach tool to promote the project to funders, stakeholders, and the basin's community. The Office Manager will assist with mailings document preparation, and stakeholder coordination efforts.

Contracted services costs were provided by estimates provided by contractors. Again, the LiDAR flight will be entirely paid for with funding from Washington Department of Health, and the cultural survey costs will be funded by BPA.

Mileage was calculated by multiplying the number of miles from the WWBWC office to the project site and back, times an estimated 55 trips. The mileage rate used is the current IRS standard mileage rate of \$0.585/mile.

The list of materials/supplies is based off the needs of similar projects. Costs for these supplies were developed through internet searches.

Does the budget identify a contingency amount for specific line item(s) within the Contracted Services and/or Material and Supplies budget category?

- Yes
 No

Funding and Match

Fund Sources and Amounts

Organization Type	Name	Source Note	Contribution Type	Amount	Description	Status
State	Washington Department of Health		Cash	\$30,000	Funds will cover all of LiDAR and WA personnel costs	Pending
Federal	US Forest Service		Cash	\$8,000	Covers WA personnel costs	Pending
Federal	Bonneville Power Administration	2022-23 Funding - WA portion	Cash	\$29,534	2022-2023 Funding WA portion	Pending
Federal	Bonneville Power Administration	2022-2023 Funding OR Portion	Cash	\$10,961	2022-2023 Funding - OR Portion	Pending
Fund Source Cash Total				\$78,495	Fund Source In-Kind Total	\$0

Match

Contribution Source-Type: Description	Amount
Washington Department of Health-Cash: Funds will cover all of LiDAR and WA personnel costs	\$9,750
US Forest Service-Cash: Covers WA personnel costs	\$0
Bonneville Power Administration-Cash: 2022-2023 Funding WA portion	\$0
Bonneville Power Administration-Cash: 2022-2023 Funding - OR Portion	\$10,961
Match Total	\$20,711

Do match funding sources have any restrictions on how funds are used, timelines or other limitations that would impact the portion of the project proposed for OWEB funding?

- Yes
 No

Do you need state OWEB dollars (not Federal) to match the requirements of any other federal funding you will be using to complete this project?

- Yes
 No

Does the non-OWEB cash funding include Pacific Coast Salmon Recovery Funds?

