



## Contact Information

# 2025 Upper Columbia Regional Project Pre-Application

\* Pre-applications (SRFB & Monitoring) due March 12, 2025 (COB)

\*Complete SRFB applications due in PRISM April 18, 2025 (COB)

\*Complete Monitoring applications due in PRISM May 1, 2025 (COB)

\*Revised SRFB proposals due in PRISM May 27, 2025 (COB)

\*Final revised SRFB & Monitoring applications due in PRISM June 23, 2025 (noon)

<b>Project Title</b>	Roaring Creek Floodplain Reconnection Project
<b>Sponsor</b>	Cascadia Conservation District
<b>Primary Contact</b>	Mark Ingman
<b>E-Mail Address</b>	marki@cascadiacd.org

## Project Summary

**Please provide a description or summary of the proposed project, including project goals. The goal of the project should be to solve identified problems by addressing the root causes. Then clearly state the desired future condition.**

This project will treat and reconnect the lowest 1.4 miles and over 40 acres of Roaring Creek floodplain that is located on Forest Service lands (RM 1.4-2.8). Grazing, timber harvest, uncharacteristic/catastrophic fire (2014, 1988), and historic extirpation of beaver are some of the leading causes of channel incision, floodplain disconnection with the stream, reduced baseflows, and simplification of the stream network. The project design separates the treated areas into three project segments (upper, middle, and lower), each with different treatment methods and goals. By aggrading and recovering the streambed, reconnecting floodplains, raising groundwater tables, increasing structural wood in the channel and system, increasing habitat complexity, and off channel habitat, the project will substantially benefit ESA threatened steelhead for multiple life stages. The reference reach is the middle reach, which has little incision, considerable side and off channel habitat, beaver activity, documented steelhead redd (primary redds location in treatment area), and extensive riparian lateral extent (over five times the riparian width of the lower and upper floodplains that are disconnected from the influence of the active channel (incised, entrenched).

**What are the project objectives? Objectives support and refine biological goals, breaking them down into small steps. Objectives are specific, quantifiable actions the project will complete to achieve the stated goal. Each objective should be SMART (Specific, Measurable, Achievable, Relevant, and Time-bound).**

**Note: This exact question is included in the PRISM application. Example format: The project seeks to address [specify limiting factor(s)] for [limiting life stage(s)] by [specific actions proposed] to create an estimated [include specific target metrics, as described below] upon implementation in [estimated year].**

The objective are directly aligned and correspond to the limiting factors for Roaring 03 and 04, respectively, as follows:

1) baseflow (Score 1 red,1 red) , 2) cover-wood (3 yellow,1 red) , 3) off channel/side channel (3 yellow, 1 red), and 4) course substrate (3 yellow both reaches).

As such, using the same numbering as above limiting factors, our project objects will directly 1) benefit baseflows by raising groundwater to approaching the floodplain level and provide an anticipated delay of return to baseflows over 1.4 mile project scale (already measuring pre-project with up and downstream flow gauges per WA Ecology funded QAPP), 2) increase cover-wood through large wood additions in all treated reaches within the project (large scale wood loading), 3) provide new side and off channels through fully aggrading upper and lower reaches that are disconnect from floodplain through a combination of Stage Zero floodplain reset methods and heavy in-stream wood loading methods, and finally, 4) providing multiple flow paths and complexity to sort substrate of multiple sizes/classes (including coarse size) within the newly created, anastomosing stream network.

## Budget Request

Values MAY be duplicative and do not have to equal TOTAL anticipated budget in pre-application.

<b>Anticipated Request - SRFB Riparian Funding</b>	470,000
<b>Tributary Committee - Anticipated or Actual</b>	330000
<b>Anticipated or Actual Other Funding</b>	220,000
<b>Anticipated TOTAL Budget</b>	1,020,000

**Other Funding Source(s), please note if funding is anticipated or actual.**

USFS Roaring Creek Floodplain Enhancement - \$220,000, actual/secured

## Project Location

<b>Briefly describe the location of the project</b>	The project will occur in Roaring Creek starting at RM 1.4 and ending at RM 2.8.
<b>Latitude (decimal degrees)</b>	47.682246
<b>Longitude (decimal degrees)</b>	-120.361772
<b>Project subbasin</b>	Entiat
<b>Entiat Assessment Unit(s)</b>	Roaring Creek

**Does the proposed project span multiple assessment units?**

No

**Reach(es) Name**

Roaring 03

**Identify the reach(es) priority/ reach ranking. Note: If the project involves work in multiple reaches, select "Multiple" and include details in the text box that will appear below. Please reference the Prioritization Web Map: <https://prioritization.ucsrb.org/>.**

Rank 2

Unranked (not a priority or missing data)

Multiple reaches (provide details below)

**Please detail the reach-ranking of the reaches below**

Roaring Creek 02 is listed as Rank 2 for steelhead recovery. The reach is mistakenly classified as confined on account of error in the FS "valley confinement algorithm." Instead, there are two large floodplains in the project extent that are flat and extend 16 bankfull widths before reaching the valley wall. We contest this moderate ranking for Roaring 02, because it has documented steelhead redds, and our survey crew document both adult steelhead above the project area as well as active redds between RM 1.0 and 2.8. We request an independent review of the Roaring 03, on the 1-7 scale. Baseflow as a limiting factor: the Trout Unlimited's Roaring Creek Flow Enhancement Project (SRP/PRISM #13-1337), verified a 1.5 CFS improvement in flow for Roaring Creek from RM 1.3 and downstream, which is right below the project area (Roaring 01-02).

**Project Information**

**1. What species will the project benefit?**

Spring Chinook

Steelhead

Summer Chinook

Coho

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

Instream Flow

Instream Habitat (Includes Floodplain & Off-Channel Reconnection)

Riparian Habitat

**Instream Flow: Reporting Code**

Change in water flow

**Instream Habitat: Reporting Code**

Total miles of instream habitat treated

Miles of off-channel stream created or connected

Acres of channel/off-channel connected or added

Number of structures placed in channel

Pools created through channel structure placement

**Riparian Habitat: Reporting Code**

Total riparian miles streambank treated

Total riparian acres treated

4. Does this project already exist in Salmon Recovery Portal or PRISM?

No

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

No

6. What category is the project?

Restoration

If applicable, what is the secondary project category?

N/A

Is the project eligible for Riparian Funding?

Yes

## Design and Restoration Proposals

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)?

No

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

Cover - Wood

Flow - Summer Base Flow

Off-Channel - Floodplain

Off-Channel - Side-Channels

Pool Quantity & Quality

Riparian

Riparian - Canopy Cover

10. Which life stages will the proposed project address?

Fry

Spawning and Incubation

Summer Rearing

Winter Rearing

11. Freshwater Benefits - Describe how your project will improve survival, capacity and/or distribution for target species at the reach scale?

Habitat quantity (side and off channels, inundated extent, and floodplain habitat area) will be increased.

Habitat quality will also be improved. The predominantly single thread channel will become anabranching (multi-thread) in nature post treatment, and this quality improvement will be significantly increased through installation of large quantities of structural large wood in channel in within the treated floodplain extent. We anticipate relatively fast vegetative response in the widening of the riparian corridor both through active plantings and passive natural recruitment. As a result, edge habitat will be significantly expanded.

Fish: A total of 16 steelhead redds have been documented within the treated project area during surveys conducted in 2008, 2009 and 2011. Modeled peak flows in the planned treated area of the documented redd locations indicate the potential redds have been washed out by peak flows in some years in some locations. The restoration methods will have the effect of slowing and spreading peak flows, spreading and sorting gravels, that combine to produce reduced flows and expanded spawning opportunities. An additional 13 steelhead redds were documented within Roaring Creek, downstream of the project area during the same survey years (data source: UCSRB). There is a PIT array in Roaring 01 ("RCT").

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

Restoration actions align with natural confinement patterns along of the project reach. Full floodplain treatments are proposed in the unconfined Upper and Lower reach segments. These segments have valley bottoms greater than 8 times the bankfull width and were historically depositional in nature. Through streambed raising, roughness (wood) treatment, and improved groundwater interactions, we anticipate vegetation response and development of multiple threads within 2-4 years.

The middle segment is naturally confined by colluvial and landslide deposits. The restoration approach accordingly targets and seeks to activate pocket floodplain areas with strategic low-tech and landslide-simulating wood treatments. We anticipate localized response in floodplain activation, sediment sorting, and pool development within similar timeframes.

**13. Temporal Effect - How long will it take for the project to achieve its intended response?**

1-10 years

Greater than 50 years

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

50+ years

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

The level and interval of maintenance will depend upon the reach and its corresponding treatment methods. Overall, the project sponsor has extensive direct experience with low tech process based restoration in the Upper Columbia region. In our discussions with stakeholders we have received feedback that floodplain reset ("stage 0") methods benefit significantly through adaptively managing the desired stream response through low tech process based restoration (personal communication, Paul Powers, USFS). We will be monitoring fish response (separate SRFB proposal), stream response, and riparian establishment and growth through multiple funding sources (WA Ecology -secured; other proposals in progress). The project sponsor has been successful each cycle in applying and receiving state restoration maintenance/stewardship funding through the WSCC Riparian Grant Program (RGP). WSCC RGP can support both riparian maintenance and BDA/Low Tech maintenance. We foresee low tech restoration based adaptive management for 10 years following the implementation, and then less maintenance thereafter. The potential for beaver being a primary actor in ongoing maintenance and restoration is relatively high given the signs of both historical and recent beaver activity in Roaring Creek (above the project area, and within the project area).

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

Upper Reach (naturally unconfined, high incision): The upper reach is naturally unconfined (valley bottom >8x channel width) but incised 4-6 feet from its historical floodplain level. This reach has proposed Stage 0 (streambed) raising restoration techniques. The lower end of this reach will include a transitional roughened channel meet grade with the middle reach.

Middle Reach (partially confined with localized "pocket" floodplains): The middle reach is naturally confined by hillslope and colluvial deposits. These deposits create localized floodplain pockets that have mixed to low connectivity. The proposed restoration actions will include low-tech structures to create localized complexity and connectivity in areas where riparian disturbance is undesirable. Restoration

actions will also include landslide-simulating logjams to activate floodplain areas where equipment access is feasible.

Lower Reach (moderate-high incision): The lower reach has similar attributes to the upper reach, with a naturally wide valley bottom and high incision. The proposed restoration actions include Stage 0 (stream-bed raising) approaches to connect floodplains, reduce stream power, improve groundwater interactions, and promote riparian regrowth.

**17. If the project is eligible and applying for Riparian Funding, does the project have in-stream components? If so, briefly describe those components, how they support riparian plant survival and/or natural regeneration, and why they are necessary for the success of the riparian habitat elements of the project.**

Yes, the project is eligible for Riparian Funding. The in-stream components will raise the bed grade to a full floodplain reset (Stage 0) level in the upper and lower reaches where this method is appropriate and most needed. This means aggrading stream bed incision that is as much as 6 feet below the floodplain in its current and unrestored state. Stage Zero and large wood additions will significantly raise groundwater levels, delay the annual return to baseflows, that will invariably rewet the floodplain for robust riparian growth and establishment in which a response is expected in the 2-4 year time interval. The project will benefit riparian vegetation both passively through raising groundwater levels, but also actively through a riparian planting plan encompassing the upper, middle, and lower reaches.

## Assessment Proposals

## Protection Proposals

## Monitoring Proposals

## Project Risk and Economic Benefits

1. What is the landownership? Forest Service

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

### Please explain

The landowner is the original project implementer and co-funder of the project and the Forest Service has partnered with Cascadia CD to implement the project. Cascadia CD has received an award from the Forest Service to implement the design and the construction (partial construction award as match). The Forest Service is reviewing all design milestones of the project and co-leading permitting for the project with Cascadia CD. The Roaring Creek Floodplain Enhancement project is named as part of the USFS Mad Roaring Mills Landscape Restoration NEPA of 2018, finalized in 2023.

**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**

The Forest Service has provided match funding for the design, and partial funding for construction. The Forest Service is reviewing the 30%, 60% and final design stages. There is Forest Service gate and primitive road that leads to the project area. The design team has been in conversation with the Forest Service about widening at least one part of the road in order to transport large quantities of wood to the staging areas.

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

There is relatively low/infrequent use of Roaring Creek and the primitive roadway is mostly out of the floodplain and unaffected by the restoration methods. There is some occasional dispersed camping

points in the treated area that were unpermitted and may be better displaced than encouraged. It is a relatively low recreational use adjacent and along the stream. Additionally, this project was part of the MRM NEPA that was finalized in 2023. The project sponsor organizes the Entiat Watershed Planning Unit and utilizes this and other venues to present project updates and receive feedback.

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

Cascadia CD will have the responsibility of managing the project for at least 10 years, which is the same duration we require as a district for all projects. The current and future landowners will remain the Forest Service. The Forest Service provides input at each design stage as well as funding for both design and construction (funding serving as match). The design project is on the Forest Services work plan for 2025. Cascadia CD looks forward to continuing its partnership with the Forest Service to complete the design, implement, and continue ongoing maintenance.

