# PROJECT: 16-1574 REST, SNOHOMISH WATERSHED RESTORATION USING BEAVER

Sponsor: Tulalip Tribes Program: Puget Sound Acq. & Restoration Status: Active
Project Start Date: 01/20/2018 Agreement End Date: 03/30/2023

Final Report Status: Accepted 04/24/2024

## Description

**PROJECT AGREEMENT DESCRIPTION**

The Tulalip Tribes Wildlife Program will protect and restore riparian and in-stream habitat-forming processes and function in the Mount Baker-Snoqualmie National Forest by relocating beavers to headwater streams of the Snohomish Watershed. The project objective is to re-establish beaver colonies above or along approximately 1 mile (total) of streams in the upper Skykomish and upper Snoqualmie basins in order to improve stream habitat conditions where salmonids spawn and rear. Funds will be used to a) administer the project, b) construct beaver dam analogs to prepare sites for beaver reintroduction, c) trap nuisance beavers, d) care for beavers at holding facility, and e) relocate beavers to suitable habitat on USFS land. The presence of new beaver dams in these streams will not only hold water, but is also expected to change the timing of how that water exits the sites, seasonally. Beaver dams capture the energy of intense winter storms and hold water longer into the dry season. The results of a study conducted on the hydrologic benefits of the Tulalip Beaver Project found that ???successful beaver relocations created 243 cubic meters of surface water storage per 100 meters of stream reach in the first year following relocation, and stored approximately 2.4 times as much groundwater as surface water per relocation reach. On average, stream reaches downstream of newly created beaver dams exhibited an average of 2.3 degrees celsius cooling effect in stream temperature during summer base flow conditions??? (Dittbrenner, 2019). The Tribes expect these hydrologic benefits will trickle down the system, creating better conditions for Fall Chinook, Coho, Fall Chum, Winter and Summer Steelhead, and Bull Trout (WDFW SalmonScape) within or immediately downstream of relocation sites.

The Snohomish watershed is the second largest salmon producing watershed in Puget Sound. The goal of the project is to increase the number of beavers and their dams in the watershed to sustain salmon populations for commercial and recreational harvest by tribal and state anglers. The Wildlife Program will measure success of beaver and beaver-built dam retention at release sites for at least 9 months post-relocation and expect to increase the area of in-stream habitat at seven relocation sites.

**FINAL PROJECT DESCRIPTION**

Overall goal achieved

2019
Beaver Worktype: 26 beavers were trapped from 12 sites where roadway and farm field flooding and hazard tree creation necessitated beaver removal. These beavers were relocated to one site in the South Fork Snoqualmie and three sites in the Skykomish watersheds.

Channel Structure Placement Worktype: Maintained existing BDA lines at Burn Creek site in the Skykomish watershed.

Education & Outreach:
• Trained South Sound Beaver Recovery from Puyallup and San Louis Obispo Beaver Brigade
• Presented to 60 attendees at Beavers Northwest sponsored outreach event.

Amendments: Budget amendment completed due to delay in receiving funds to initiate this agreement.

2020
Beaver Worktype: N/A (see Challenges).

Channel Structure Placement Worktype: No BDAs installed or maintained (see Challenges).

Amendments: Cost increase request: Tulalip Tribes worked with RCO to complete cost increase and scope change amendments, and a new time extension amendment. No habitat restoration work was completed toward this grant during this reporting period due to extended furlough associated with Covid-19. We requested a 21-month time extension through March 31, 2023 to allow for another two field seasons of work.

2021
Beaver Worktype: During this reporting period project staff assessed previously occupied relocation sites for establishment success. It was found that four out of four sites remained established by relocated beavers. Three additional families of beavers (13 individuals) were relocated to the Snoqualmie watershed.

Channel Structure Placement Worktype: Maintained of existing BDA lines at Burn Creek site and installed installed one new line at Blanca site, both in the Skykomish watershed.

Education & Outreach: Funds were used to attend the 2022 BeaverCON Conference where staff presented on Tulalip Beaver Project successes and updates.

Amendments: No-cost time extension, Special Conditions change.

2022
Beaver Worktype: Tulalip Beaver Project staff trapped and relocated a total of 23 beavers to eight sites this season. Three families (8 individuals) of beavers we moved to pre-selected sites in the Skykomish Watershed. TBP crew trapped and relocated beaver families from and additional four sites, three of which (10 individuals) were relocated in the Snoqualmie watershed and the remaining family (5 individuals) was relocated to the Stillaguamish watershed. End of season inventory was performed for all relocation sites.