- Yes
 No

Uploads

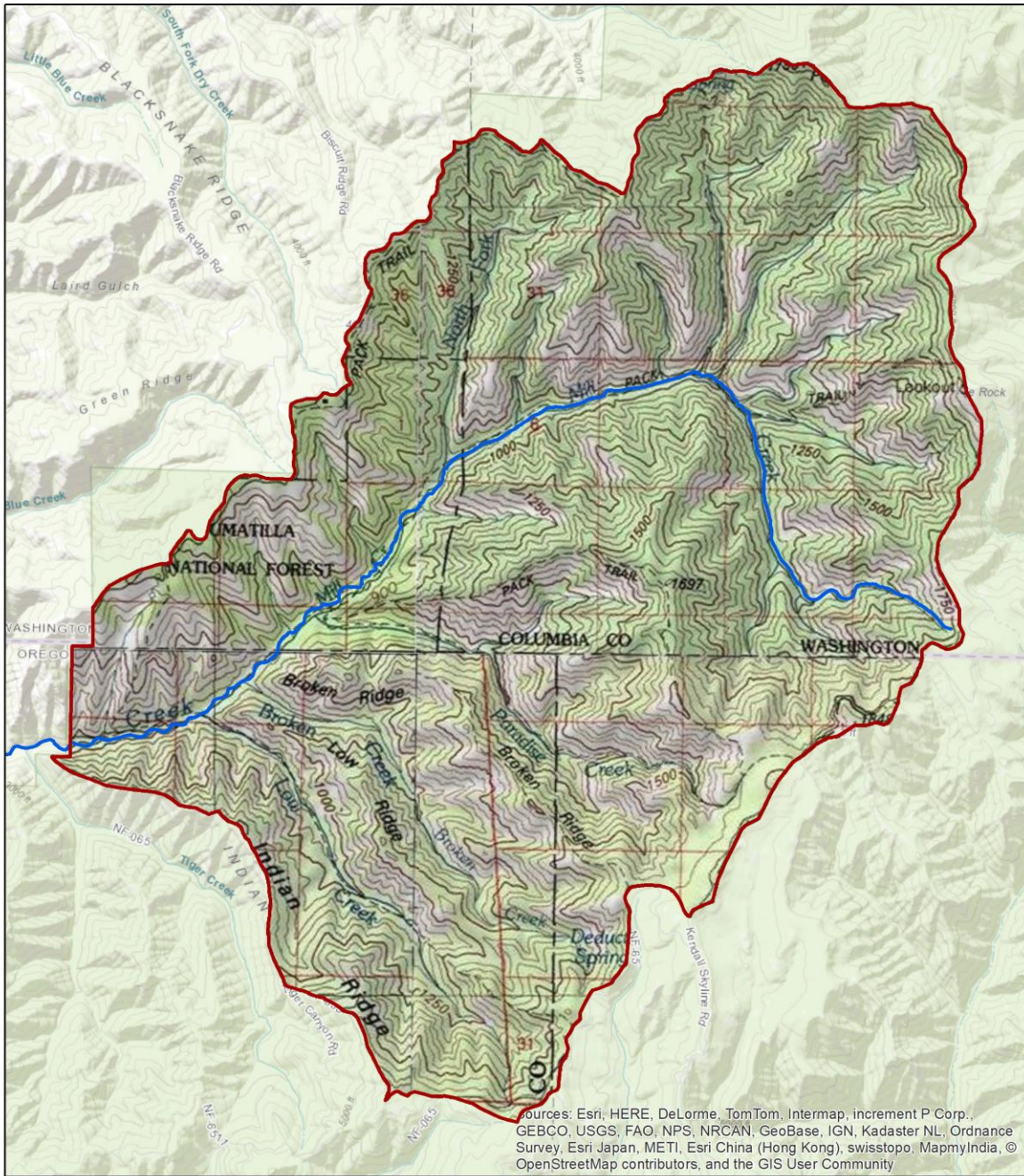
Map: [Maps.pdf - Maps of project area](#)

Support Letters: [LettersOfSupport.pdf - Letters of Support](#)

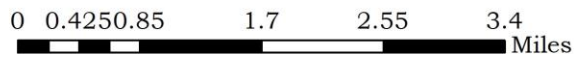
Figures and Tables: [References.pdf - References](#)

Permit Page

Project Activity Requiring a Permit or License	Name of Permit or License	Entity Issuing Permit or License	Status
Conducting a study on National Forest Land	Special Uses Permit	Walla Walla Ranger District	In process. Have discussed with district office.