**6. Are other projects being proposed immediately upstream or downstream of worksite?**

No

**7. Please describe the risk of failure associated with this project.**

This project benefits from utilizing process based restoration at the full floodplain scale. In this way, it is utilizing natural processes coupled with engineering design and modeling. We have collected input from multiple agencies and stakeholders before and during the design process and we continue to take in feedback at every consequent design milestone. We have collected considerable field and remote sensing data, reviewed existing datasets and records, and consulted with outside experts who have experience with the same type of full floodplain projects (P. Powers, R. Flitcroft, and others, predominantly versed in full floodplain/stage 0 projects). We have intentionally focused on such risk factors as 1) grade control at the downstream location, 2) water rights – confirmed downstream users are in fact now groundwater users, 3) geophysical subsurface transects, 4) streamflow gauges upstream and downstream of treated project area, 5) limiting impacts to wetlands and sensitive species, and other leading risk considerations. The project sponsor is part of a CRM, which leverages our pooled resources among staff, community relationships, low tech processed based program, Wenatchee-Entiat Beaver Project, and other capabilities for all of our projects. This creates a level of redundancy and a depth of resources.

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

The Roaring Creek Floodplain Reconnection project is included in the “Mad Roaring Mills Landscape Project” as one primary component sites of the public NEPA process (See “Objective 3 – restore floodplain connection” <https://www.fs.usda.gov/project/okawen/?project=59963>). The NEPA was finalized in July of 2023. We continue to provide landowner outreach about this award through direct engagement with local landowners as well as through public venues such as the Entiat Watershed Planning Unit, a quarterly public meeting facilitated by Cascadia Conservation District. There has been past and recent outreach with downstream landowners on Roaring Creek regarding restoration activities.

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

The project will result in funds being invested into the local economy in the form of subcontracts, payroll, materials, supplies, fuel. The project sponsor is mindful of sourcing materials locally and regionally whenever possible. The Entiat watershed is an important recreation location in North Central Washington. The reconnection of over a mile of floodplain along Roaring Creek will not only benefit threatened steelhead and other native fish, but it will benefit wildlife on a watershed scale. This benefits extend to hikers, birders, and many other forms of recreation. Water scarcity is a real concern going forward and the slowing of water leaving Roaring Creek benefits the watershed at every location downstream in terms of the availability of water resources. While we do not have a calculation of dollars spent, we do feel that our ratio of dollars spent per distance and area restored is perhaps the best ratio of dollars invested for linear stream and acres restored (\$1M for 1.4 miles and over 40 acres)!

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

Cascadia CD is part of a coordinated resource management (CRM) team with Cascade Fisheries and Trout Unlimited. Trout Unlimited initiated several BDAs with the Forest Service on Roaring Creek to arrest several head cuts for fish passage. In 2023 Cascadia CD assisted Trout Unlimited in installing several beaver dam repairs upstream of the project area. Recently Cascadia CD and Cascade Fisheries collaborated on project development of other sites on Roaring Creek. Cascadia CD will undoubtedly utilize the CRM for assistance during all phases of implementation (such as Low Tech PBR components), maintenance, and monitoring.

The US Forest Service has been developing the Roaring Creek Floodplain Reconnection project since around 2018 that coincides with the Mad Roaring Mills Landscape Project (NEPA). The Forest Service received funding for landscape scale projects and awarded Cascadia CD funding for design and implementation of the project. The Forest Service team includes fisheries biologists, hydrologist, botanist, archeologist, and the ranger. We have also consulted with a member of the USFS Pacific Northwest Research Station. Concurrent to the Forest Service's award, the WA Department of Ecology provided funding for design and monitoring of the Roaring Creek Reconnection Project. The WA Ecology has reviewed and approved streamflow monitoring of the project, which includes streamflow measurements above and below the project site. Our consultant design team includes Lichen Land and Water as principal, Nick Legg PG and Dominique Shore (geomorphologist), Gabe Williams, PE, Resource Specialists Inc. as lead engineer, Lauren Zatkos, Wetland Scientist, W2R, and AJ Jones, PE, ESCM, Wolf Water Resources. The consultant design team has extensive experience with full floodplain restoration projects in the Pacific Northwest to include full floodplain and Stage 0 restoration. The project sponsor, Mark Ingman has a MS in Water Resources and over ten years of experience in natural resources project management. Cascadia CD also has its own archeologists on staff for cultural resources inventories.

## Optional Section - Preparation for PRISM (SRFB applications only)

The following questions are identical to the questions RCO requires in the PRISM application for SRFB projects. If desired, sponsors can complete associated questions early and copy responses into PRISM during the "Complete Application" phase due on April 18, 2025.

\*please note, this section is not applicable for Monitoring proposals

Do you want to review and/or pre-populate PRISM questions?

No

## Supporting Documents

[Upper Columbia Process Guide 2025](#)

[SRFB Manual 18 \(2025\)](#)

[RCO Application Resources \(2025\)](#)

## PROJECT: 25-1232 REST, ROARING CREEK FLOODPLAIN RECONNECTION PROJECT

Sponsor: Cascadia Conservation District Program: Salmon State Riparian Status: Application Submitted

### Parties to the Agreement

#### PRIMARY SPONSOR

Cascadia Conservation District

**Address** 1350 McKittrick St, Suite B

**City** Wenatchee **State** WA **Zip** 98801

**Org Type** District-Conservation

**Vendor #** SWV0024685-00

**UBI**

**Date Org created**

**Org Notes**

[link to Organization profile](#)

Org data updated

#### SECONDARY SPONSORS

No records to display

#### MANAGING AGENCY

Recreation and Conservation Office

#### LEAD ENTITY

Upper Columbia Salmon Rcy Bd L

#### QUESTIONS

#1: List project partners and their role and contribution to the project.

USFS - funder for design & partial construction, landowner, permitting support  
WA Ecology - funder for design and some monitoring

### External Systems

#### SPONSOR ASSIGNED INFO

**Sponsor-Assigned Project Number**

**Sponsor-Assigned Regions**

#### LINK AN EXISTING SRP PROJECT

Unlink

25-1232, Roaring Creek Floodplain Reconnection Project,

# Project Application Report - 25-1232

## Project Contacts

Contact Name Primary Org	Project Role	Work Phone	Work Email
<u>Amee Bahr</u> Rec. and Conserv. Office	Project Manager	(360) 867-8585	<a href="mailto:Amee.Bahr@rco.wa.gov">Amee.Bahr@rco.wa.gov</a>
<u>Mark Ingman</u> Cascadia Conservation District	Project Contact	(509) 906-1545	<a href="mailto:marki@cascadiacd.org">marki@cascadiacd.org</a>
<u>Ariel Edwards</u> Upper Columbia Salmon Rcy Bd L	Lead Entity Contact	(208) 540-2691	<a href="mailto:ariel.edwards@ucsr.org">ariel.edwards@ucsr.org</a>

## Worksites & Properties

### # Worksite Name

#1 Roaring Creek Floodplain Reconnection

Restoration	Property Name
✓	Roaring Creek Floodplain Reconnection

# Project Application Report - 25-1232

## Worksite Map & Description

### Worksite #1: Roaring Creek Floodplain Reconnection

#### WORKSITE ADDRESS

Street Address 47°41'11.5"N 120°20'51.7"W  
City, State, Zip

## Worksite Details

### Worksite #1: Roaring Creek Floodplain Reconnection

#### SITE ACCESS DIRECTIONS

From Wenatchee, WA: Take US-97 ALT N to Entiat River Rd in Entiat, WA. Continue on Entiat River Rd for 7.5 miles heading upriver. Turn left onto Roaring Creek Rd, travel 1.8 miles and pass through USFS gate, arrive at lower end of project area, Latitude and longitude for downstream treatment area and parking area is 47°41'11.5"N 120°20'51.7"W.

#### TARGETED ESU SPECIES

Species by ESU	Egg Present	Juvenile Present	Adult Present	Population Trend
Steelhead-Upper Columbia River, Entiat River, Threatened	✓	✓	✓	Declining

#### Reference or source used

Upper Columbia Spring Chinook and Steelhead Recovery Plan

#### TARGETED NON-ESU SPECIES

Species by Non-ESU	Notes
Cutthroat	Weslope cutthroat documented above project area in Tamarack Creek tributary.

#### Questions

#1: Give street address or road name and mile post for this worksite if available.

Project linear extent along stream in vicinity of Roaring Creek Road: 47.682246  
-120.361772 (downstream point) and 47.677732, -120.371776 (upstream point)

# Project Application Report - 25-1232

## Project Location

### RELATED PROJECTS

#### Projects in PRISM

PRISM Number	Project Name	Program Name	Current Status	Relationship Type	Notes
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No related project selected

#### Related Project Notes

### Questions

#1: Project location. Describe the geographic location, water bodies or habitat types, and the location of the project in the watershed, i.e. nearshore, tributary, main-stem, off-channel, etc.

The project is located between river mile 1.4 and 2.8 on Roaring Creek on USFS property (1.4 total miles of stream) and 40 acres of aquatic, riparian, and floodplain habitat. Roaring Creek is a significant fish bearing tributary of the Entiat River.

#2: How does this project fit within your regional recovery plan and/or local lead entity's strategy to restore or protect salmonid habitat? Cite section and page number.

The assessment unit is ranked #2 for steelhead restoration and #2 for steelhead protection.

#3: Is this project part of a larger overall project?

No

#4: Is the project on State Owned Aquatic Lands? Please contact the Washington State Department of Natural Resources to make a determination. [Aquatic Districts and Managers](#)

No

## Property Details

Property: Roaring Creek Floodplain Reconnection (Worksite #1: Roaring Creek Floodplain Reconnection)

✓ Restoration

#### LANDOWNER

Name	US Forest Service (USFS)
Address	215 Melody Ln
City	Wenatchee
State	WA Zip 98801
Type	Federal

#### CONTROL & TENURE

Instrument Type	Landowner Agreement
Timing	Existing
Term Length	Fixed # of years
# Yrs	3
Expiration Date	01/01/2028
Note	

This is time existing on the USFS-CCD contract where USFS has awarded CCD the funding to design and implement the project on USFS land.

# Project Application Report - 25-1232

## Project Proposal

### Project Description

This project will treat and reconnect the lowest 1.4 miles and over 40 acres of Roaring Creek floodplain that is located on Forest Service lands (RM 1.4-2.8). Grazing, timber harvest, uncharacteristic/catastrophic fire (2014, 1988), and historic extirpation of beaver are some of the leading causes of channel incision, floodplain disconnection with the stream, reduced baseflows, and simplification of the stream network. The project design separates the treated areas into three project segments (upper, middle, and lower), each with different treatment methods and goals. By aggrading and recovering the streambed, reconnecting floodplains, raising groundwater tables, increasing structural wood in the channel and system, increasing habitat complexity, and off channel habitat, the project will substantially benefit ESA threatened steelhead for multiple life stages.

### Project Questions

#1: Problem statement. What are the problems your project seeks to address? Include the source and scale of each problem. Describe the site, reach, and watershed conditions. Describe how those conditions impact salmon populations. Include current and historic factors important to understand the problems.

Roaring Creek is identified as a priority for steelhead restoration and protection by the Upper Columbia Salmon Recovery (UCSRB, 2021). The reach has a documented spawning use in WDFW redd surveys and is categorized as a high priority assessment unit (AU) for adult migration, spawning, fry colonization, and summer rearing. The project area spans Roaring Creek Entiat Reaches 02 & 03. Low summer base flows are listed as an unacceptable limiting factor. Channel modification, instream enhancement, and upland management are identified as action categories.

The project reach currently suffers from the effects of relatively extreme incision and disconnection of the creek from its floodplain (Figure 1). For a vast majority of the floodplain segments, the creek is entrenched below its historical floodplain level by 5-6 feet, which exceeds the creek's average bankfull depth (~1.5 feet) by a factor of three. The creek sits in an incision trench typically narrower than 20 feet wide, which is less than 2 times wider than the creek's bankfull width of 13 feet. These basic statistics indicate the degree of entrenchment and diminished floodplain connection.

Within the incision trench, the creek has developed little adjacent (inset) floodplain since the original incision. Vegetation within the incision trench is young deciduous trees (<6 inches diameter). These patterns indicate the incision likely occurred within the post-settlement period, likely from beaver trapping/removal and localized land-use impacts including historical homesteading.

As a result of the incision, the stream is primarily single-threaded with little off-channel habitat or floodplain connectivity. The creek has an observed lack of large wood and pools and naturally has elevated stream power as a result of the entrenchment.

## Project Application Report - 25-1232

#2: Describe the limiting factors, and/or ecological concerns, and limiting life stages (by fish species) that your project expects to address.

The objectives are directly aligned and correspond to the limiting factors for Roaring 03 and 04, respectively, as follows:

1) baseflow (Score 1 red, 1 red), 2) cover-wood (3 yellow, 1 red), 3) off channel/side channel (3 yellow, 1 red), and 4) coarse substrate (3 yellow both reaches).