Channel Structure Placement Worktype: Maintained existing BDA lines at Burn Creek site in the Skykomish watershed.

Primary outdoor recreation opportunity provided
N/A.

Primary type of habitat to be protected or restored
Instream and riparian habitat benefitted from our beaver relocation work.

Priority species supported
We observed localized increases in biodiversity from game camera footage in the areas that our beavers successfully altered wetland habitat from ESA listed salmon, to amphibians, songbirds, and mammals.

Summary
At the end of the reporting period, five of the sites that receive beavers remain active, with 3 additional sites still being monitored for permanent occupancy. Three sites have been confirmed inactive and two additional sites were restored using Beaver Dam Analogs but have yet to retain beavers in the monitored reach. Additionally, three relocation sites were identified in the Stillaguamish watershed and one of those sites received beavers during the agreement period but unfortunately did not stick. Dams were constructed by relocated beavers at two relocation sites, one in the Skykomish watershed and another in the Snoqualmie watershed.

Challenges
Several amendments were performed to the agreement over the life of the grant ranging from name change and watershed expansion to time extension and cost changes. Unable to spend entirety by amended end date. Tulalip staff we furloughed for a four-month period during the 2020 season which lead to staff layoffs and major delays to seasonal beaver relocation work. This necessitated a lengthy agreement amendment process that did not allow spending of these funds until the 2021 field season.

While wetted edge data were collected using UAVs during this reporting period, new equipment and imagery processing issues did not allow us to report accurate surface water increases for this relocation period. Issue with internal staff time to rectify these images to accurately calculate wetted edge improvements.

Hydrologic conditions varied widely each season, with some heavy winter flows preventing establishment and low summer conditions making many one-eligible sites ineligible for relocation so options for where beavers could be placed was limited. We experimented with the use of Beaver Dam Analogs to improve site conditions but thus far no beavers have remained long-term at BDA sites, although they have added complexity via plunge pools and increased water storage at these sites.
Include Stilly issues – therefore we will not be continuing our relocation efforts in this watershed until we are able to obtain permission to enhance the habitat with the use of BDAs.

2022 Bolt Creek Fire: Prevented months of monitoring and relocation work in the Skykomish and Stillaguamish watersheds due to access issues and air quality conditions.

Remaining funds: Unfortunately, due to all of these unforeseen conditions and delays, we were unable to spend the entirety of the allocated funds by the final amended end date of the agreement.

In the Fall of 2022, the project manager, Molly Alves, began graduate school. Therefore, she was away from work responsibilities for ~8 months in 2023. For this reason, we have been delayed in submitting closeout reporting for this award. Therefore, we want to again offer our sincerest apologies for the delay and want to extend a heartfelt thank you to all who helped administer this grant, namely Jennifer Williams and apologize for final reporting delay.

Identify what was acquired, restored, developed, and/or designed with grant funds
• Beaver trapping lure
• Chlorohexidine antiseptic
• Hip waders
• Wheelbarrow for hatchery maintenance
• Multitools for field staff
• Headlamps for early morning trap checking
• Emergency field kit
• Cedar wood chips for captive beaver bedding
• Work gloves
• Hand sanitizer
• Plywood for temporary beaver housing
• Nuts/screws for game camera deployment
• Rodent pellets for captive beaver food
• SD card reader
• Bar chain oil and safety chaps for BDA construction
• Lithium batteries for game cameras
• Machete for trap and field site navigation
• Rope and carabiners for beaver trap anchoring
• Truck bed liner for safe beaver transport
• Installed and maintained Beaver Dam Analogs at two project locations

Miles of trail maintained, hours of education/outreach, etc.
Education and Outreach
• Training: South Sound Beaver Recovery group from Puyallup in beaver relocation techniques
• Training: Hosted WDFW/TUL Certified Beaver Relocator training from 2019-2023.
• Training: SLO Beaver Brigade from California in safe capture and transport, habitat suitability analysis.
• Outreach: Co-hosted event with Nonprofit partners Beavers Northwest (presented to ~60 participants).
• Presentation: BeaverCON 2022 Conference in Baltimore, MD, June 14-16, 2022.
• Presentation: National Beaver Working Group Science Committee, October 17, 2022.
Upcoming collaborative beaver research with The Tulalip Tribes and Utah State University.
• Presentation: Waterstories Webinar Presentation, June 8, 2022.
Presented to hundreds of webinar participants alongside Dr. Emily Fairfax and Ben Goldfarb.
• Article: How the Tulalip and Yurok Tribes Protect Wildlife
https://www.mutualofomaha.com/wild-kingdom/media-center/article/how-the-tulalip-and-yurok-tribes-protect-wildlife
• Article: New York Times, September 6, 2022
“It was war, then a rancher’s truce with some pesky beavers paid off”
https://www.nytimes.com/2022/09/06/climate/climate-change-beavers.html?searchResultPosition=2

• Film: BBC Earth: Changing Planet, Episode air date: April 20, 2023
The Tulalip Beaver Project spent three days filming with the BBC Earth documentary crew for their series Changing Planet.