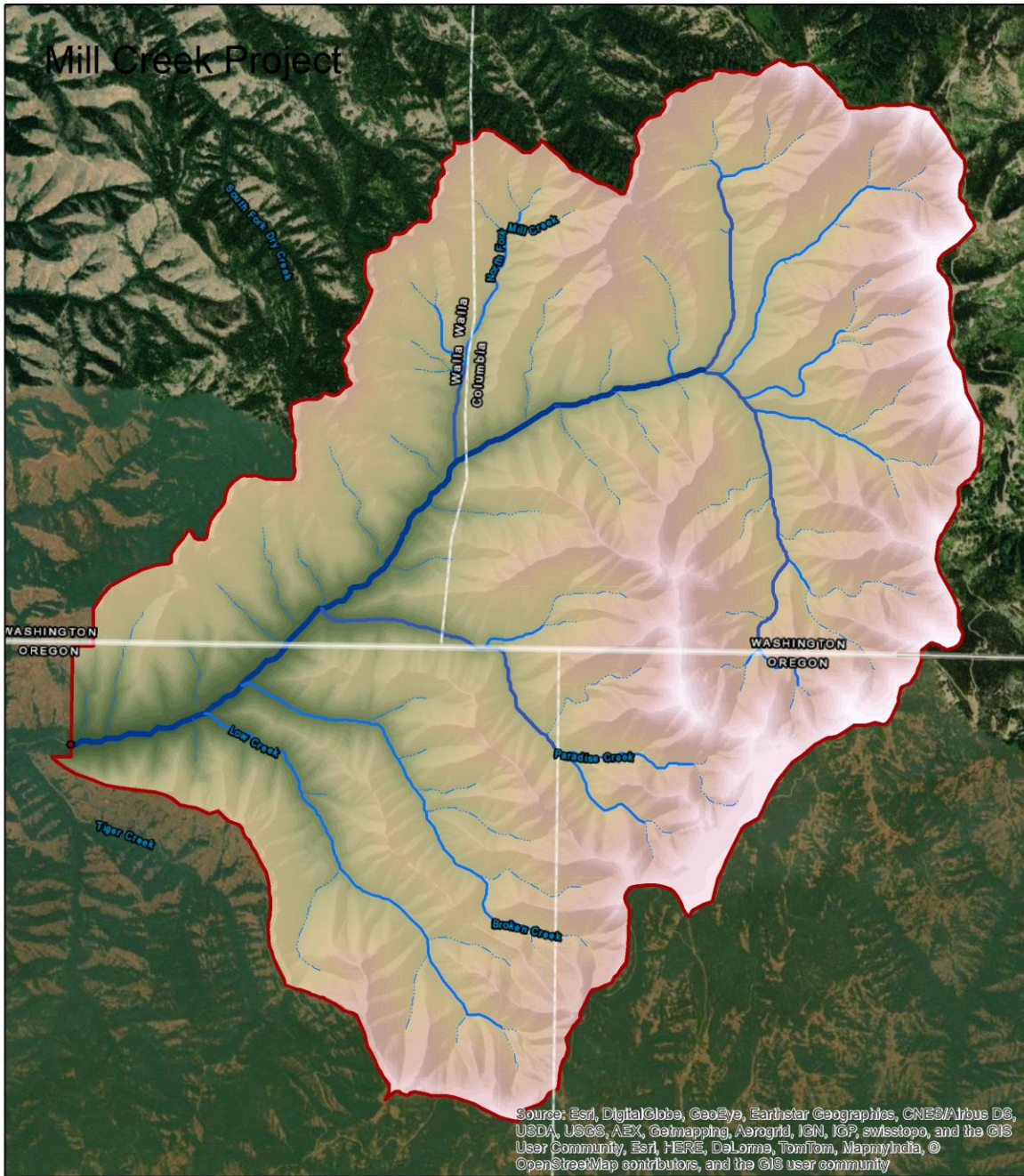


Mill Creek Source Water Boundary



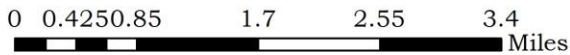
Legend

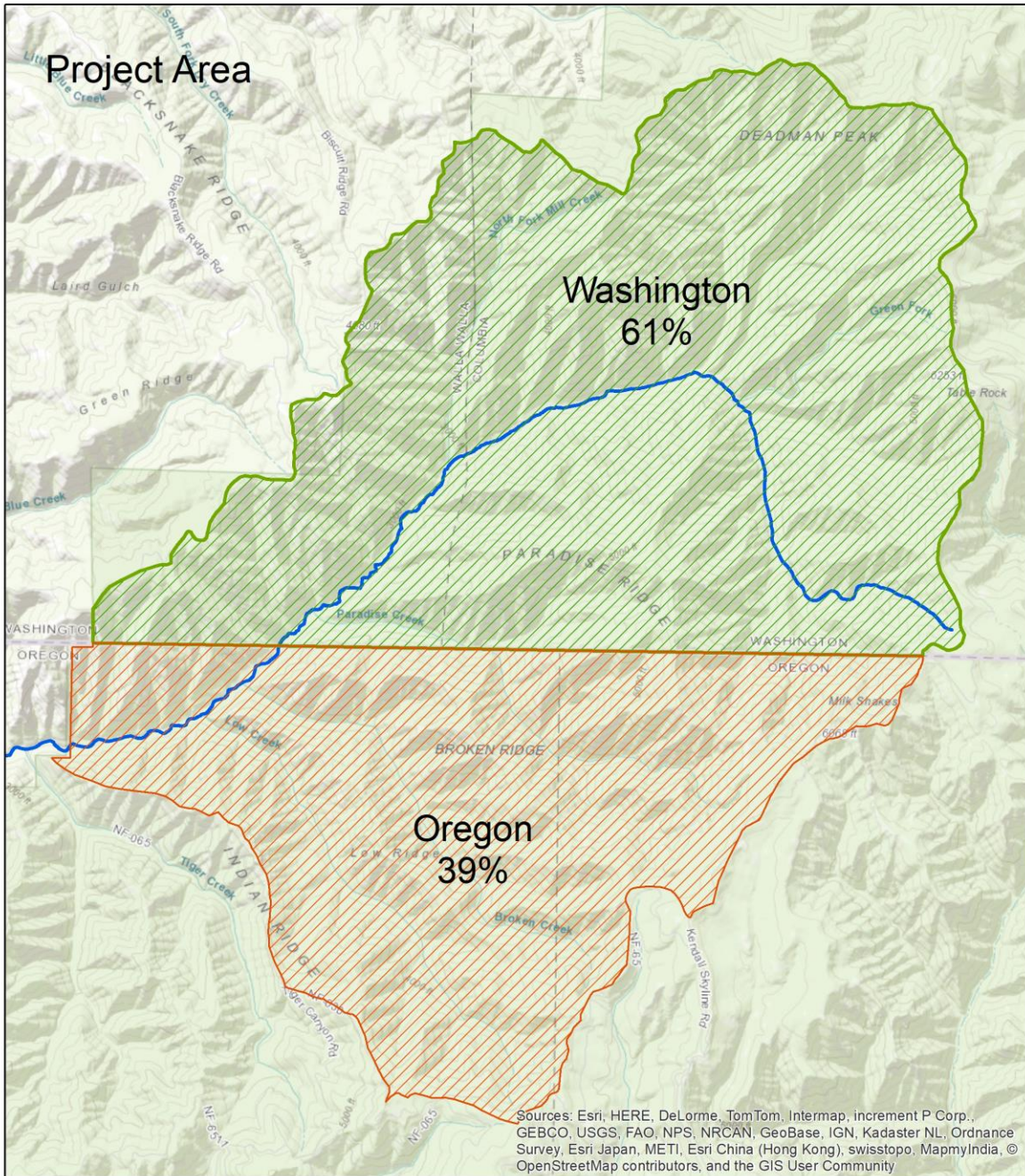
- Project Boundary
- Mill Creek



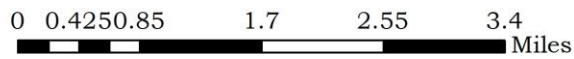
Streams in project area 32 miles

Mill Creek Source Water Boundary








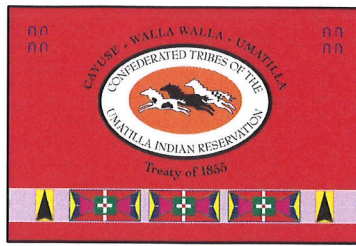
Mill Creek Source Water Boundary



Legend

- State**
-  Oregon
 -  Washington
 -  Mill Creek

Confederated Tribes *of the*
Umatilla Indian Reservation
Department of Natural Resources
Water Resources Program



46411 Timine Way
Pendleton, OR 97801

www.ctuir.org email: info@ctuir.org
Phone 541-276-3165

January 6, 2022

James Capurso, Regional Fisheries Biologist
US Department of Agriculture-Forest Service
Drinking Water Providers Partnership of Oregon and Washington
James.capurso@usda.gov

SUBJECT: CTUIR in-kind assistance for the Mill Creek baseflow assessment and spring inventory of SE Washington and NE Oregon.

