

*Project Title	Wenatchee-Entiat Beaver-Powered Restoration
*Sponsor	Trout Unlimited
*Primary Contact	Kodi Jo Jaspers
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*Anticipated Request - SRFB	128,399
*Anticipated Request - Tributary Committee	107,298
*Anticipated Other Funding	99,959
*Anticipated TOTAL Budget	335,657
*Other Funding Source(s)	Other funding sources are currently being explored and submitted for, including corporate and public sources. In-kind time and materials has also been used as a match.
*Briefly describe the location of the project	Beaver relocation and landowner assistance will occur in multiple locations along the Columbia River, Wenatchee River, and various sites within the upper Wenatchee subbasin. Beaver Dam Analogs will be potentially implemented within Lower Entiat, Mad, Chiwawa, Peshastin, Upper-Middle Entiat or Upper Wenatchee Assessment Units.
*Latitude (decimal degrees)	47.74295
*Longitude (decimal degrees)	-121.04671
*Project subbasin	Multiple Subbasins
Please explain why there are multiple subbasins	In order to maximize the benefit of beaver-powered restoration, we focus our work in multiple subbasins. This type of work is low-cost processed based restoration that allows us to implement at a larger scale than traditional restoration practices. Through work focused in multiple subbasins we increase our reach on beaver relocations and beaver dam analog implementation.

*Reach(es) Name

Multiple Reaches

1. *In one or two sentences, what do you propose to do?

This project will address and reduce stream and habitat concerns in multiple tributary watersheds by harnessing beaver-powered restoration realized through landowner assistance, beaver relocations, and beaver dam analog (BDA) implementation.

2. *What species will the project benefit?

Spring Chinook

Steelhead

Bull Trout

3. *Select the project's objectives and the associated tracking metrics

Instream Habitat (Includes Floodplain & Off-Channel Reconnection)

Instream Habitat: Reporting Code

Miles of instream habitat treated

4. *Does this project or any of its phases (e.g., design) already exist in Salmon Recovery Portal or PRISM?

Yes

5. *Has this project been submitted previously for funding through the SRFB and/or Targeted process(es)?

Yes

Please explain which process(es) and how this proposal differs from the previous submission (e.g., different phase, modified scope, etc.)

This project builds off the successful work of the previously submitted and funded Wenatchee-Entiat Beaver Project. The focus is to continue landowner assistance, beaver relocation, and installation of beaver dam analogs in new stream reaches. We propose, over the course of a two-year period, to assist 10-20 landowners, relocate 20-30 beavers, and install 80-100 BDAs. Through these three beaver-powered restoration techniques we will restore and conserve important natural stream and habitat processes, such as pool quality and quantity, floodplain reconnection, late season flow and wildfire resiliency.

6. *What category is the project?

Restoration

7. *What project phase(s) are proposed for completion?

Construction

8. Is your project within a completed (or soon-to-be completed) Reach Assessment or other type of assessment (e.g., Rapid Site Assessment, other)?

Yes, multiple assessments.

9. *Which limiting factors does the project propose to address?

Flow - Summer Base Flow

Food - Food Web Resources

Off-Channel - Floodplain

Off-Channel - Side-Channels

Pool Quantity & Quality

Pools - Deep Pools

10. *Which life stages will the proposed project address?

Summer Rearing

Winter Rearing

11. *Freshwater Benefits - To what extent will your project improve survival, capacity and/or distribution for target species at the project scale?

Proposed project activities will occur in multiple watersheds and, in the case of beaver dam analogs (BDAs), at a multi-reach or watershed scale. Survival at all life stages will be enhanced through habitat creation, water quantity/quality improvement, and increased habitat access. Specifically, research has shown beavers to support the following habitat components that support survival, capacity and/or distribution of target species:

1. Beaver ponds retain surface water, store ground water, and elevate water tables to enhance base flows and promote aquifer recharge. (Naiman, Johnston and Kelley, 1988)
2. Ponds offer habitat for salmonids and other aquatic/terrestrial species including invertebrate food sources. (Pollock et al., 2004)
3. Beaver dams and BDAs increase stage to aggrade incised streams, reconnect streams with floodplains, and create critical off-channel habitat. (Bouwes, et al., 2016)
4. Beaver activities attenuate flooding and sediment transport. (Rosell and Parker, 1996)
5. Beaver habitats create a natural fire break, riparian vegetation fire resistance and refugia creation. (Fairfax and Whittle, 2020)
6. Beavers recruit woody debris to the stream system. (Orr, et al., 2020)