## Narrative

Project history:
The Tulalip Beaver Project was initiated in 2014, under the sovereign rights of the Tulalip Tribes to restore and create salmon rearing habitat within their Usual and Accustomed fishing area (U&A). Since that time we have relocated over 350 beavers to the Skykomish, Snoqualmie, and South Fork Stillaguamish watersheds. Funding from the Puget Sound Acq. & Restoration grant program has enabled Tulalip and not only continue but expand our work in these areas. Without stable capacity and equipment funding the Tulalip Beaver Project would not be possible.

Changes:
As a result of the investigations of beaver habitat suitability in the South Fork Stillaguamish watershed, we have ultimately decided to discontinue beaver relocation efforts here. The best available habitat was majority naturally occupied by beavers and most of the remaining habitat identified as suitable from the Beaver Intrinsic Potential (BIP) model was not suitable for relocation. This watershed is plagued by erosion and susceptibility drought. This area also retains snow later into the year so access is limited. The relocation window is therefore too small between snow melt and low flow conditions to justify continuation. We will continue to relocate in the Snohomish Watershed region.

Lessons learned:
We are in the process of procuring new funds to expand our non-invasive monitoring techniques. We ultimately discovered that aerial imagery captured using UAV is not as reliable as previously thought. We assumed this technology would be more efficient than taking ground GPS points to monitor water increases at release sites but timing regarding leaf-off conditions, access to sites with variable fall snows, and technological issue with imagery processing, made this technology insufficient to quantify program results. We are therefore planning to incorporate monitoring using eDNA technology, autonomous recording unit (ARU), and snorkel surveys to better capture the effects of beaver establishment of salmon and biodiversity as a whole.

Project Outcomes:
Despite monitoring shortcomings, we were still able to preclude the lethal management and relocate 62 beavers to strategically selected areas of the Snohomish and South Fork Stillaguamish watersheds. We achieved establishment and dam building at seven sites across the Skykomish and Snoqualmie watersheds. These sites will continue to be monitored for reproduction, which will further contribute to long-term beaver establishment and hydrologic restoration in these areas.

## Worksites

### Worksite #1: Skykomish Headwaters Secondary Restoration

**Worksite Address (Optional)**
**Street Address** Foss River Road NE
**City** Skykomish
**State, Zip** WA 98288

### Worksite #2: Snoqualmie Headwaters Secondary Restorat

**Worksite Address (Optional)**
**Street Address**
**City**
**State, Zip**

## Worksite Details

### Worksite #1: Skykomish Headwaters Secondary Restoration

**Worksite Name** Skykomish Headwaters Secondary Restoration

**WORKSITE DESCRIPTION**
Our worksite is broadly defined as the headwater stream systems of the Skykomish Watershed, and includes sites in the South Fork Skykomish, Beckler, Foss, and Tolt, sub-basins

**Geographic Coordinates**

| | | | | |
|---|---|---|---|---|
| **From mapped point:** | Latitude | 47.702948 | Longitude | -121.302884 |
| **For Directions:** | Latitude | | Longitude | |

**SITE ACCESS DIRECTIONS**
This is a a broad geographical area, and most sites are within 30 minutes drive from the highway 2 corridor between the town of Sultan and Stevens Pass.

### Worksite #2: Snoqualmie Headwaters Secondary Restorat

**Worksite Name** Snoqualmie Headwaters Secondary Restorat

**WORKSITE DESCRIPTION**
Our worksite is broadly defined as the headwater stream systems of the Snoqualmie Watershed, and includes sites in the South Fork, Middle Fork and North Fork Snoqualmie sub-basins.