Dear Mr. Capurso:

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) – Department of Natural Resources (DNR) - Water Resources Program (WRP) is pleased to support the project proposed by the Walla Walla Basin Watershed Council (WWBWC) to conduct a baseflow assessment and spring inventory of the upper Mill Creek watershed in the Walla Walla Basin of southeast Washington and northeast Oregon. WRP will provide in-kind assistance to the WWBWC in the amount not exceed \$24,000, which includes WRP salary, materials, vehicle and indirect expenses. Given the remote and rough terrain of the upper Mill Creek watershed, it is estimated that up to 6 weeks of field work and 1 week of office documentation and review by WRP staff will help the WWBWC in this project.

Since the work proposed is located within the CTUIR's ceded lands and may include ground disturbance with traverses in the study area, a cultural resources inventory will need to be done before field work begins (US National Historic Preservation Act). The CTUIR recommends that WWBWC hire a qualified contractor to review the Oregon State Historic Preservation Office, the Washington Department of Archaeology and Historic Preservation, and the CTUIR's Tribal Historic Preservation Office databases for known cultural-resource sites within the study area. CTUIR can help WWBWC identify qualified contractors but cannot financially support this work,

The CTUIR appreciates the collaborative work that the WWBWC and stakeholders have accomplished in the Walla Walla Basin to protect and restore important river ecosystems for First Foods (water, salmon, big game, roots and berries) and drinking water supplies for the City of Walla Walla. Although there is considerable work remaining, the information gained from this project will improve our understanding of the groundwater-flow system and strategies to adapt water management practices and policies under a changing climate.

We look forward to working with WWBWC.

Sincerely,

for David Haire
CTUIR-DNR Water Resources Program Manager

cc: CTUIR- Eric Quaempts, DNR Director, Gary James, Fisheries Program Manager, Kate Ely, Umatilla Basin Hydrologist, and Carey Miller, Tribal Historic Preservation Officer; and WWBWC- Troy Baker, Executive Director, and Tara Patton, Project Lead

File Code: 2530
Date: January 6, 2022

Subject: Walla Walla Basin Watershed Council's Drinking Water Provider's Partnership Grant Application for Funding: Baseflow Inventory for Mill Creek Municipal Watershed

To the DWPP Review Team:

I am writing to express my support of the Walla Walla Basin Watershed Council's inventory of seeps, springs, streams and lidar acquisition for the Mill Creek Municipal Watershed. As the primary land management agency of the Watershed, the Walla Walla Ranger District has a vested interest in maintaining and improving watershed health and sustainable water supplies. The upper Mill Creek subwatershed contains the Mill Creek Municipal Watershed, which provides almost 90% of the drinking water for the City of Walla Walla, critical habitat for ESA-listed summer steelhead, bull trout and culturally significant spring Chinook salmon. In addition, downstream users also depend on a steady flow of water for agricultural production.

The proposed project will map seeps, springs, wetland areas, perennial and intermittent streams needed to more completely describe the hydrology of this important area. This information will help the Walla Walla Ranger District gain a better understanding of surface and groundwater flow paths that are vital to forest management actions, municipal water supply and downstream water users. The survey will aid with the current Tiger-Mill Watershed Health and Hazardous Fuels Reduction Project to improve ecological health and resiliency of the Watershed and build on current work within the basin, including downstream habitat and fish passage improvements.

I support the proposed baseflow inventory proposal and look forward to collaboratively working with the Watershed Council to identify and map water sources in upper Mill Creek.

Sincerely,



AARON GAGNON
District Ranger



December 6, 2021

USDA Forest Service
Pacific Northwest Region
Attention: James Capurso
PO Box 3623
Portland, Oregon 97204

RE: WWBWC's 2022 Application for Funding

To the DWPP Review Team:

On behalf of the City of Walla Walla (City), I am pleased to support the Walla Walla Basin Watershed Council (WWBWC) proposal for a baseflow inventory of groundwater sources in the upper Mill Creek municipal watershed. The City will collaborate with WWBWC to map and describe the groundwater springs currently providing year-round flow to Mill Creek.