Using the same numbering as above limiting factors, our project objects will directly 1) benefit baseflows by raising groundwater to approaching the floodplain level and provide an anticipated delay of return to baseflows over 1.4 mile project scale (already measuring pre-project with up and downstream flow gauges per WA Ecology funded QAPP), 2) increase cover-wood through large wood additions in all treated reaches within the project (large scale wood loading), 3) provide new side and off channels through fully aggrading upper and lower reaches that are disconnect from floodplain through a combination of Stage Zero floodplain reset methods and heavy in-stream wood loading methods, and finally, 4) providing multiple flow paths and complexity to sort substrate of multiple sizes/classes (i.e. coarse substrate, gravel sorting) within the newly created, anastomosing stream network.

#3: What are the project goals? The goal of the project should be to solve identified problems by addressing the root causes. Then clearly state the desired future condition. Include which species and life stages will benefit from the outcome, and the time of year the benefits will be realized. **Example Goals and Objectives**

The following goals were identified through discussion with the project team. In recognition that realistic SMART (Specific, Measurable, Achievable, Relevant, and Time-Bound) objectives depend on the chosen alternative, detailed objectives have not been developed at this juncture.

1. Floodplain Ecosystem Function - The Roaring Creek floodplain is degraded due to historical impacts that have caused the stream to incise and disconnect from its floodplain.
2. Target Fish Species Benefits - The reach is identified as critical habitat for steelhead, with adult migration, spawning, and rearing uses.
3. Streamflow Improvement (baseflow) - Roaring Creek is known to go dry on an intermittent basis in the reaches downstream of the project area.
4. Value - The project seeks to maximize value from public funding.
5. Learning - The benefits of headwater stream restoration are often described qualitatively but rarely quantified with regionally specific studies.

## Project Application Report - 25-1232

#4: What are the project objectives? Objectives support and refine biological goals, breaking them down into smaller steps. Objectives are specific, quantifiable actions the project will complete to achieve the stated goal. Each objective should be SMART (Specific, Measurable, Achievable, Relevant, and Time-bound). [Example Goals and Objectives](#)

1. Floodplain Ecosystem Function - *1. Floodplain Ecosystem Function* - The project seeks wholesale and sustainable ecosystem uplift through improved connectivity, improved riparian function, reduced stream power, improved sediment retention, and improved water storage and

quality. Objective focus areas as follows: A) Existing beaver presence/use sustained and expanded, B) floodplain reconnection for riparian recovery of historical proportions and function, and C) improved ecosystem function and connectivity are expected to provide increased capacity for steelhead using the treated reaches.

2. Target Fish Species Benefits - *improve productivity for steelhead, addressing known limiting factors related to instream complexity, floodplain connectivity, and limited baseflow.*

3. Streamflow Improvement - Roaring Creek is known to go dry on an intermittent basis in the reaches downstream of the project area. *The project seeks to raise groundwater tables and seasonal water storage to improve streamflow and connectivity within the reach and downstream.*

4. Value - The project seeks to maximize value from public funding. *For the purposes of this project, value conceptually considers benefits relative to costs as well as the durability (longevity) of anticipated benefits.*

5. Learning - *the project will serve as a regional pilot for full-floodplain restoration in a system with active beaver use and active wolf presence.*

#5: Scope of work and deliverables. Provide a detailed description of each project task/element. With each task/element, identify who will be responsible for each, what the deliverables will be, and the schedule for completion.

Task 1. Complete permitting and finalize design, CCD & Lichen Land & Water, Winter 2025-26.

Task 2. Construction specifications, bidding, CCD & Lichen, Spring 2026

Task 3. Implementation, pending multiple factors, CCD & Lichen, 2026/2027.

Task 4. Asbuilts and begin maintenance & adaptive management, CCD & Lichen, 2026/2027

Task 5. Bi-annual reporting and final report, CCD, throughout life of contract.

#6: What are the assumptions and physical constraints that could impact whether you achieve your objectives? Assumptions and constrains are external conditions that are not under the direct control of the project, but directly impact the outcome of the project. These may include ecological and geomorphic factors, land use constraints, public acceptance of the project, delays, or other factors. How will you address these issues if they arise?

The USFS contract with Cascadia CD to implement this project named in the Mad Roaring Mills EA/NEAP (2021). As a federal agency, the USFS is experiencing funding and capacity challenges. As a result, Cascadia CD and the design team have addressed both project risks as follows: 1) funding - secured match from the WA Department of Ecology Streamflow program and CCD may apply for WSCC Riparian Grant Program funding as match at a later date if necessary (CCA funding for CDs to implement riparian projects), and 2) permitting - proactively built upon the existing permitting work of the completed NEPA by consulting with WA Ecology for wetland delineations, the WDFW, the USFWS, and other agencies so that they are aware of the project and able to assist as necessary throughout the permitting process.

Riparian success: we are excited about this riparian project to dramatically increase the riparian lateral extent and ecosystem function through raising the groundwater levels quickly and substantially. We are likewise interested to see the relatively recent presence of wolves (documented in 2021; source WDFW presentation to Entiat Watershed quarterly meeting 2024), will have in restoring the ecosystem.

## Project Application Report - 25-1232

#7: How have lessons learned from completed projects or monitoring studies informed this project?

Lichen Land and Water ranked extremely high in the contractor bidding process on account of their extensive experience in full floodplain projects. Lichen's team includes advisors additionally experienced in Stage 0 techniques (primarily in Oregon) as well as wood loading, low tech process-based restoration, USFS land interactions, and wetland/regulatory compliance. Their combined list of stage 0 techniques includes their leadership in restoration for the following projects: Desolation Creek, Wilson-Haun (Wallawa River), Tucannon River PA 27/28, Steigerwald Floodplain (Columbia River), Finn Rock Reach P1 (McKenzie River), Crane Creek (Malheur River), Summit Creek (Malheur River), SF Toutle Headwaters, Whychus Creek, and Big Creek. Cascadia CD brings with it over 15 years of combined staff experience managing stream and river scale restoration projects and more recently, their low-tech process based restoration program (LTPBR) that in just the last four seasons has installed over 450 structures and treated over 3.5 miles of continuous stream in 7 HUC12 scale watersheds within the Wenatchee and Entiat subbasins.

#8: Describe the alternatives considered and why the preferred was chosen.

The design alternative memo is attached that explains at length the reason for selection of design alternative three. Roaring Creek is unique as a project area in that it lacks infrastructure within the valley bottom extent (low risk to infrastructure). Alternatives 1 and 2 do not provide as much biological uplift nor on the same timetable (alternatives 1 and 2 may take decades or even more than centuries to achieve comparable gains, and the gains are not as assured as those of Alternative 3). This is partially on account of the observed low sediment supply in the system. Alternative 3 provides by far the most biological uplift without an increase in risk to infrastructure and is the most cost effect. While alternative 3 utilizes Stage 0 techniques to treat the primary channel incision in the upper and lower reaches, it is "hybrid" in that it uses fewer intensive techniques to enhance the ecosystem functions of the middle reach that are fundamentally less degraded than the upper and lower reaches.

#9: How were stakeholders consulted in the development of this project? Identify the stakeholders, their concerns or feedback, and how those concerns were addressed.

This project is a named sub-project of the larger Mad Roaring Mills Landscape Restoration Project #59963, listed as "Roaring Creek Floodplain Enhancement Project." The site where comments were collected is still viewable at this site: <https://cara.fs2c.usda.gov/Public/CommentInput?Project=59963> . While this is an extensive public comment process carried out by the USFS, Cascadia CD and CRM partners have been in communication with downstream landowners on Roaring Creek and we continue to keep them updated. Additionally, the project applicant/sponsor is the Entiat Watershed coordinator, and will provide a project update to the public at the May 14, 2025 meeting. Agency stakeholder input from the USFS (biologists, ranger, hydrologist, NSAEC team), and area USFWS biologist were informally received through a site visit held last spring in 2024. Cascadia CD views stakeholder input as an ongoing and continual element of the project from beginning to completion.

#10: Does your project address or accommodate the anticipated effects of climate change?

Yes

# Project Application Report - 25-1232

#10a: How will your project be climate resilient given future conditions?

The applicant secured funding for a comprehensive Thermal IR survey of the Entiat and Mad Watersheds that includes Roaring Creek (2023 dataset). One of the most critically important cold water patches, in particular based upon its location in the lower Entiat River (warmest water is downriver), is the Roaring Creek tributary cold water patch where it confluences with the Entiat River. The Entiat River in its lower reaches average over 21 C and warmer, throughout the baseflow summer months. We are testing per the methods from Hunt et al. 2018 and funded by the WA Ecology (approved QAPP) the anticipated change to streamflow pre and post treatment, per above and below project streamflow gauges. This measurement of streamflow, along with the significant storing of water subsurface in the aquifer, is anticipated to buffer the affects of climate change and potentially enhance the cold water patch where Roaring Creek flows into the Entiat River for cold water species critical habitat.

#10b: How will your project increase habitat and species adaptability?

Our selected Alternative is the most dynamic in the level of complexity, patchiness, and heterogeneity that it provides because it returns the stream back to stage 0 conditions (anastomosing). These more so anastomosing conditions of the stream, as compared to its predominantly single thread and entrenched current state of the stream, are the originating conditions from which salmonids evolved. The most dynamic habitat conditions (Alternative 3, stage 0 techniques) represents a dramatic increase in habitat quantity and quality for cold water species, which in term allows these species to utilize the full range of their genetics so to increase their productivity and move forward on the path towards recovery.

#11: Describe the sponsor's experience managing this type of project. Describe other projects where the sponsor has successfully used a similar approach.

The project sponsor has over 15 years of staff experience leading and managing aquatic restoration projects in multiple watersheds where engineering consulting is required to tackle large scale and highly technical problems (Entiat Watershed, Snohomish Watershed, Mason County/WRIA 14, and others). More recently, the Cascadia CD aquatic-riparian program has implement process based restoration that worked towards stage 0 conditions on an incremental timescale through the full scale implementation of low tech process based restoration (averaging implementation of over 150 structures per season; BDAs, PALS, LWD griphoisted jams, wood loading). These LTPBR projects includes Entiat River tributaries Stormy and Potato Creeks, and Wenatchee River tributaries, Chumstick, Little Chumstick, Eagle Creek and also Squilchuck Creek (direct tributary to the Columbia River). Cascadia CD has additionally provided technical and field support for most of Trout Unlimited and Cascade Fisheries' projects.

#12: Will veterans (including the veterans conservation corps) be involved in the project? If yes, please describe.

Yes

The applicant is a veteran having served in the US Navy for five years with multiple overseas tours. Cascadia CD has also utilized Team Rubicon through their local Wenatchee representative for implementing projects. We plan to use Team Rubicon's field support this summer on Stormy Creek for implementing low tech process based restoration (July 2025).

## Restoration Supplemental

#1: Is the primary activity of the project riparian planting?

No

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#2: Does the project include measures to stabilize an eroding stream bank?

No

#3: Does the project include side channel reconnection or floodplain re-grading worktypes?

Yes

#3a: Explain why the side channel reconnection or floodplain regrading is necessary and secondary to accomplish the riparian restoration.

I think the answer is actually "no," however to explain, I needed to state "yes." This is not a side channel project in the traditional sense. Rather, by aggrading the primary channel incision (only), we are allowing the stream to re-undate historical flow pathways that have the full range of sizes and types (complex pathways), to include microtopography. In this way, this is not a "side channel project."

As for floodplain re-grading, alternative 3 does not do this either. If for instance the decision was to aggrade the primary channel through imported soils from beyond the project extent, the floodplain would be relatively unchanged. To be cost effective, alternative 3 does harvest needed alluvial soils and cobble from higher areas, but this is only in a few selected locations, and therefore does not constitute "regrading of the floodplain."

#4: Does the project include an instream structure placement worktype?

Yes

#4a: Explain why the instream structure placement is necessary and secondary to accomplish the riparian restoration.

The selected alternative 3 calls for structure placement in the stream within the middle reach only, where unlike the upper and lower reaches of the project area, incision is much less, but ecosystem function is still lacking and would greatly benefit from the complexity that small wood structures and wood loading would provide (primarily low tech process based restoration, i.e. BDAs, PALS, and wood loading). This preserves the wetland areas within the middle reach and makes permitting more streamlined.

#5: Is the primary activity of the project invasive species removal?

No

#6: Describe the steps you will take to minimize the introduction of invasive species during construction and restoration. Consider how you will use un-infested materials and clean equipment entering and leaving the project area.

Even though we are not using BPA funding, we will adopt the HIP III

BMP's for the project. This includes pre and post invasive plant treatments, and ensuring equipment is clean and weed free prior to mobilization. We have the ability to freeze or chemically treat waders, boots and other gear when moving between projects that are different bodies of water.

#7: Describe the long-term stewardship and maintenance obligations for the project.

Cascadia CD has a 10 year plan of work with the USFS that is reviewed annually. We have multiple funded projects on USFS land and we highly value our strong relationship of working with the USFS. As a conservation district, we apply our universal standard, whether private or public landowner, to maintain all implemented practices for at least 10 years. We have direct access to the the WA WSCC riparian grant program (RGP) that we intend to use for stewardship funding of this riparian project. We are also in a planning mode to develop a second phase of construction on Roaring Creek after this project is implemented and being stewarded, sizably increasing our presence and investment in Roaring Creek well into the future.