**Geographic Coordinates**

| | | | | |
|---|---|---|---|---|
| **From mapped point:** | Latitude | 47.547993 | Longitude | -121.537666 |
| **For Directions:** | Latitude | 47.548000 | Longitude | -121.538400 |

**SITE ACCESS DIRECTIONS**
This is a broad geographical area, most sites are between North Bend and Snoqualmie Pass.

## Properties

| Worksite # | Worksite Name | Property Name | Sponsor Verified | RCO Verified | RCO Verified Map |
|---|---|---|---|---|---|
| 1 | Skykomish Headwaters Secondary Restoration | Mount Baker Snoqualmie National Forest | ✓ | ✓ | N/A |
| 2 | Snoqualmie Headwaters Secondary Restorat | Mt. Baker Snoqualmie National Forest | ✓ | ✓ | N/A |

## Restoration Metrics

| | Current Agreement | Final |
|---|---|---|

### Worksite: Skykomish Headwaters Secondary Restoration (#1)

| | | |
|---|---|---|
| Targeted salmonid ESU/DPS (A.23) | ☐ No Salmon ESU or Steelhead DPS<br>✓ Chinook Salmon-Puget Sound ESU<br>☐ Chinook Salmon-unidentified ESU<br>✓ Chum Salmon-Puget Sound/Strait of Georgia ESU<br>☐ Chum Salmon-unidentified ESU<br>✓ Coho Salmon-Puget Sound/Strait of Georgia ESU<br>☐ Coho Salmon-unidentified ESU<br>☐ Pink Salmon-Even year ESU<br>☐ Pink Salmon-Odd year ESU<br>✓ Pink Salmon-unidentified ESU<br>✓ Steelhead-Puget Sound DPS<br>☐ Steelhead/Trout-unidentified DPS | ☐ No Salmon ESU or Steelhead DPS<br>✓ Chinook Salmon-Puget Sound ESU<br>☐ Chinook Salmon-unidentified ESU<br>✓ Chum Salmon-Puget Sound/Strait of Georgia ESU<br>☐ Chum Salmon-unidentified ESU<br>✓ Coho Salmon-Puget Sound/Strait of Georgia ESU<br>☐ Coho Salmon-unidentified ESU<br>☐ Pink Salmon-Even year ESU<br>☐ Pink Salmon-Odd year ESU<br>✓ Pink Salmon-unidentified ESU<br>✓ Steelhead-Puget Sound DPS<br>☐ Steelhead/Trout-unidentified DPS |
| Targeted species (non-ESU species) | ☐ None<br>☐ Unknown<br>☐ Brook Trout<br>☐ Brown Trout<br>✓ Bull Trout<br>☐ Cutthroat<br>☐ Forage Fish<br>☐ Kokanee<br>☐ Lamprey<br>☐ Rainbow<br>☐ Searun Cutthroat | ☐ None<br>☐ Unknown<br>☐ Brook Trout<br>☐ Brown Trout<br>✓ Bull Trout<br>☐ Cutthroat<br>☐ Forage Fish<br>☐ Kokanee<br>☐ Lamprey<br>☐ Rainbow<br>☐ Searun Cutthroat |
| Miles of Stream and/or Shoreline Treated or Protected (C.0.b) | 0.50<br>**Note:** This is an estimate. Sponsor will calculate results of beaver relocation by measuring each release location from downstream most beaver dam to the upstream extent of inundation. | 2.00<br>**Note:** Actual stream miles restored was not possible to quantify due to issues with UAV monitoring, however we estimate based on established relocated beavers at five sites that approximately 2 stream miles were positively impacted by relocated beavers. This number could easily be higher for beavers that left monitored reaches, further contributing to restored mile quantity. |
| Project Identified In a Plan or Watershed Assessment (C.0.c) | Shared Strategy Development Committee. 2007. Puget Sound Salmon Recovery Plan. Seattle, WA.<br>Snohomish Basin Recovery Forum, June 2005, Snohomish River Basin Salmon Conservation Plan, Snohomish County Department of Public Works, Surface Water Management Division, Everett, WA.<br><br>Snohomish Basin Protection Plan: 4.2.6. Beaver Management. | *Not Collected at Closure* |

| | | |
|---|---|---|
| | Snohomish River Salmon Conservation Plan: Ch. 5<br><br>Puget Sound Partnership Action Agenda-Near Term Actions: Appendix D; Page 546-684 | |
| Priority in Recovery Plan | Snohomish Basin Protection Plan: 4.2.6. Beaver Management.<br><br>Snohomish River Salmon Conservation Plan: Ch. 5<br><br>Puget Sound Partnership Action Agenda-Near Term Actions: Appendix D; Page 546-684 | *Not Collected at Closure* |
| Type Of Monitoring (C.0.d.1) | Implementation Monitoring<br>✓ None<br>**Note:** Monitoring is funded with dollars outside of this SRFB project agreement and entails monitoring 1/4 mile of stream at each release site for beaver activity and calculating the acres of inundation above the dam(s). | Implementation Monitoring<br>✓ None |
| Monitoring Location (C.0.d.2) | ✓ No monitoring completed<br>☐ Downstream<br>☐ Onsite<br>☐ Upslope<br>☐ Upstream | ☐ No monitoring completed<br>☐ Downstream<br>✓ Onsite<br>☐ Upslope<br>☐ Upstream<br>**Note:** Beaver occupancy was monitored using sign surveys and game cameras. Of the 23 relocations, seven resulted in permanent establishment of beaver families at monitored release sites. |