As a municipal drinking water provider and co-manager with the U.S. Forest Service (USFS) of the upper watershed, the City has a vested interest in watershed health and sustainable water supplies. Climate models predict decreasing groundwater contributions in upcoming decades. To understand these changes and plan accordingly, we first need to document existing conditions. In addition, the Mill Creek municipal watershed is an important spawning and rearing area for ESA-listed bull trout, summer steelhead, and culturally significant spring Chinook salmon. Changes to summertime base flows will undoubtedly affect habitat suitability for these native fish populations.

We value the opportunity to collaborate with WWBWC in this effort and believe it will contribute valuable information to inform water management and wildlife conservation in the Mill Creek watershed and, more broadly, in the Walla Walla Basin.

Thank you for your support.

Sincerely,

A handwritten signature in blue ink, appearing to read "Nabil Shawa", is written over the word "Sincerely,".

Nabil Shawa,
City Manger of City of Walla

A WONDERFUL PLACE TO **LIVE WORK PLAY**

References

- CTUIR. 2017. Lower Mill Creek Final Habitat and Passage Assessment and Strategic Action Plan. Available at https://paluut.ctuir.org/services/uploads/P/1202/S/26/WWR_LowerMillCr_FinalHabitatAndPas sageAssessmentAndSAP_CTUIR_June2017.pdf
- Dwire, K. A., Mellmann-Brown, S., & Gurrieri, J. T. 2018. Potential effects of climate change on riparian areas, wetlands, and groundwater-dependent ecosystems in the Blue Mountains, Oregon, USA. *Climate Services*, 10, 44–52. Retrieved from https://www.fs.fed.us/rm/pubs_journals/2018/rmrs_2018_dwire_k001.pdf
- Halofsky, J.E. and Peterson, D.L. (Eds.). 2017. *Climate Change Vulnerability and Adaptation in the Blue Mountains Region*. U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station, Portland, OR. General Technical Report PNW-GTR-939. Retrieved from https://www.fs.fed.us/pnw/pubs/pnw_gtr939.pdf
- Johnson, J., and Clifton, C. 2008. 2008 Spring Inventory Report. Umatilla National Forest, Oregon. Available at www.wwbwc.org/files/JohnsonAndClifton_2008_SpringInventoryReport_UNF.pdf
- National Marine Fisheries Service. 2009. *Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan*. Portland, Oregon. Retrieved from https://archive.fisheries.noaa.gov/wcr/publications/recovery_planning/salmon_steelhead/domains/interior_columbia/middle_columbia/mid-c-plan.pdf
- Northwest Power and Conservation Council. 2004. *Walla Walla Subbasin Plan*. Portland, Oregon. Retrieved from <https://www.nwcouncil.org/subbasin-plans/walla-walla-subbasin-plan>
- Oregon Department of Fish and Wildlife. 2010. *Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment*. Salem, Oregon. Retrieved from https://www.dfw.state.or.us/fish/CRP/docs/mid_columbia_river/Oregon_Mid-C_Recovery_Plan_Feb2010.pdf
- United States Department of Agriculture (2012). *Groundwater-Dependent Ecosystems: Level I Inventory Field Guide, Inventory Methods for Assessment and Planning*. Gen. Tech. Report WO-86, March 2012. Retrieved from https://www.fs.fed.us/geology/GDE_Level_I_FG_final_March2012_rev1_s.pdf
- U.S. Fish and Wildlife Service. 2015. *Mid-Columbia Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*)*. Portland, Oregon. Retrieved from https://www.fws.gov/pacific/bulltrout/pdf/Final_Mid_Columbia_RUIP_092915.pdf

Washington State Salmon Recovery Office. 2011. *Snake River Salmon Recovery Plan*. Olympia, Washington. Retrieved from <http://snakeriverboard.org/wpi/wpcontent/uploads/2013/01/Full-Version-SE-WA-recovery-plan-121211.pdf>