**Restoration Metrics**

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## Worksite: Roaring Creek Floodplain Reconnection (#1)

Miles of Stream and/or Shoreline Treated or Protected (C.0.b)	1.40
Project Identified In a Plan or Watershed Assessment (C.0.c)	UC Spring Chinook and Steelhead Recovery Plan Mad-Roaring-Mills EA Entiat Watershed Management Plan
Priority in Recovery Plan	Tier two priority for restoration for Steelhead
Type Of Monitoring (C.0.d.1)	None
Monitoring Location (C.0.d.2)	Downstream Onsite Upstream

### INSTREAM HABITAT PROJECT

Total Miles Of Instream Habitat Treated (C.4.b)	1.40
---	------

#### Channel reconfiguration and connectivity (C.4.c.1)

Total cost for Channel reconfiguration and connectivity	\$434,000
---	-----------

Type of change to channel configuration and connectivity (C.4.c.2)	Channel Bed Restored Creation of Instream Pools Creation/Connection to Off-Channel Habitat
--	--

Miles of Stream Treated for channel reconfiguration and connectivity (C.4.c.3)	1.40
--	------

Miles of Off-Channel Stream Created or Connected (C.4.c.4)	1.00
	<b>Note:</b> Estimated per current state of design.

Acres Of Channel/Off-Channel Connected Or Added (C.4.c.5)	14.0
---	------

Instream Pools Created/Added (C.4.c.6)	20
--	----

#### Channel structure placement (C.4.d.1)

Total cost for Channel structure placement	\$468,716
--	-----------

Material Used For Channel Structure (C.4.d.2)	Individual Logs (Anchored) Individual Logs (Unanchored) Rocks/Boulders (Unanchored) Stumps With Roots Attached (Rootwads)
---	--

Miles of Stream Treated for channel structure placement (C.4.d.3)	1.40
---	------

Acres Of Streambed Treated for channel structure placement (C.4.d.4)	2.2
--	-----

Pools Created through channel structure placement (C.4.d.5)	20
---	----

Number of structures placed in channel (C.4.d.7)	25
	<b>Note:</b> Estimated per stage of design development.

### RIPARIAN HABITAT PROJECT

Total Riparian Miles Streambank Treated (C.5.b.1)	1.40
---	------

Total Riparian Acres Treated (C.5.b.2)	14.0
--	------

#### Planting (C.5.c.1)

Total cost for Planting	\$60,000
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Species Of Plants planted in riparian (C.5.c.2)	Under development, consistent with willow-cottonwood riparian ecosystem and site existing native plants. Please see Riparian Enhancement Plan (under development, attached).
---	--

Acres Planted in riparian (C.5.c.3)	14.0
	<b>Note:</b> Restore up to 14 acres. Planting actively less acres.

Miles of streambank planted (C.5.c.4)	0.90
	<b>Note:</b> 1.8 miles assuming both banks.

Average Riparian Width	60
	<b>Note:</b> We are seeking to restore the full

# Project Application Report - 25-1232

floodplain, but in multiple cases the STPH is more than the valley bottom extent.

Site Potential Tree Height at 200 years (SPTH-200)

115

## CULTURAL RESOURCES

### Cultural resources

Total cost for Cultural resources

\$1,000

**Note:** Included to account for communication with USFS. NEPA MRM 2021 is believed to have included the CR review for all named projects. Confirming this with USFS Heritage Program. Staff time only for communications and filing of records.

Acres surveyed for cultural resources

14.00

## ARCHITECTURAL & ENGINEERING

### Architectural & Engineering (A&E)

Total cost for Architectural & Engineering (A&E)

\$56,284

# Project Application Report - 25-1232

## Overall Project Metrics

### COMPLETION DATE

Projected date of completion

11/15/2027

## Restoration Cost Estimates

### Worksite #1: Roaring Creek Floodplain Reconnection

Category	Work Type	Estimated Cost	Note
Cultural Resources	Cultural resources	\$1,000	Included to account for communication with USFS. NEPA MRM 2021 is believed to have included the CR review for all named projects. Confirming this with USFS Heritage Program. Staff time only for communications and filing of records.
Instream Habitat Project	Channel reconfiguration and connectivity (C.4.c.1)	\$434,000	
	Channel structure placement (C.4.d.1)	\$468,716	
Riparian Habitat Project	Planting (C.5.c.1)	\$60,000	
Admin, Architecture, and Engineering	Subtotal:	\$963,716	
		\$56,284	
Total Estimate For Worksite:		\$1,020,000	

### Summary

Total Estimated Costs Without AA&E:	\$963,716
Total Estimated AA&E:	\$56,284
Total Estimated Restoration Costs:	\$1,020,000

## Cost Summary

	Estimated Cost	Project %	Admin/AA&E %
<u>Restoration Costs</u>			
Restoration	\$963,716		
Admin, Architecture, and Engineering	\$56,284		5.84 %
SUBTOTAL	\$1,020,000	100.00 %	
Total Cost Estimate	\$1,020,000	100.00 %	

## Funding Request and Match

### FUNDING PROGRAM

Salmon State Riparian	\$470,000	46.078431 %
-----------------------	-----------	-------------

### SPONSOR MATCH

Other Monetary Funding	Grant - Federal	
Amount		\$220,000.00
Funding Organization		US Forest Service Okanogan-Wenatchee National Forest Entiat Ranger District
Grant Program		Federal
Other Monetary Funding	Grant - Local	
Amount		\$330,000.00
Funding Organization		PUD TRIB Committee
Grant Program		PUD TRIB Committee

Match Total: \$550,000.53.921569 %

# Project Application Report - 25-1232

Total Funding Request (Funding + Match): \$1,020,000100.000000

## Questions

#1: Explain how you determined the cost estimates

Cost estimates are based upon the consultant/engineers itemized preliminary budget, combined with costs needed for project staking, project management, and supervision.

## Other Funding

### OTHER FUNDING DETAILS

## Cultural Resources

### Cultural Resource Areas

#### Worksite #1: Roaring Creek Floodplain Reconnection

##### Area: Relative APE

#1: Provide a description of the project actions at this worksite (acquisition, development and/or restoration activities that will occur as a part of this project)

Only restoration, in-stream and riparian. Staging of materials and equipment/monilization, elevating stream bed (fill), harvest of few higher areas for fill material (excavation), installation of wood and wooden structures. Planting. Vehicle/equipment traffic.

#2: Describe all ground disturbing activities (length, width and depth of disturbance and equipment utilized) that will take place in the Area of Potential Effect (APE). Include the location of any construction staging or access roads associated with your project that will involve ground disturbance.

There will be up to 14 acres disturbed through planting, and lesser quantities of excavation, fill. Installation of logs for wood loading, and likely BDAs and PALS. The depth of earth work and disturbance will be up to 8' but generally 1-4' deep.

#3: Describe any planned ground disturbing pre-construction/restoration work. This includes geo-technical investigation, fencing, demolition, decommissioning roads, etc.

If cultural resources is determined not to have been completed as part of the existing NEPA, then preconstruction ground disturbance will involve hand dug holes a part of the wetland delineation and cultural resource survey.

#4: Describe the existing project area conditions. The description should include existing conditions, current and historic land uses and previous excavation/fill (if depths and extent is known, please describe).

The site is undeveloped, rural, public land, that is partially vegetated with native trees and shrubs.

#5: Will a federal permit be required to complete the scope of work on the project areas located within this worksite?  
Yes

#5a: List the agency that will be issuing the permit and the date you anticipate applying for and receiving the permit.  
Will the federal permit cover ALL proposed ground disturbing activities included in the project?

ACOE, USFWS

# Project Application Report - 25-1232

#6: Are you utilizing Federal Funding to complete the scope of work? This includes funds that are being shown as match or not.

Yes

#6a: Please list the federal agency and funding sources.

USFS - This federal funding to Cascadia CD includes design and partial construction funding. The amount available for construction is estimated to be \$220,000, depending on the amount used for design.

#6b: Does the federal funding you are utilizing as match require you to receive state funding?

No.

#7: Do you have knowledge of any previous cultural resource review within the project boundaries during the past 10 years?

Unknown

We believe the NEPA issued in 2021 included cultural resources, however we are having the USFS Heritage office confirm this. If not, we will commence with the cultural resources process.

#8: Is the worksite located within an existing park, wildlife refuge, natural area preserve, or other recreation or habitat site?

Yes

#8a: Please name the area and specify when the site was established.

Okanogan Wenatchee National Forest lands

#9: Are there any structures over 45 years of age within this worksite? This includes structures such as buildings, tidegates, dikes, residential structures, bridges, rail grades, park infrastructure, etc.

No

## Project Permits

Permits and Reviews	Issuing Organization	Applied Date	Received Date	Expiration Date	Permit #
NEPA	Federal Agencies		07/31/2023		59963

**Note:** The applicant did not apply for this. It was USFS led and issued.

## Permit Questions

#1: Are you planning on using the federal permit streamlining process? **Limit 8**

Yes

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## Attachments

### Required Attachments

8 out of 8 done

- Applicant Resolution/Authorizations ✓
- CCA Tribal Notification ✓
- Cost Estimate ✓
- Landowner acknowledgement form ✓
- Map: Restoration Worksite ✓
- Photo ✓
- RCO Fiscal Data Collection Sheet ✓
- Riparian Enhancement Plan ✓

### PHOTOS (JPG, GIF)

Photos (JPG, GIF)



# 666435 Primary # 666525 Secondary

### PROJECT DOCUMENTS AND PHOTOS

Project Documents and Photos

## Project Application Report - 25-1232

File Type	Attach Date	Attachment Type	Title	Person	File Name, Number Associations	Shared
	05/27/2025	Correspondence	Roaring ComResp Attachments-combined red.pdf	Markl	Roaring ComResp Attachments-combined red.pdf, 670488	✓
	05/22/2025	Correspondence	Updated Jotform - Roaring-03 FP Reconnection.pdf	Markl	Updated Jotform - Roaring-03 FP Reconnection.pdf, 670287	✓
	05/22/2025	Cost Estimate	SAL-CostEstimate Roaring Creek 5.21.2025.xlsx.XLSX	Markl	SAL-CostEstimate Roaring Creek 5.21.2025.xlsx.xlsx, 670252	✓
	05/22/2025	Cost Estimate	Roaring Cr. Prelim Design Const Cost Est 5-21-25.pdf	Markl	Roaring Cr. Prelim Design Const Cost Est 5-21-25.pdf, 670248	✓
	05/22/2025	Design document	Roaring Cr Plans Preliminary Draft 5-21-25.pdf	Markl	Roaring Cr Plans Preliminary Draft 5-21-25.pdf, 670247	✓
	04/30/2025	Project Application Report	Project Application Report, 25-1232R (sub 04/30/25 11:00:04)	Markl	Project Application Report - 25-1232 (submitted 04-30-2025_11-00-04).pdf, 668231	✓
	04/30/2025	Riparian Enhancement Plan	Updated SAL-RiparianPlan DRAFT Roaring Creek 4.30.2025.pdf	Markl	SAL-RiparianPlan DRAFT Roaring Creek 4.30.2025.pdf, 668207	✓
	04/21/2025	Project Review Comments	Project Review Comments Report, 25-1232R (04/21/25 07:54:37)	AmeeB	Project Review Comments Report - 25-1232 (04-21-2025_07-54-37).pdf, 666945	✓
	04/21/2025	Project Application Report	Project Application Report, 25-1232R (04/21/25 07:53:51)	AmeeB	Project Application Report - 25-1232 (04-21-2025_07-53-51).pdf, 666944	✓
	04/18/2025	Landowner acknowledgement form	Landowner Acknowledgemen Form - Roaring Cr RCO SRFB.pdf	Markl	Landowner Acknowledgemen Form - Roaring Cr RCO SRFB.pdf, 666704	✓
	04/17/2025	Project Application Report	Project Application Report, 25-1232C (sub 04/17/25 15:31:58)	Markl	Project Application Report - 25-1232 (submitted 04-17-2025_15-31-58).pdf, 666581	✓
	04/17/2025	Cost Estimate	SAL-CostEstimate Roaring Creek 4.17.2025.xlsx	Markl	SAL-CostEstimate Roaring Creek 4.17.2025.xlsx, 666579	✓
	04/17/2025	Design document	Roaring Creek Alternatives Memo draft.pdf	Markl	Roaring Creek Alternatives Memo draft.pdf, 666526	✓
	04/17/2025	Map: Planning Area	Map - Upper Reach Selected Alternative.JPG	Markl	Map - Upper Reach Selected Alternative.jpg, 666525	✓
	04/17/2025	Application Document	Jotform - Roaring-03-Roaring-04-Roaring-Creek-Floodplain-Rec	Markl	Jotform - Roaring-03-Roaring-04-Roaring-Creek-Floodplain-Reconnection-Project.pdf, 666499	✓
	04/17/2025	Project Review Comments	Project Review Comments Report, 25-1232C (04/17/25 06:16:18)	AmeeB	Project Review Comments Report - 25-1232 (04-17-2025_06-16-18).pdf, 666476	✓
	04/17/2025	Project Application Report	Project Application Report, 25-1232C (04/17/25 06:15:28)	AmeeB	Project Application Report - 25-1232 (04-17-2025_06-15-28).pdf, 666475	✓
	04/16/2025	Stewardship plan	Appendix A - Riparian QAPP.pdf	Markl	Appendix A - Riparian QAPP.pdf, 666458	✓
	04/16/2025	CCA Tribal Notification	Tribal Notification Letter.docx	Markl	Tribal Notification Letter.docx, 666447	✓
	04/16/2025	Map: Restoration Worksite	Roaring EC Map HAWS.pdf	Markl	Roaring EC Map HAWS.pdf, 666442	✓
	04/16/2025	Applicant Resolution/Authorizations	2025-04-CCDApplicantAuthorizationResolution for signature.pdf	Markl	2025-04-CCDApplicantAuthorizationResolution for signature.pdf, 666440	✓
	04/16/2025	Photo	Roaring Photos - Comparison.JPG	Markl	Roaring Photos - Comparison.jpg, 666435	✓
	04/16/2025	RCO Fiscal Data Collection Sheet	CascadiaCD - FiscalDataCollectionSheet.pdf	Markl	CascadiaCD - FiscalDataCollectionSheet.pdf, 666431	✓