### Instream Habitat Project

| | | |
|---|---|---|
| Total Miles Of Instream Habitat Treated (C.4.b) | 0.50<br>**Note:** Estimates based on the results from our previous successful relocations. Using the average amount of habitat restored per successful site, we extrapolated to predict the amount of habitat restored for future relocation sites. | 2.00<br>**Note:** Actual stream miles restored was not possible to quantify due to issues with UAV monitoring, however we estimate based on established relocated beavers at five sites that approximately 2 stream miles were positively impacted by relocated beavers. This number could easily be higher for beavers that left monitored reaches, further contributing to restored mile quantity. |

#### Beavers (C.4.h.1)

| | | |
|---|---|---|
| Total cost for Beavers | $34,210 | *Not Collected at Closure* |
| Number Of Beavers (C.4.h.2) | 10<br>**Note:** In the first three years of the Tulalip Beaver Project, staff have been able to relocate 80 beavers and foresee having the ability to meet or exceed this number of relocated beavers over the next three years. Beavers are released in family units; the number of beavers will depend on the size of the families relocated. | 30<br>**Note:** Of 62 beavers relocated, 30 were placed across six sites in the Skykomish watershed. |

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

| | | |
|---|---|---|
| Total cost for Channel structure placement | | *Not Collected at Closure* |
| Material Used For Channel Structure (C.4.d.2) | Deflectors/Barbs<br>✓ Flood Fencing<br>Gabions<br>Individual Logs (Anchored)<br>Individual Logs (Unanchored)<br>Logs Fastened Together (Logjam)<br>None<br>Other Engineered Structures<br>Rocks/Boulders (Fastened Or Anchored)<br>Rocks/Boulders (Unanchored)<br>Stumps With Roots Attached (Rootwads)<br>Weirs<br>**Note:** Beaver Dam Analogs to prepare sites for future beaver relocation. | Deflectors/Barbs<br>✓ Flood Fencing<br>Gabions<br>Individual Logs (Anchored)<br>Individual Logs (Unanchored)<br>Logs Fastened Together (Logjam)<br>None<br>Other Engineered Structures<br>Rocks/Boulders (Fastened Or Anchored)<br>Rocks/Boulders (Unanchored)<br>Stumps With Roots Attached (Rootwads)<br>Weirs |
| Miles of Stream Treated for channel structure placement (C.4.d.3) | 0.01 | 0.13<br>**Note:** estimated for fixes to 12 structures and installation of one new structure. |
| Pools Created through channel structure placement (C.4.d.5) | 2<br>**Note:** Above Beaver Dam Analogs (surface water acreage will be calculated for each relocation site). | 5<br>**Note:** Four existing structures were maintained (three times) and one new structure was placed. |
| Number of structures placed in channel (C.4.d.7) | 2 | 1<br>**Note:** Four existing structures were maintained (three times) and one new structure was placed. |

### Architectural & Engineering

#### Architectural & Engineering (A&E)

| | | |
|---|---|---|
| Total cost for Architectural & Engineering (A&E) | | *Not Collected at Closure* |
| Did A&E costs exceed billed amount (Yes/No) | *Collected at Closure* | No |

### Agency Indirect Costs

#### Agency Indirect

| | | |
|---|---|---|
| Total cost for Agency Indirect | $14,035 | *Not Collected at Closure* |