A recent study of coho salmon production in the Stillaguamish River basin found that a reduction in beaver ponds and other slow-moving water habitats limited the smolt production potential in both summer and winter habitat (Pollock et al., 2004). Bouwes et al. (2016) also found that beaver activities and beaver dam analogs lead to a “significant increases in the density, survival and production of juvenile steelhead without impacting upstream and downstream migrations”. We anticipate all of these beaver-powered freshwater benefits to lead to improved survival, capacity and distribution of target species in our project area.

12. *Temporal Effect - Briefly describe how and to what extent the project would promote natural stream/watershed process consistent with reach-scale geomorphology?

Research surrounding beaver-powered restoration shows that beaver create complex stream habitats with increased water quality and overall healthy watersheds (Naiman, Johnston and Kelley, 1988; Bouwes, et al., 2016; Orr, et al., 2020). As outlined in our response to question 11, beaver-powered restoration leads to the promotion of numerous stream processes. With the loss of beavers on the landscape the natural systems supported by this species have been degraded, such as pool quality/quantity, floodplain and off-channel habitat connections and riparian habitat quality. For example, the 2019 Upper Wenatchee Pilot Project: Aquatic Habitat Assessment and Restoration Strategy Report found the upper watershed contained at risk or poor pool quality/quantity, reduced floodplain connectivity and increased duration of low flow conditions; these are all natural stream processes that can be restored through beaver-powered restoration and the reestablishment of beavers on the landscape.

13. Temporal Effect - How long will it take for the benefits of the project to be realized?

1-10 years

14. Temporal Effect - How long will the restoration action and its benefits persist?

>10 years

15. Temporal Effect - What level and/or interval of maintenance is anticipated? What is the plan for any anticipated maintenance?

Beaver-powered restoration is built on active adaptive management practices. Just as a natural beaver dam is meticulously maintained by the animal, so too do we maintain and adjust our beaver dam analogs as natural stream processes begin to reestablish themselves. Our plan following BDA installation is to regularly (at least quarterly) revisit the sites to determine the need for maintenance and adaptive management. Beaver relocations are also regularly monitored for success, including pre-release site evaluation, and at least three post-release site visits.

16. Methods - Briefly describe the potential (for design) or proposed restoration methods and how they will achieve project objectives.

Over the course of a two-year period the project proposes to assist 10-20 landowners, relocate 20-30 beavers, and install 80-100 BDAs.

The project offers landowner assistance that encourages beaver co-existence so that the ecosystem benefits currently being provided by beavers for the stream systems can continue to be realized. This effort includes site assessments, tree caging and painting and flow device installations. When this is unsuccessful, we will utilize beaver relocation to move the beavers to upstream in the watershed where their ecosystem benefits can continue to promote healthy streams in our watershed. Beavers will be relocated in pairs and/or family-units to increase the success of reestablishment. Based on linear beaver colony densities reported in the literature (Scrafford et al. 2018; Cox and Nelson, 2009; Boyce, 1980; Busher et al. 1983; Busher et al. 1983) we anticipate that for every relocated beaver family they have the potential to treat 0.9 – 1.6 km of stream with ecosystem benefits (instream habitat).

Lastly, we will utilize low-cost processed based restoration techniques, such as beaver dam analogs (BDAs), to restore natural stream processes. Based off Hafen (2017) we estimate that with BDA installation we can increase surface water storage by a range of 0.11 – 0.3 acre/ft, dependent on dam height. Using prioritization based on fish presence and ecological concerns and the Upper Columbia Beaver-Powered Restoration Decision Support System (DSS) we have narrowed the potential BDA site locations to the following list. Site visits will be conducted this spring/summer and at a minimum two stream stretches will be selected for BDA installation. All potential BDA sites will be presented to the Tributary Committee for approval prior to implementation.