### Application Status

Application Due Date: 06/23/2025

## Project Application Report - 25-1232

Status Name	Status Date	Submitted By	Submission Notes
Application Submitted	04/30/2025	Mark Ingman	Please note match funding accounts for \$220,000 , secured from USFS, that is design and construction funding received.
Preapplication	04/03/2025		

I certify that to the best of my knowledge, the information in this application is true and correct. Further, all application requirements due on the application due date have been fully completed to the best of my ability. I understand that if this application is found to be incomplete, it will be rejected by RCO. I understand that I may be required to submit additional documents before evaluation or approval of this project and I agree to provide them. (Mark Ingman, 04/30/2025)

Date of last change: 05/22/2025

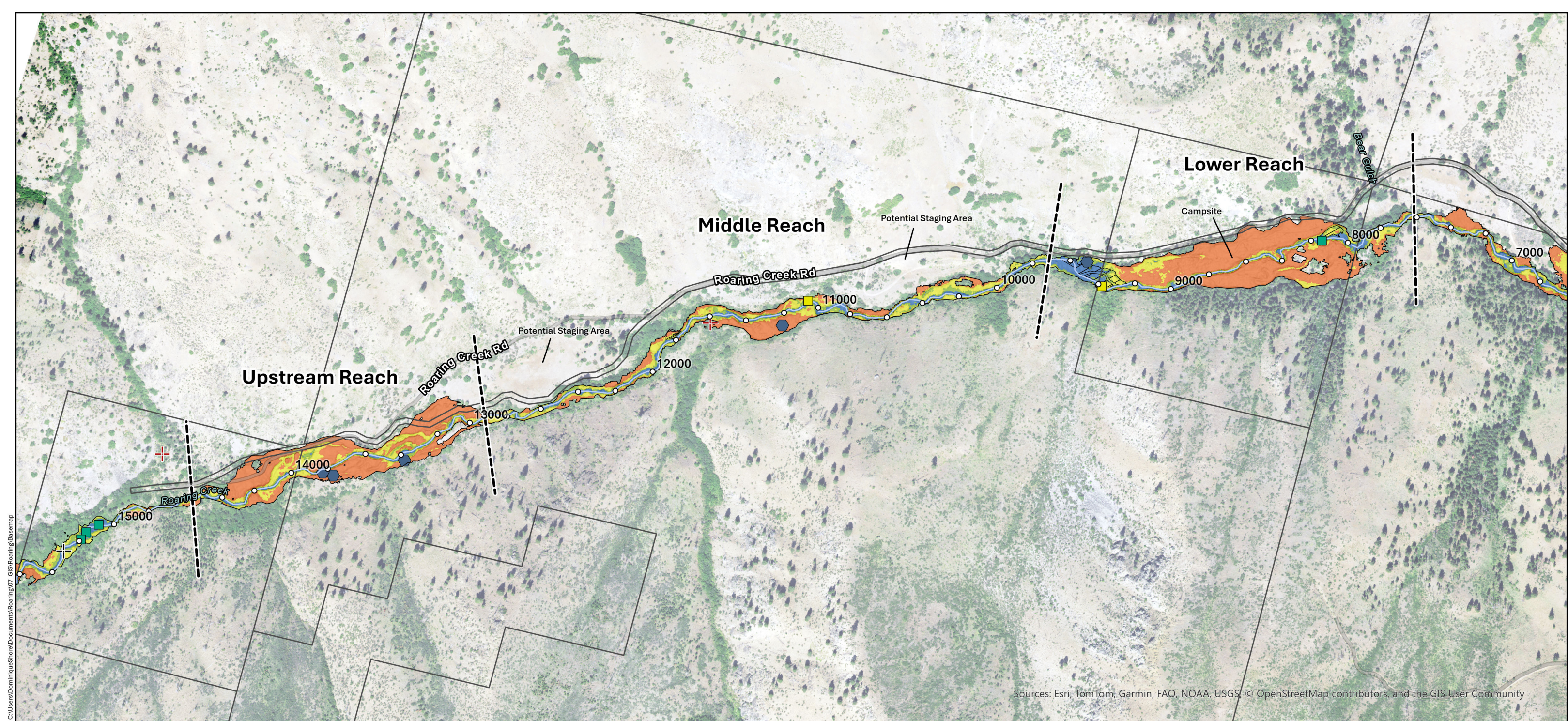


# CUMULATIVE TOTALS

*This sheet contains automatic calculations*

Project Name	Roaring Creek Floodplain Reconnection Project
SRFB #	25-1232
Sponsor	Cascadia Conservation District

	OVERALL PROJECT Cost	GRANT REQUEST Amount	PRISM MATCH Amount	MATCH NOT IN PRISM Amount	Budget Check
<u>Sheet #1 Acquisition</u>					
Property Costs	\$ -	\$ -	\$ -	\$ -	0
Incidental Costs	\$ -	\$ -	\$ -	\$ -	0
Administrative Costs	\$ -	\$ -	\$ -	\$ -	0
Indirect Costs	\$ -	\$ -	\$ -	\$ -	0
STotal	\$ -	\$ -	\$ -	\$ -	0
<u>Sheet #2 Design</u>					
Design Costs	\$ -	\$ -	\$ -	\$ -	0
Indirect Costs	\$ -	\$ -	\$ -	\$ -	0
STotal	\$ -	\$ -	\$ -	\$ -	0
<u>Sheet #3 Restoration</u>					
Construction Costs	\$ 963,716	\$ 444,065	\$ 311,790	\$ 207,860	0
AA&E	\$ 56,284	\$ 25,935	\$ 18,210	\$ 12,140	0
Indirect Costs	\$ -	\$ -	\$ -	\$ -	0
STotal	\$ 1,020,000	\$ 470,000	\$ 330,000	\$ 220,000	0
<b>Totals</b>	<b>\$ 1,020,000</b>	<b>\$ 470,000</b>	<b>\$ 330,000</b>	<b>\$ 220,000</b>	<b>0</b>



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

# Existing Conditions Map (HAWS)

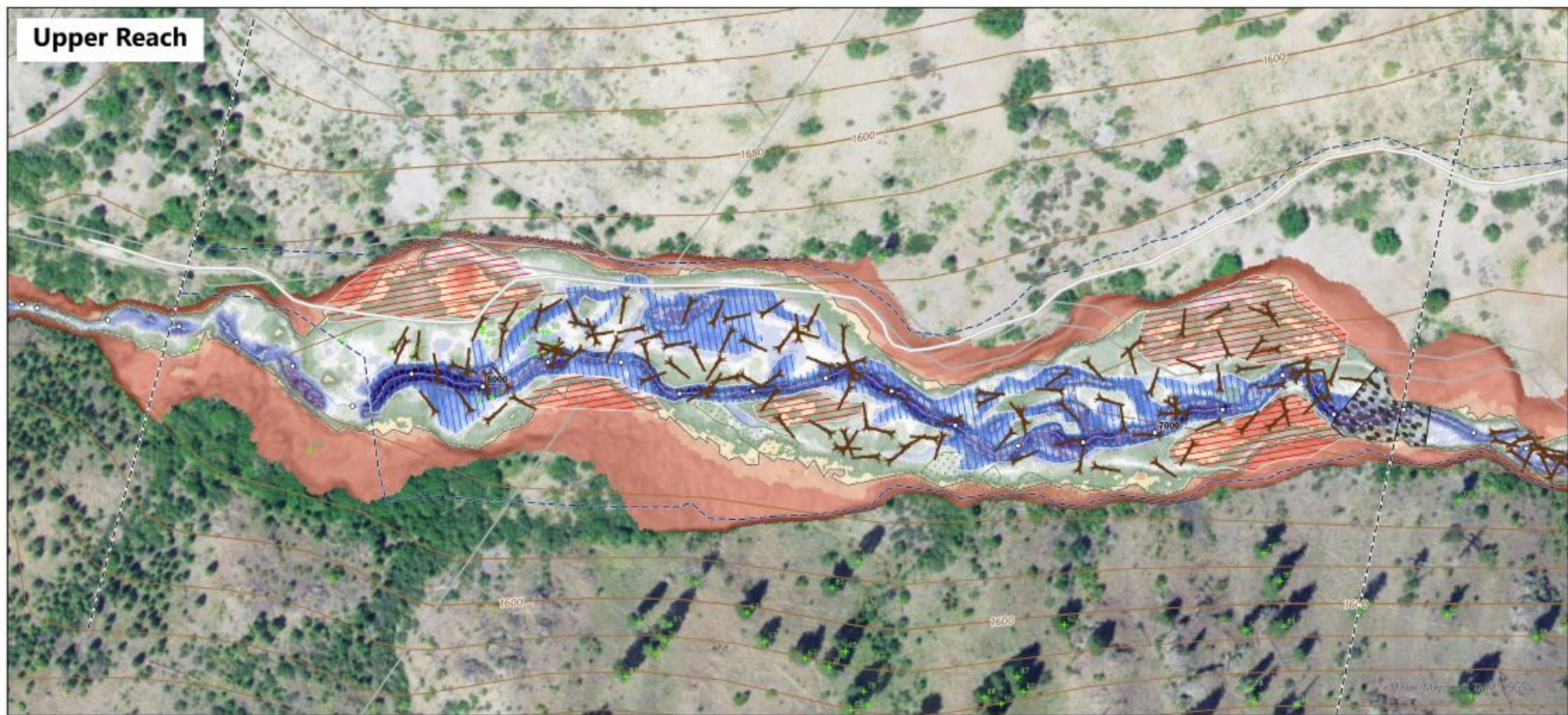
## Roaring Creek Floodplain Restoration Design

\* Classified landscape zones based on relative elevation model (REM) tied to the streambed centerline elevation. The REM used for landscape classification was developed using topobathymetric LiDAR collected by NV5 Geospatial on behalf of WA Department of Natural Resources (2022).

- Roaring Creek
  - Station (ft)
  - Tax Parcels (approx.)
  - Reach Boundaries
  - Historic Valley Bottom (approx.)
  - Observed Wetlands
  - Observed Wetland
- Monitoring**
  - Hobo Logger
  - Streamflow Gage
  - Complexity Features**
  - Beaver Dam Analog
  - Beaver Dam
- Landscape Zones based on REM\* and bankfull stage**
  - Seasonal Inundation: <1 ft (<0.5x BF Stage)
  - Annual Inundation: 1-2 ft (0.5-1x BF Stage)
  - Decadal Inundation: 2-4 ft (1-2x BF Stage)
  - Upland: >4ft (>2x BF Stage)



# Upper Reach



Geomorphic Grade Line built from topobathymetric LIDAR (2022) collected by NVS on behalf of Washington Department of Natural Resources

Basemap Imagery: National Agriculture Imagery Program (NAIP), 2021, State of Washington, USDA NRCS.

Wood structures and pieces shown on map are for reference only. The actual number of features installed will likely exceed what is depicted.

- Roaring Creek Channel
- Stationing (ft)
- Reach Boundaries
- USFS Road
- Taxlots (approx.)
- Area of Potential Effects (est.)