## Worksite: Snoqualmie Headwaters Secondary Restorat (#2)

| | | |
|---|---|---|
| Targeted salmonid ESU/DPS (A.23) | ☐ No Salmon ESU or Steelhead DPS<br>✓ Chinook Salmon-Puget Sound ESU<br>☐ Chinook Salmon-unidentified ESU<br>☐ Pink Salmon-Even year ESU<br>✓ Pink Salmon-unidentified ESU<br>✓ Steelhead-Puget Sound DPS<br>☐ Steelhead/Trout-unidentified DPS | ☐ No Salmon ESU or Steelhead DPS<br>✓ Chinook Salmon-Puget Sound ESU<br>☐ Chinook Salmon-unidentified ESU<br>☐ Pink Salmon-Even year ESU<br>✓ Pink Salmon-unidentified ESU<br>✓ Steelhead-Puget Sound DPS<br>☐ Steelhead/Trout-unidentified DPS |
| Targeted species (non-ESU species) | ☐ None<br>☐ Unknown<br>☐ Brook Trout<br>☐ Brown Trout<br>✓ Bull Trout<br>☐ Cutthroat<br>☐ Forage Fish<br>☐ Kokanee<br>☐ Lamprey<br>☐ Rainbow<br>☐ Searun Cutthroat | ☐ None<br>☐ Unknown<br>☐ Brook Trout<br>☐ Brown Trout<br>✓ Bull Trout<br>☐ Cutthroat<br>☐ Forage Fish<br>☐ Kokanee<br>☐ Lamprey<br>☐ Rainbow<br>☐ Searun Cutthroat |
| Miles of Stream and/or Shoreline Treated or Protected (C.0.b) | 0.50<br>**Note:** This is an estimate. Sponsor will calculate results of beaver relocation by measuring each release location from downstream most beaver dam to the upstream extent of inundation. | 0.80<br>**Note:** Actual stream miles restored was not possible to quantify due to issues with UAV monitoring, however we estimate based on established relocated beavers at two sites that approximately 0.8 stream miles were positively impacted by relocated beavers. This number could easily be higher for beavers that left monitored reaches, further contributing to restored mile quantity. |
| Project Identified In a Plan or Watershed Assessment (C.0.c) | Shared Strategy Development Committee. 2007. Puget Sound Salmon Recovery Plan. Seattle, WA.<br>Snohomish Basin Recovery Forum, June 2005, Snohomish River Basin Salmon Conservation Plan, Snohomish County Department of Public Works, Surface Water Management Division, Everett, WA.<br><br>Snohomish Basin Protection Plan: 4.2.6. Beaver Management.<br><br>Snohomish River Salmon Conservation Plan: Ch. 5<br><br>Puget Sound Partnership Action Agenda-Near Term Actions: Appendix D; Page 546-684 | *Not Collected at Closure* |
| Priority in Recovery Plan | The plan identifies the need to restore off-channel habitat in the to benefit recovery of Puget Sound Chinook Salmon. | *Not Collected at Closure* |
| Type Of Monitoring (C.0.d.1) | ☐ Implementation Monitoring<br>✓ None | ☐ Implementation Monitoring<br>✓ None |

| | | |
|---|---|---|
| | **Note:** Monitoring is funded with dollars outside of this SRFB project agreement and entails monitoring 1/4 mile of stream at each release site for beaver activity and calculating the acres of inundation above the dam(s). | |
| Monitoring Location (C.0.d.2) | ✓ No monitoring completed<br>Downstream<br>Onsite<br>Upslope<br>Upstream<br>**Note:** Monitoring work is funded through another source, and lasts ~ 9 months post beaver relocation. It is outside of this project's scope of work. | No monitoring completed<br>Downstream<br>✓ Onsite<br>Upslope<br>Upstream<br>**Note:** Beaver occupancy was monitored using sign surveys and game cameras. Of the 23 relocations, seven resulted in permanent establishment of beaver families at monitored release sites. |

### Instream Habitat Project

| | | |
|---|---|---|
| Total Miles Of Instream Habitat Treated (C.4.b) | 0.50<br>**Note:** Estimates based on the results from our previous successful relocations. Using the average amount of habitat restored per successful site, we extrapolated to predict the amount of habitat restored for future relocation sites. | 0.80<br>**Note:** Actual stream miles restored was not possible to quantify due to issues with UAV monitoring, however we estimate based on established relocated beavers at two sites that approximately 0.8 stream miles were positively impacted by relocated beavers. This number could easily be higher for beavers that left monitored reaches, further contributing to restored mile quantity. |

#### Beavers (C.4.h.1)

| | | |
|---|---|---|
| Total cost for Beavers | $30,000 | *Not Collected at Closure* |
| Number Of Beavers (C.4.h.2) | 10<br>**Note:** In the first three years of the Tulalip Beaver Project, staff have been able to relocate 80 beavers and foresee having the ability to meet or exceed this number of relocated beavers over the next three years. Beavers are released in family units; the number of beavers will depend on the size of the families relocated. | 27<br>**Note:** Of 62 beavers relocated, 27 were placed across six sites in the Skykomish watershed. |