Note: Identified by Watershed, Assessment Unity, Tributary

1. Entiat, Lower Entiat, Roaring
2. Entiat, Mad, Mainstem below Tillicum
3. Entiat, Mad, Tillicum
4. Entiat, Upper-Middle, Mud
5. Wenatchee, Chiwawa, Brush
6. Wenatchee, Chiwawa, Minnow
7. Wenatchee, Upper Wenatchee, Skinny

All three elements of this project harness beaver-powered restoration so that we can achieve our objective of restoring stream systems for salmonid species. Specifically, an increase in

pool quality/quantity, reconnection of floodplains, flow augmentation and storage and landscape resiliency to wildfire.

1. *What is the landownership?

Both Private and Public

2. *Have you secured landowner participation in or acceptance for this project?

Yes

*Please explain

Through the first three years of the project we have established a relationship with both private and public landowners. We anticipate working with private landowners for beaver issue assistance and relocation efforts. On public lands, primarily US Forest Service Lands, we will continue our relocation efforts and beaver dam analog implementation. As we move forward in selecting BDA site locations we will coordinate and receive approval from appropriate landowners. We also have a strong established partnership with the Leavenworth National Fish Hatchery (LNFH) as the beaver acclimation facility that will continue forward.

3. Describe any land owner requirements (e.g., design elements, right-of-ways, access agreements, liability waivers, etc.) and if/how they could affect the project

Approval from landowners and permitting will be required prior to BDA implementation, this could affect the project by delaying the season of implementation.

4. Will the project raise potential concerns for interest groups (e.g., recreational users) or the community at large (including upstream/downstream/ adjacent landowners)?

We do not anticipate there being any potential concerns for interest groups. In the first three years of the project we have successfully received support from landowners, local organizations, federal agencies, and the public. We plan to leverage this diverse support to ensure we continue to provide a community focused project that incorporates interest groups to reduce any concerns that we have not anticipated.

5. Who will have the responsibility to manage and maintain the project? What is the responsibility of current or future landowners?

Relocated beavers will be marked/tagged. Trout Unlimited and its restoration partners will be responsible for managing animals relocated by the project. Trout Unlimited and its restoration partners will also be maintaining and monitoring BDA installations.

6. Please describe the risk of failure associated with this project.

Risk of complete failure is negligible. BDA installations are a semi-engineered approach with relatively certain outcomes as shown with our previous BDA implementation. Beaver relocations are less predictable but in our first three years of the project we have made strides in successfully tracking and monitoring released beavers, we also hope to be able to partner with university researchers in the future to help us better understand the outcomes of released beavers.

7. Is there any public outreach planned during and/or after implementation? Does the project build community support for salmon recovery efforts?

Community engagement is a vital component to the success of this project. Outreach has occurred through multiple volunteer opportunities, internship positions, and coordination with other local organizations and entities. A strategic community engagement plan is currently being developed and will be implemented concurrently with this proposed project. As our beaver acclimation facility, the Leavenworth National Fish Hatchery provides an unparalleled outreach opportunity to

build community support for salmon restoration and resource conservation. Over the last year we have increased our community outreach through multiple social media outlets (Facebook and Instagram) and articles through local news outlets. We have also increased our outreach to local landowners through a Chelan County wide virtual landowner event where we created a WEB project video.

8. Does the project represent an opportunity for economic benefit? How much benefit does the project create for the dollars invested?

Yes. Materials, equipment, and contractors will be procured locally as much as possible. Importantly, project activities will result in greater resilience to drought (water storage), flood (stream power reduction and flood mitigation), wildfire (wetland buffers and green firebreaks), erosion (sediment storage), and other natural conditions that impact our economies and ways of life. This is a low-cost, large-scale project. The ecological, social, and economic benefits achieved for the price make it extremely cost effective.

9. Describe any partnerships, their experience, and types of contributions supporting the project.

Throughout the first three years of the project we have built strong partnerships to support our beaver-powered restoration work. We have in-kind support (BDA designs and other technical support, relocation program assistance, and labor) from the US Fish and Wildlife Service and other regional restoration partners such as Cascadia Conservation District and Cascade Fisheries. We continually have volunteer support from the Wenatchee Valley Fly Fishers group and landowner and facility support from US Fish and Wildlife and US Forest Service. As beaver restoration work grows, we have partnered and learned from other beaver projects both within and outside of Washington State and other Trout Unlimited projects across the United States implementing similar beaver-powered restoration projects. All these partnerships have provided expertise to support the growth and continuation of the WEB project. We are continually investigating other ways to involve the community and other partners in our work and anticipate further partnerships into the future.