- Estimated Historic Valley Bottom
- Estimated Wetland
- Beaver Dam Analog
- Beaver Dam
- Trees >55 ft

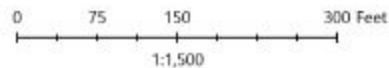
- |                            |  |
|----------------------------|--|
| <b>Earthwork (Grading)</b> | <b>Elevations relative to the Geomorphic Grade Line (ft)</b> |
| Floodplain Lowering        | 7 - 10   |
| Channel Aggradation        | 6 - 7  |
| Roughened Channel          | 5 - 6  |
| <b>Wood Structures</b>     | 4 - 5  |
| Large Log Jam              | 3 - 4  |
| Log Jam                    | 2.5 - 3  |
| Single Log                 | 2 - 2.5  |
|                            | 1.5 - 2  |

- |           |
|-----------|
| 1 - 1.5   |
| 0.5 - 1   |
| 0 - 0.5   |
| -0.5 - 0  |
| -1 - -0.5 |
| -1.5 - -1 |
| -2 - -1.5 |
| -2.5 - -2 |
| -3 - -2.5 |
| -4 - -3   |
| < -4      |

## Alternative 3 - Stage 0 and Simulated Landslide

Roaring Creek Floodplain Restoration Design

03/18/2025





Upper & Lower Reaches (mostly disconnected)



Middle Reach (mostly connected)



Dry floodplains and severe incision



Wetland conditions mostly needing large wood

# Riparian Enhancement Plan – Roaring Creek

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## ☑ Existing Conditions Assessment

**Overview:** This federally owned parcels are inclusive of Roaring Creek. The treated area includes a 40-acres of riparian zone that averages 50 feet wide each side of the stream and the treated area of the project extends approximately 1.4 miles from river mile 1.4 to 2.8. The left bank is on the west side of the stream and is sparsely vegetated, providing little functional afternoon shade to the stream.

**Target species:** The salmonid species of concern in Roaring Creek is Endangered Species Act-listed (endangered) steelhead trout. Washington Department of Fish and Wildlife Statewide Washington Integrated Fish Distribution data show documented steelhead spawning occurs from river mile zero to 1.9, while recent department PIT array at RM 0.2 shows an average of 10-20 spawning pairs return to the stream annually (hatchery and wild origin). UCSRB steelhead intrinsic potential indicates steelhead presence at additional life stages (i.e. juvenile rearing) is rated as high potential as far upstream as RM 3.4.

**Environmental Setting:** The Roaring Creek watershed is in the Ponderosa Pine Zone bordering the eastern Washington steppe. Ponderosa pine forms climax stands that border native grasslands and is a common member in many other forested communities. It is a drought tolerant tree that usually occupies the transition zone between grassland and forest (source WDFW.gov). Ponderosa pine is more vulnerable to fire at more mesic sites where other conifers as Douglas-fir and Grand fir form dense understories that can carry fire upward to the overstory. Ponderosa pine seedlings germinate more rapidly when a fire has cleared the grass and the forest floor of litter, leaving only mineral rich soil (ibid). Species consistent with the floodplain soils (Burnscreek stony sandy loam) besides ponderosa pine are bitterbrush (*Purshia tridentata*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Other observed species noted as common in the middle reach of the project area are red twig dogwood (*Cornus sericea*), mountain alder (*Alnus incana*), black cottonwood ([\*Populus trichocarpa\*](#)), blue elderberry ([\*Sambucus cerulea\*](#)), horsetail ([\*Equisetum arvense\*](#)), and others.

**Land use:** The site is river mile 1.4 to 2.8 of Roaring Creek main stem. Land use along the lower three miles of the watershed to Roaring Creek's confluence with the Entiat River is entirely riparian and some upland species. There are signs of occasional unpermitted camping pullout locations in the lower quarter mile of the treatment area (RM 1.4 to 1.6).. The rural residential land use is primarily from RM zero to RM 0.75. These water users and one small orchard were converted to groundwater wells through a Trout Unlimited led water right conversion project completed in 2018 (reference #13-1337; 1.5 CFS estimated in-stream water savings).

**Soils:** U.S. Department of Agriculture (1989) mapped soils as burnscreek stony sandy loam through this section of the Roaring Creek floodplain. Stony, sandy loam consists of deep, well-drained soils formed in mixed alluvium. Burnscreek soils are found on floodplains and low terraces with slopes of 3 to 30 percent. They are well drained, with slow runoff and high permeability. The sponsor surveyed eight, eighteen-inch deep, randomly located pits on April 25, 2023. Textures were consistent throughout the soil profile. Our experience is that survivorship is high in silty loams.

**Hydrology/Water Quality:** Roaring Creek is a snow dominated sub-watershed, with primarily snowmelt feeding Entiat River from higher elevations. On the project site, the depth to the water table measured in the summer is greater than forty inches. The project will significantly reduce the depth to groundwater throughout the treated project area. The floodplain portion of the site is subject to occasional brief periods of flooding from November through April, however this is limited to the middle reach (upper and lower reaches experience little if any flooding (see map). There is a permanent WA Department of Ecology stream gauge at approximate river mile 0.8. The project includes stream flow monitoring for pre and post project benefits to streamflow and baseflow. There is an ephemeral portion that is dry most years between roughly river mile 0.8 to 1.1.

The Entiat River is listed on the 303 (d) list for temperature, however it is a category 4, and progress is managed through the Entiat Watershed Management Plan (not through a Total Maximum Daily Load, TMDL). There is a documented cold water patch (thermal anomaly) at the confluence of Roaring Creek entering the Entiat River. This suggests Roaring Creek provides a unique cold water holding habitat for juvenile salmonids and steelhead in the lower Entiat River during warm weather months (Thermal IR survey, August 2023, Cascadia CD).

**Site Constraints:** The primary enhancement challenges include restoring groundwater levels to support historical vegetation in the riparian zone as evidenced by legacy live and dead cottonwood in the elevated and disconnected floodplain. Increasing the dispersal and recruitment of forbes in and along the the newly inundated areas of the project area is an important riparian goal. Browse damage along the Entiat River has been relatively modest for riparian projects and therefore in most cases have not necessitated browser protection. Wolf presence (tracks) were found as early as December of 2021 (USFS and recreational hunters) and this should aid in reducing browse damage. Cougar, bobcats, and coyotes are all present predatorial species in the drainage. Hunting both in Roaring Creek and throughout the Entiat Watershed also reduces browse damage in fall months of the year, while snow pack affords a base level of lower protection to seedlings and saplings. Lastly, beaver presence has been documented as active in the middle reach. While this may initially cause some damage to riparian plants, beaver also aid in the dispersal of species such as willow and dogwood through their damage building and they also increase water availability (dispersal and soil moisture advantages). As such, beaver represent a relative tradeoff and benefit from adaptive management.

## ☑ Restoration Objectives

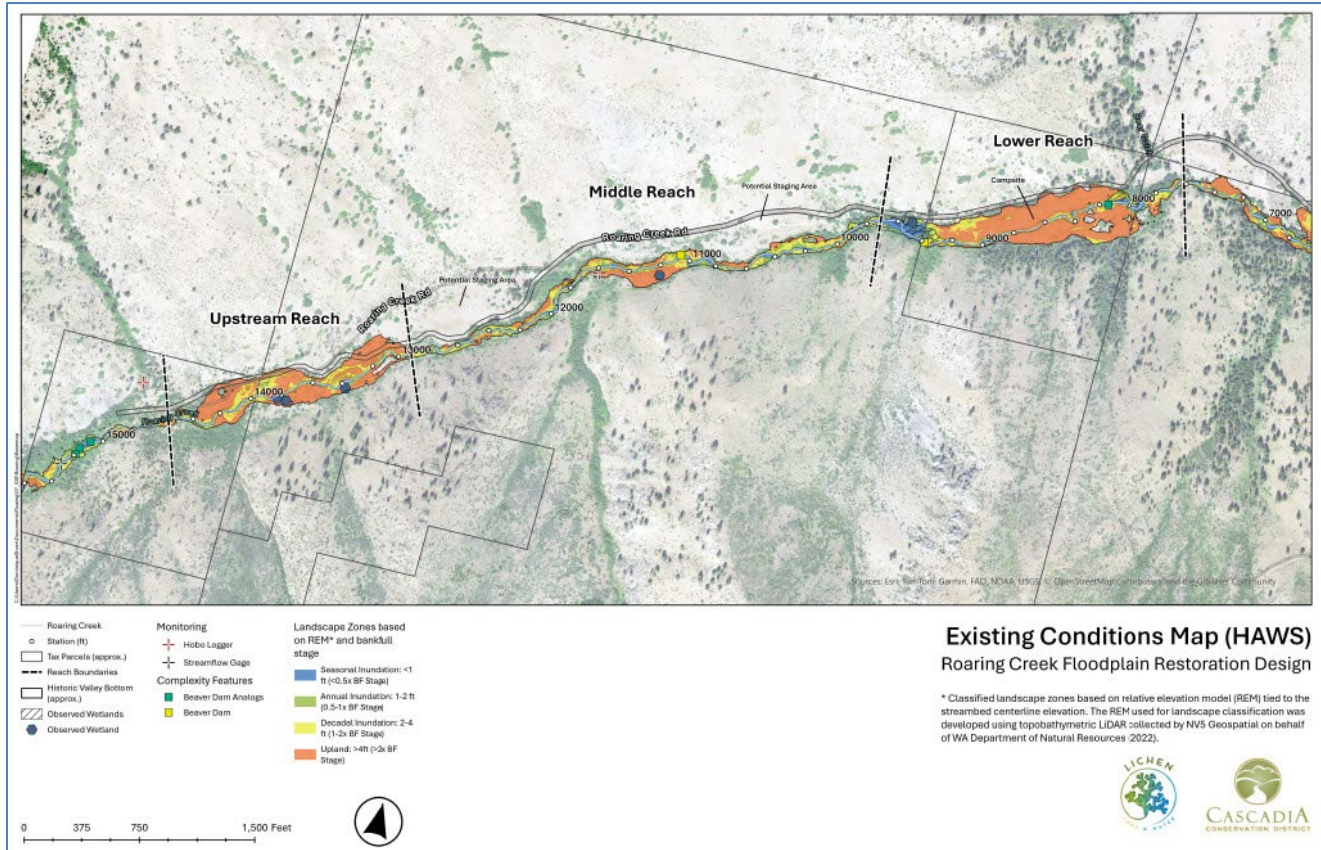
The goal of this restoration plan is to enhance and restore self-sustaining functioning riparian habitat that supports Endangered Species Act-listed steelhead salmon. The objective is to improve Roaring Creek juvenile steelhead rearing habitat conditions, specifically by planting native trees along the floodplains of the upper and lower reaches to reduce summer stream temperatures and to recruit trees for large wood complexity that will increase in-stream habitat. The specific objectives of this project include:

1. Establish native riparian plant composition on the site using the following guidelines:
  - a. Achieve the Washington Department of Fish and Wildlife-defined 200-year site potential tree height buffer width for this site, which is a 185-foot Douglas fir tree, with the proposed 190-foot planting width.
  - b. Address the historic incision of the stream, which has caused the floodplain to disconnect and desiccate. Reconnecting the floodplain will promote natural recruitment and regeneration of the riparian zone
  - c. Plant tree species at ten feet spacing on center across entire site maintaining 80 percent survival at year five. Expect 80 percent canopy cover at year ten with need to thin for health between years ten and twenty, to optimize native tree growth and vigor.
  - d. Establish native shrub density across entire site with five-foot spacing on center within a twenty-foot buffer from the shoreline (zone 1), to inhibit bank erosion, widening to ten-foot spacing beyond that buffer (zone 2). Maintain 50 percent survival to year five. Native shrub component will be the dominant understory and exceed nonnative cover by year ten.
2. Provide thermal protection of stream to reduce summer rearing mortality of coho salmon. A 190-foot-wide riparian forest along Eagle Creek, with a bankfull width of 25 feet, that runs north and south along this reach, is expected to provide increasing incremental thermal input protection over the course of its maturation.
3. Provide a source of large woody materials from dying or flood-recruited trees on site that will add to in-stream habitat complexity along or downstream of this reach, to

benefit adult coho spawning and passage. Compared with nearby reference sites, the site should provide adequately sized inputs by year eighty.

- Track performance of enhancement efforts through monitoring in years one, three, five, seven, ten, fifteen, and twenty0 as outlined in monitoring plan found in section 6.

## Plan Maps



**Map 1. Map of treatment extent that includes Upper, Middle and Lower Reaches**

## ☑ Site Preparation Methods

The instream restoration approach will raise groundwater tables and increase water availability for plants across the floodplain. The instream restoration actions effectively support site preparation and promote natural recruitment of riparian species as well as success of plantings.

The sponsor will secure funding and hire and supervise field crews to complete site preparation work. The sponsor will secure any permits and licenses needed to complete work, including aquatic noxious weed control permits or land-use permits, and will ensure field crews possess necessary licenses and qualifications. The sponsor will provide forty- eight-hour notice before accessing the property and a minimum of one week notice before completing any herbicide application.

**Reed Canarygrass (*Phalaris arundinacea*):** Initial site preparation of knapweed will be hand pulling and spot spraying if necessary with an aquatic approved herbicide and by one of Cascadia CD's licensed pesticide operators. Any reed canarygrass will involve a fall treatment of a 5 percent aquatic formula glyphosate in calendar year one, a following spring mow of any remaining thatch, followed by a fall spot herbicide retreatment in calendar year two. Planting of native species will occur either in winter year two or spring year three. Care will be taken to shield native shrubs and forbs on site during initial herbicide treatment.

Further control and treatment of these species will be included in the Post-Implementation Maintenance section 7 below.