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

| | | |
|---|---|---|
| Total cost for Channel structure placement | $14,467 | *Not Collected at Closure* |
| Material Used For Channel Structure (C.4.d.2) | Deflectors/Barbs<br>✓ Flood Fencing<br>Gabions<br>Individual Logs (Anchored)<br>Individual Logs (Unanchored)<br>Logs Fastened Together (Logjam)<br>None<br>Other Engineered Structures<br>Rocks/Boulders (Fastened Or Anchored)<br>Rocks/Boulders (Unanchored)<br>Stumps With Roots Attached (Rootwads)<br>Weirs<br>**Note:** Beaver Dam Analogs to prepare sites for future beaver relocation. | Deflectors/Barbs<br>✓ Flood Fencing<br>Gabions<br>Individual Logs (Anchored)<br>Individual Logs (Unanchored)<br>Logs Fastened Together (Logjam)<br>None<br>Other Engineered Structures<br>Rocks/Boulders (Fastened Or Anchored)<br>Rocks/Boulders (Unanchored)<br>Stumps With Roots Attached (Rootwads)<br>Weirs<br>**Note:** BDA work was only performed in the Skykomish watershed. Installation permissions for the Snoqualmie watershed were not granted in time to use funds from this grant. |
| Miles of Stream Treated for channel structure placement (C.4.d.3) | 0.01 | 0<br>**Note:** BDA work was only performed in the Skykomish watershed. Installation permissions for the Snoqualmie watershed were not granted in time to use funds from this grant. |
| Pools Created through channel structure placement (C.4.d.5) | 2<br>**Note:** Above Beaver Dam Analogs (surface water acreage will be calculated for each relocation site). | 0<br>**Note:** BDA work was only performed in the Skykomish watershed. Installation permissions for the Snoqualmie watershed were not granted in time to use funds from this grant. |
| Number of structures placed in channel (C.4.d.7) | 2 | 0<br>**Note:** BDA work was only performed in the Skykomish watershed. Installation permissions for the Snoqualmie watershed were not granted in time to use funds from this grant. |

## Architectural & Engineering

### Architectural & Engineering (A&E)

| | | |
|---|---|---|
| Total cost for Architectural & Engineering (A&E) | $7,000 | *Not Collected at Closure* |
| Did A&E costs exceed billed amount (Yes/No) | *Collected at Closure* | No |

## Agency Indirect Costs

### Agency Indirect

| | | |
|---|---|---|
| Total cost for Agency Indirect | $0 | *Not Collected at Closure* |

## Overall Metrics

| | Current Agreement | Final |
|---|---|---|
| **Completion Date** | | |
| Projected date of completion | 12/31/2019 | 03/30/2023 |
| **Project Goals** | | |
| Goals, purpose, and expected benefits (A.17) | The Tulalip Beaver Project addresses hydrologic problems in the Snohomish Basin, particularly in the Skykomish Watershed, that are inhibiting the recovery efforts of salmon, steelhead, and bull trout. These problems include impacts to hydrologic and sediment processes, loss of high-quality habitat, and loss of floodplain and off-channel connectivity. Climate models predict a decrease in summer precipitation and an increase in winter precipitation and storm intensity. This transition in the Snohomish from a mixed/snow to rain-dominated basin by 2080 will result in high volumes of fine sediment in the water column that will limit fish production. These changes will substantially affect flow quantities and timing as well as habitat quality and availability. | The Tulalip Beaver Project passively addressed hydrologic issues in the Snohomish and Stillaguamish watersheds through strategic beaver relocation of 62 beavers, for the purposes of restoring and creating habitat for salmonids. With establishment of seven sites across the Snohomish basin, the Tulalip Beaver Project has contributed to long-term protection of hydrologic processes for salmonids and other species as our climate continues to vary and dry in this region. |

## Restoration Costs

*Final amounts include a pending billing*
*Date of Last Released Billing 04/10/2024*

| | | Proposed | Final |
|---|---|---|---|
| **Worksite: Skykomish Headwaters Secondary Restoration (#1)** | | | |
| | SPLIT OUT FINAL TOTAL BELOW | $226,716 | $55,394 |
| Instream Habitat Costs (C.4.a) | | $34,210 | $31,457 |
| Architectural & Engineering Costs | | | $10,617 |
| Agency Indirect Costs | | $19,822 | $13,320 |
| | Difference | | $0 |
| **Worksite: Snoqualmie Headwaters Secondary Restorat (#2)** | | | |
| | SPLIT OUT FINAL TOTAL BELOW | $0 | $36,975 |
| Instream Habitat Costs (C.4.a) | | $44,467 **Note:** This is an estimate and will be determined by the number of beavers trapped and released in the Snoqualmie watershed. | $20,105 |
| Architectural & Engineering Costs | | $7,000 | $7,295 |
| Agency Indirect Costs | | $0 | $9,575 |
| | Difference | | $0 |