## ☑ Riparian Planting Methods

Planting will consist of live stakes, bareroot, and potted plant stock. The sponsor will source plant stock using available tools such as the seed-lot selection tool ([seed-lot selection tool](#)) to choose material to increase resilience under the climate change scenario for the region. Bareroot material size will depend on species and availability. The sponsor will install potted stock no later than the end of December. Bareroot material will be planted no later than March. Live stakes will be collected at nearby locations in winter and planted during the same time as bareroot. Any bareroot material remaining will be grown in containers and reserved to replace future mortality during post-implementation maintenance and stewardship. A draft planting plan is included in Table A. It includes a species list for each planting zone. This list is subject to change based on plant availability and landowner input.

Plant stock installation will occur with a power augur when needed, otherwise by digging holes eighteen to twenty-four inches deep by hand with appropriate tool based on soil composition. Shrubs plantings will include a three-by-three square of weed cloth and all plants will receive a three-inch-deep by three-foot layer of weed free mulch at their bases. Vinyl tree protectors with stake support will be installed to prevent herbivory and plant damage during maintenance. Vinyl tree protectors will be removed and properly disposed of

no later than year five of monitoring. Orange or pink flagging will be tied onto the stake to assist in location during post-implementation maintenance. Supplemental watering is expected during the driest months of the year for this site and is accounted for in the Adaptive Management plan (section 8).

**Species List**

The anticipated species list include Red-osier dogwood (*Cornus stolonifera*), Sitka willow (*Salix sitchensis*), Salmonberry (*Rubus spectabilis*), Snowberry (*Symphoricarpos albus*), Red elderberry (*Sambucus racemosa*), Nootka rose (*Rosa nutkana*), Black cottonwood (*Populus trichocarpa*), Quaking aspen (*Populus tremuloides*), Mountain alder (*Alnus incana*), and others. We will quantify the counts, spacing, and other details later in the design process.

To evaluate if the enhancement activities meet the restoration objectives (section 2), the sponsor will perform implementation monitoring in years one through six after installation and potentially if funding and capacity exist. The monitoring effort will utilize a riparian protocol recently developed by the Sponsor. The approach is streamlined and targeted to planting areas. The approach avoids detailed stem counts, and instead identifies overall success of planting areas based on qualitative observations of success and needs for adaptive management. Alternatively, the sponsor may substitute high resolution drone imagery to determine the percentage of canopy cover of trees, possibly other species, using an off-the-shelf analysis software.

- Percent canopy cover of native and nonnative vegetation (quantitative), year one through six and beyond. Includes planted and naturally regenerating species.
- Vigor and health assessment of species (qualitative)

Monitoring results will allow sponsor to assess the need for adaptive management of the restoration site. Monitoring likely will occur between May and July, to target growing season and correspond with annual maintenance activities. As part of quantitative and qualitative monitoring efforts, the sponsor will take a minimum of three photos at six established photo stations. Drone imagery of the entire site also may be captured. The sponsor will provide a summary of data to RCO in the final report and as part of future stewardship grant requests.

**Post-Implementation Maintenance**

**Table B: Maintenance Schedule**

Work	Timing
Chemical spot treatment of invasive nonnative plants	Years 1-5 in spring and fall Years 6-10, and 15 in spring only
Replant native species to maintain survival/cover objectives	Years 1-10 in spring/fall
Thin trees to maintain healthy density	Years 10, 15, and 20 in summer

Note: Browsing protection not anticipated, wolf, bobcat, and cougar are all confirmed and present in the Roaring Creek drainage and browse pressure has been relatively light in other Entiat riparian sites in recent years.

<sup>1</sup>Merritt, David M.; Manning, Mary E.; Hough-Snee, Nate, eds. 2017. The National Riparian Core Protocol: A riparian vegetation monitoring protocol for wadeable streams of the conterminous United States. Gen. Tech. Rep. RMRS-GTR-367. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 37 p.

Maintenance will occur until plants reach a stage where natural suppression of invasive species and forest succession appear to be self-sustaining. Control methods of most invasive vegetation will include chemical spot treatment with possible mechanical mowing (hand-held brush cutter) or grubbing as needed. Irrigation will occur via tank mounted truck system, weekly or biweekly depending on precipitation conditions, between July and September.

In addition to sponsor maintenance, the landowner agreed to perform a visual inspection of a portion of the planting area annually for ten years to inform the sponsor of potential challenges including beaver browse, flood damage, plant mortality, or significant site disturbances. The visual inspection may occur any time throughout the year as the landowner is available, although the growing season (March to October) is the best time to inspect plants for mortality. The landowner inspection is intended to be qualitative and limited in nature and will supplement the annual implementation monitoring completed by the sponsor. The landowner may request copies of vegetation monitoring data and reports.

## **Adaptive Management**

Monitoring efforts will evaluate for specific success criteria, including:

- Natural regeneration takes over planting site
- Invasive species shaded by native tree species
- Invasive species crowded out by dense cover of native shrubs/grasses native
- Trees grow above deer browse height (5-7 ft)/weed height
- Density of native species precludes damaging browse
- Good trajectory (sufficient growth and water availability, low browse pressure)

Monitoring may also identify adaptive management needs related to ungulate browse, plant desiccation, and poor stock source. Replanting from these impacts may occur to maintain survival and cover performance metrics. Under heavier loss conditions, the following adaptive management will be considered.

**Ungulate:** if grazing pressures cause more than 25 percent mortality and/or significant defoliation of plants, the sponsor will consider use of a spray deterrent. If grazing pressures cause more than 50 percent mortality and/or significant defoliation of plants, the sponsor will consider metal cage protection of highest value species (conifers).

**Desiccation:** Observed desiccation may be addressed through localized instream restoration and water distribution using hand-installed low-tech structures. The site does not have irrigation sources available.

**Poor or inappropriate stock:** if there is more than 50 percent mortality of a single species from other than the causes listed above, the sponsor will assess plant stock type and source when considering whether to replant or replace if a more suitable species appears warranted.

## **As-Built Documentations**

*Update the riparian enhancement plan if implementation resulted in significant changes from what was proposed. Be sure to update design drawings, maps, site preparation, planting method, and monitoring elements of the plan as necessary.*

No example provided.

## **Stewardship Activity Report**

*This is a written report that documents activities implemented as part of the stewardship project. If adaptive management was a significant factor, document the changes implemented on site. Provide implementation monitoring results to show how the site is achieving restoration objectives.*

No example provided.

The following table includes responses to the comments received during the review process. Following the table are a series of figures to help reviewers visualize the design approach and anticipated response/benefits.

<b>RTT Comments</b>
<p><b>RTT Comment 1</b> - The primary concern was the impact of the project on existing steelhead spawning in Roaring Creek. Currently, Roaring Creek is an important spawning stream for steelhead (i.e., 80 to 100 steelhead adults return to spawn in Roaring Creek). As such, the RTT is unclear whether this project has been discussed with NOAA and other regulators, and whether the proposed project can be permitted. The RTT would also like additional clarification on where the stage-0 approach would be applied relative to historical and current spawning habitat.</p>
<p><b>Response to RTT Comment 1 –</b></p> <p><b>Spawning Impacts and Benefits:</b> The design approach is to strategically fill channels to minimize the potential short-term impacts on stream segments with mapped redds. Furthermore, the existing redd distributions in the project reach (including preliminary survey results from spring 2025) show that spawning is concentrated in segments of stream with beaver and/or well-connected floodplains. The existing redds are almost entirely absent from the incised segments of stream planned for channel filling. These patterns suggest that (1) there is potential to expand suitable spawning substrates by addressing incision and reconnecting floodplains; and (2) our proposed restoration actions can feasibly minimize impacts to existing spawning segments. Future design phases will include refinements to minimize short-term impacts. Stage 0 projects have been demonstrated to create significant spawning benefits, as highlighted in the project highlight below (Harrington Creek).</p> <p><b>Agency Pre-Coordination:</b> Additional pre-coordination and planning activities include:</p> <ul style="list-style-type: none"> <li>-Applicant has already consulted directly with the following agencies: USFS (biologists, archeologist, PacNW Research station, NSAEC team and Enterprise team), USFWS (informally, site visit spring 2024), WDFW biologist (site visit pending), WA Ecology (wetlands, also funding agency).</li> <li>-Annual steelhead redd data last conducted in 2007, with years 2009 and 2011 added by WDFW, then fully discontinued. CCD’s has committed over ¾ of its small annual monitoring funding to Roaring Creek in order to do a comprehensive steelhead redd survey by a professional fish survey team. All redd survey data will be provided to the design team upon completion of survey for integration into the design process.</li> <li>-Applicant has a meeting scheduled with a NOAA representative on May 28th to gather input for the project.</li> </ul>
<p><b>Comment 2</b> - The RTT expressed concerns about whether “spreading out” flows, which annually get quite low in Roaring Creek, could create spawning, rearing issues and/or migration issues.” Include hydraulic and temperature impacts in response.</p>
<p><b>Response to Comment 2 –</b> The current design involves a strategic stage 0 approach to preserve significant topographic complexity and mature vegetation on the floodplain. This means that low flows, while distributed over a broader portion of the valley bottom than in the existing condition, will not be spread fully over the valley bottom (see attached cross-sections). Additionally, the proposed restoration strategy involves widespread wood placement to provide additional complexity, flow path development, and hydraulic diversity. As shown in the attached project highlight and cross-sections, rapid vegetation and sediment sorting responses develop even more hydraulic diversity within a short period (&lt;5 years) after construction.</p> <p>We are also conducting due diligence on the potential issue of subsurface flow. We have contracted with a geophysical survey to characterize the alluvial aquifer. This will allow us to calculate groundwater conveyance and assess the potential for streamflow losses to the subsurface.</p>
<p><b>Comment 3</b> - The RTT recommends that the sponsor discuss this project with regulators before submitting a final proposal.</p>
<p><b>Response to Comment 3 –</b> The project sponsor has had preliminary discussions with USFS, USFWS, WDFW, Ecology, and NOAA. The strategic stage 0 approach minimizes impacts to existing wetlands (which are currently limited), and spawning substrates. The project sponsor has engaged with sponsors of successful Stage 0 projects in Oregon to understand the concerns of regulators.</p>

## UCSRB Field Tour Questions and Comments

**Comment 1** - Roaring Creek is a (relative) stronghold for steelhead. This stream doesn't look that bad, or enough to warrant disturbance and/or risk to the steelhead. Essentially the risk vs benefits don't seem to justify going forward with the project.

**Response to Comment 1** – Our response addresses the stream conditions and spawning impacts separately.

Stream and floodplain conditions: The lower and upper reaches of the project area have historical valley bottom widths exceeding 15 times the stream width, indicating that they were significant floodplain reaches. But these historic floodplains are completely disconnected from the creek as a result of 5-6 feet of stream incision. As a result of this entrenchment, the active floodplain is barely wider than the existing channel.

The consequences of the incision and floodplain narrowing include increased stream power and reduced spawning gravel retention, vastly reduced side channel and peripheral habitat for juveniles, and a dried and disconnected riparian zone (as reflected by conifer encroachment). The restoration strategy seeks to strategically raise the stream to its historical floodplain to address the root cause of degradation and the related reductions in steelhead habitat.

The attached highlight of the Harrington Creek project shows the potential benefits of the proposed restoration strategy on a similarly sized stream. These benefits are often realized within 2-4 years of implementation, as shown.

Short-Term Impacts to Existing Steelhead Spawning: The sponsor takes potential short impacts to steelhead very seriously and anticipates continued refinement of the design to minimize these impacts.

Available redd data from the reach show that existing spawning maps onto segments of the creek where there are localized connected floodplain areas and beaver usage (“middle treatment reach” in design plans). The middle treatment reach presumably has improved gravel retention because of localized floodplain connectivity. These existing spawning areas are also stream segments expected for light touch restoration actions. Furthermore, the mapped redds are almost entirely absent in the incised stream segments proposed for channel fill. This pattern is indicative of the deleterious impacts of incision on spawning. It also indicates that the channel segments with the most significant construction impacts have limited spawning in the current condition (with high spawning potential in the restored condition).

**Comment 2** - What were the original conditions and the reasons behind them? Have you gone back and looked at satellite imagery? What is the end state you are planning to achieve and how will you ensure the project will reach this end state or desired condition?

**Response to Comment 2** – We have reviewed readily available imagery, which does not capture the floodplain in its pre-disturbance condition. However, historical floodplain surfaces (now abandoned due to incision) have a network of relict channel threads and bar features indicating former activity by the floodplain. The valley bottom includes significant signs of anthropogenic manipulation, including apparent water diversion infrastructure and homesteading activities. These historical activities, in combination with beaver trapping, almost certainly promoted incision and disconnection of the floodplain.

At station 60+00, there exists a small relict segment that has low incision and high floodplain connectivity. This floodplain area has dense wetland and riparian vegetation, multiple channel threads active at low flow, and beaver activity. This area provides a reference for post-project conditions.

**Comment 3** - This watershed hasn't had a big fire. What is happening in the upper watershed? Is there a likelihood of a big fire and how does that affect your project your proposing?

**Response to Comment 3** – The most recent fire upstream of the project reach was the 1988 Dinkelmann fire. The proposed restoration approach improves resilience to future fires that may impact 1. upstream the contributing area and 2. the project reach itself.

<p>1. <b>Resilience to potential fires in the upper watershed:</b> By reconnecting floodplains within the project reach, the project increases the likelihood that fire-derived sediment pulses will deposit and contribute to habitat development.</p> <p>2. <b>Resilience to direct fire impacts to the reach:</b> The existing riparian zone in the project reach records a trend toward drying, as reflected by dominantly legacy (old) cottonwoods and younger ponderosa pines. Based on the apparent youth of the ponderosa pines, this transition toward drying appears to reflect anthropogenically caused stream incision in the 20<sup>th</sup> century. The proposed restoration strategy seeks to address stream incision, raise water tables, and improve riparian health. Increased riparian wetness has been shown to decrease the impacts of fires on floodplain vegetation (e.g. Fairfax and Whittle, 2020).</p>
<p><b>Comment 4 –</b> Request for more information on disturbance and alignment with process-based restoration.</p>
<p><b>Response to Comment 4 –</b> The proposed restoration strategy addresses root causes of degradation and supports dynamic processes in a reconnected floodplain. By addressing incision, vertically reconnecting the floodplain, and providing significant complexity to the system, the project reinitiates processes of riparian development, sediment sorting, wood recruitment, complexity development, and beaver colonization. Rather than utilizing static and engineered project elements, the restoration approach distributes stream energy to promote the use of natural materials that evolve with natural processes (change) over time.</p>
<p><b>TRIB PUD Committee Comments</b></p>
<p><b>Comment 1 -</b> Given that reaches on Roaring Creek are not identified as high priority for restoration, please describe why this is the most appropriate place for restoration.</p>
<p><b>Response to Comment 1 –</b> The AU appears to be lacking much of the data that supports rankings. We understand that the limited rankings in the reach are assigned based on Level II surveys, which poorly capture the deleterious effects of incision on floodplain connectivity. We also understand that the rankings were based on a mapping showing a lack of floodplain (unconfined) reaches in Roaring Creek. However, the proposed project is located in a reach with valley bottoms exceeding 10 times the channel width.</p> <p>As reviewers have pointed out, Roaring Creek is an important steelhead stream in the Entiat River subbasin. This project is proposing to fully restore the most significant (and highly disconnected) floodplain reach in Roaring Creek. For that reason, the uplift potential is large, even if not directly represented in the prioritization.</p>
<p><b>Comment 2 -</b> If possible, please describe the anticipated evolution of habitat conditions following restoration and associated benefits and detriments (short- and long-term) to Plan Species.</p>
<p><b>Response to Comment 2 –</b> The anticipated evolution can be visualized in the attached Harrington project highlight, as well as the graphical sections for Roaring Creek (both attached below). Furthermore, the small, isolated reference reach (project stationing 60+00), which is less incised, provides a reference for future conditions.</p> <p>In short, the proposed channel filling strategy (in the upper and lower reaches) addresses incision by raising the streambed to its historical floodplain level. These actions also include distribution of wood (multiple size classes) across connected areas of floodplain. In the short term, these actions connect the floodplain, raise the water table, provide a high degree of roughness, and reduce stream power.</p> <p>Within 1-5 years we anticipate robust natural regeneration of riparian species, sediment sorting, and wood reorganization. Together these processes support the development of multiple anastomosing channel threads that support diverse spawning and rearing habitats. Over 5-10 years (or less) we anticipate beaver recolonization as food sources become more available and dam building becomes more viable.</p>
<p><b>Comment 3 -</b> Because Roaring Creek has historically provided spawning and rearing habitat important for total Entiat Basin steelhead production, please discuss how this project will affect future steelhead spawning (e.g., during implantation and post-implementation adjustment to stage-0 conditions) within Roaring Creek, including measures for minimizing or avoiding losses to spawning habitat. Identify any possible permitting issues associated with this project related to potential effects on steelhead spawning habitat.</p>
<p><b>Response to Comment 3 –</b> This comment has been addressed in several comments above.</p>
<p><b>Comment 4 -</b> As a hedge against the risks to the steelhead population associated with potential short- or long-term losses of spawning habitat, please consider a phased approach (i.e., select one project area for restoration and monitor effects before proceeding to subsequent phases) rather than treating all three project areas at once.</p>
<p><b>Response to Comment 4 –</b></p>

We are approaching the restoration of Roaring Creek holistically on the sub watershed level and we have divided the restoration into three phases as follows: Phase I – the subject proposal on USFS land; Phase II – an active acquisition (protection) proposal for funding (negotiations involving CCD, CDLT and the immediate downstream private parcel ongoing), and Phase III – the smaller private landowners in lower Roaring Creek (CRM staff outreach with landowners is partially complete).

We are also open to phasing within the current project area of Phase I. However, we would like to more fully consider the true risks and additional costs that may come with that level of phasing. Our remaining design phases include additional analysis of the risks. Current redd distributions are mapping out as being largely separate from the most significant channel filling, suggesting the risks may be less than suggested by reviewers.

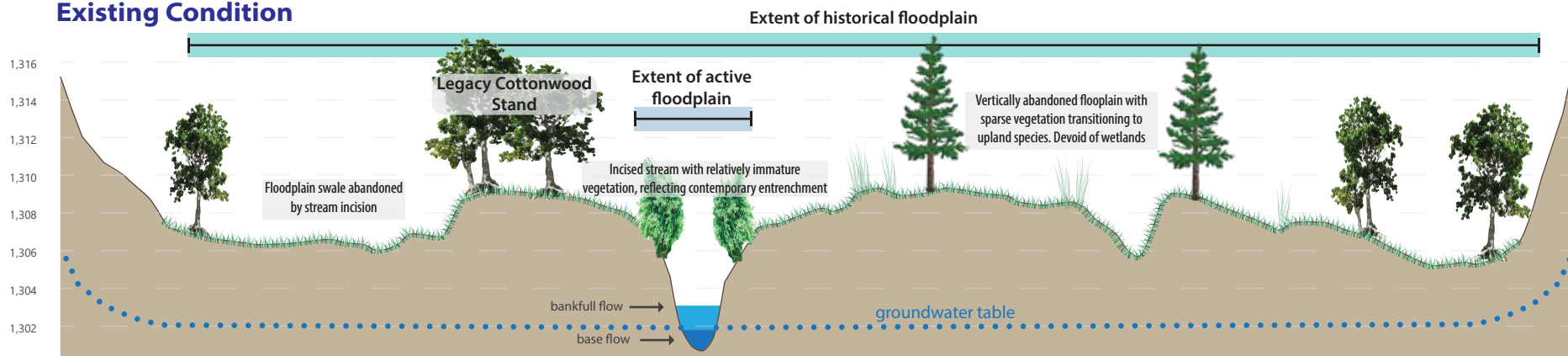
**Comment 5** - Given current staffing issues within the Forest Service, please identify when you believe this project can be implemented.

**Response to Comment 5** – USFS has reviewed the 15% design and they agree that Alternative 3 is the preferred restoration alternative. They have indicated that this project is high priority for the USFS. This is one of just a few projects they have committed staff time to review and support. They have expressed support for 2027 implementation schedule. We are coordinating a meeting with the new ranger to refine and update the plan with the forest. Furthermore, this project has been a long-term priority for the Forest as per its inclusion in the Mad Roaring Mills NEPA 2023, as the “Roaring Creek Floodplain Enhancement Project.” There are few named projects of this type in the large effort to complete that NEPA process.

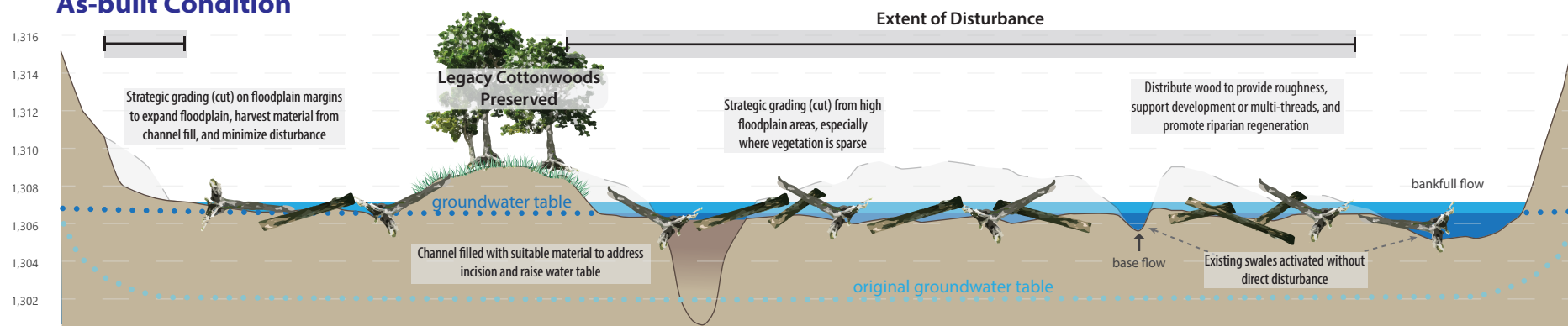
# Representative Cross-Section Demonstrating Floodplain Reconnection Approach

Roaring Creek RM 1.4 - 2.8, Lower Reach, Station 70+00

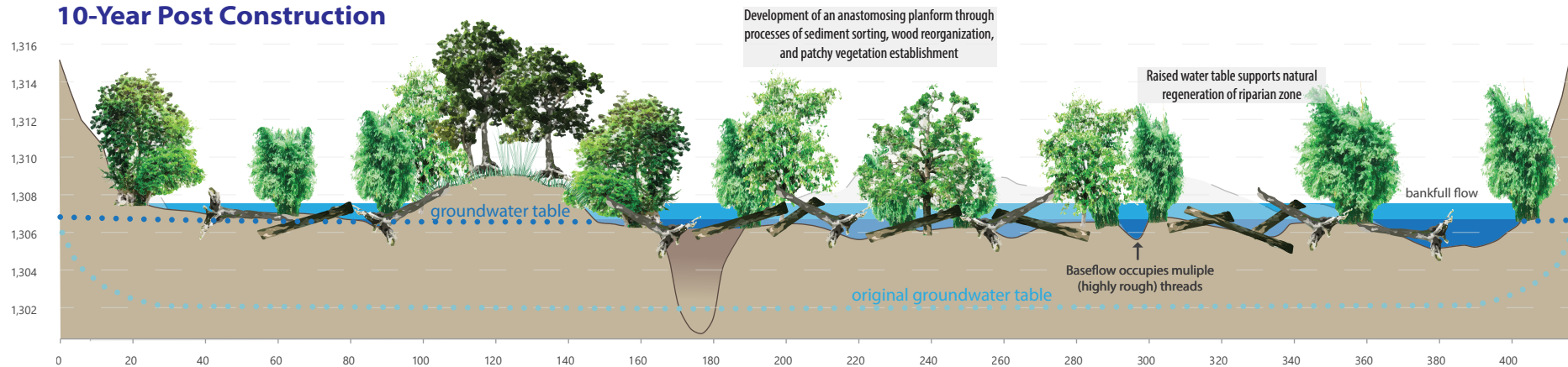
## Existing Condition



## As-built Condition



## 10-Year Post Construction



## Photos of Reference Floodplain Conditions from within the Roaring Creek Project Area

This relict segment of floodplain is located near station 60+00. The area has extensive wetlands, dense riparian vegetation, multiple active channel threads, and beaver activity. Shortly downstream of these images are a series of headcuts which represent the transition to the heavily entrenched (incised) conditions more typical of the lower reach.



# Stage 0/8 Project Snapshot for Comparison – Harrington Creek

The Harrington Creek Stage 8 project (Lower Columbia FEG) is an example of expected response from proposed treatments at Roaring Creek. Harrington Creek is similar in size to Roaring Creek (both have summer flows less than 1 cfs, and 2-yr floods of 150-300 cfs). Both creeks are used by steelhead.

**Restoration Approach:** LCFEG excavated ~3 feet of the abandoned floodplain down to creek level, maximally widening the connected floodplain area. Islands were left where mature vegetation stood. Wood was distributed throughout the existing channel and new floodplain to create complexity.

**Observations on Spawning Benefits (quote from Brice Crayne, LCFEG):** “We were also worried about short-term impacts to steelhead spawning. In fact, over the spring we became increasingly worried because of the finer sediments settling into the project area. However, we saw these fine sediments spring to life within one year and new channels form with wonderfully sorted sediments that coho and steelhead both spawned in with abundances greater than they had observed prior to restoration work. The greatest density of coho redds per mile documented in Harrington Creek was about 11-25 prior to construction. In a one-day survey, we documented a density of 70 redds per mile. The restoration work was completed in August 2019. The one-day survey was November 2020. So, while the adults returning in 2020 were not the offspring from fish that spawned/reared in the restoration site, they did spawn in greater densities than have ever been documented in the stream.

## Photographs of Floodplain and Habitat Response in Harrington Creek