## Billed Summary

*Final amounts include a pending billing*
*Date of Last Released Billing 04/10/2024*

| Category | Project Agreement RCO | Total | Totals To Date Expended | Non Reimbursable | Total Billed |
|---|---|---|---|---|---|
| Restoration | | | | | |
| Construction | 76,744.15 | 92,712.00 | 74,456.89 | | 74,456.89 |
| AA&E | 15,967.85 | 16,370.00 | 1,542.06 | 16,370.00 | 17,912.06 |
| **Restoration Total** | **92,712.00** | **109,082.00** | **75,998.95** | **16,370.00** | **92,368.95** |
| Total | 92,712.00 | 109,082.00 | 75,998.95 | 16,370.00 | 92,368.95 |

## Sponsor Match

| | Proposed | Final |
|---|---|---|
| **Project Funding** | | |
| Federal Funds | | |
| State Funds (A.11) | | $74,737.79 |
| Pending Billing - RCO Share Approved | *Collected at Closure* | $1,261.16 |

## Match Details

| Match Category | Match Type | Proposed | Final |
|---|---|---|---|
| Other In-Kind Contributions | Donated Equipment | | |
| Amount | | $10,000.00 | $10,340.57 |
| Funding Organization | | | Tulalip Tribes |
| Donated Paid Labor | Sponsor Payroll | | *Unable to tie Billed match to Proposed match.* |
| Amount | | *N/A* | $6,029.43 |
| Funding Organization | | | Tulalip Tribes |
| Donated Unpaid Labor | Donated General Labor | | |
| Amount | | $24,627.00 | $0.00 |
| Funding Organization | | | |
| Number of Hours | | *Collected at Closure* | |
| Valuation Method | | *Collected at Closure* | RCO Standard Labor Rate |

| | | | | |
|---|---|---|---|---|
| Project Funding Total | $0.00 | | $75,998.95 | 82.28 % |
| Sponsor Match Total | $34,627.00 | 100.00 % | $16,370.00 | 17.72 % |
| Project Total | $34,627.00 | 100.00 % | $92,368.95 | 100.00 % |
| Total Billed | | | $92,368.95 | |
| Difference | | | $0.00 | |

## Attachments

**PHOTOS (JPG, GIF)**

Photos (JPG, GIF)

**PROJECT DOCUMENTS AND PHOTOS**

Project Documents and Photos

| File Type | Attach Date | Attachment Type | Title | Person | File Name, Number Associations | Share |
|---|---|---|---|---|---|---|
| | 01/25/2024 | Final project report | Fig1_SiteStatusFinal.docx | MollyA | Fig1_SiteStatusFinal.docx, 594451 Final Report, 04/24/2024, Accepted | ✓ |

## Certify & Submit

**Status History**

| Report Status | Date | User | Note |
|---|---|---|---|
| Accepted | 04/24/2024 | Amee Bahr | Thank you!! Hooray! |
| Submitted | 04/24/2024 | Molly Alves | |
| Draft | 04/19/2023 | Jennifer Williams | |

WASHINGTON STATE Recreation and Conservation Office

# Property Report

## PROJECT: 16-1574 REST, SNOHOMISH WATERSHED RESTORATION USING BEAVER

Sponsor: Tulalip Tribes Program: Puget Sound Acq. & Restoration Status: Active
Project Start Date: 01/20/2018 Agreement End Date: 03/30/2023

PROPERTY: Mount Baker Snoqualmie National Forest (1: Skykomish Headwaters Secondary Restoration)

### Property Basics

**Acquisition** ✓**Restoration**

### Property Location

**Property Name** Mount Baker Snoqualmie National Forest
**Property Address (optional)**
**City**
**State** **Zip**

**Property Description** The property is owned by the U.S. Forest Service, under the jurisdiction of the Mount Baker Snoqualmie National Forest. We will relocate beavers to headwater tributaries of the Skykomish River for the purpose of restoring degraded salmon rearing habitat.
**Associated Worksite** Skykomish Headwaters Secondary Resto

### Landowner

**Landowner Name** U.S. Forest Service
**Address (optional)** 74920 Stevens Pass Hwy
**City** Skykomish
**State** WA **Zip** 98288
**Landowner Type** Federal

### Control and Tenure

**Instrument Type** Landowner Agreement
**Timing** Existing
**Term Type** Fixed # of years
**# Yrs** 10
**Expiration Date** 08/01/202
**Note**

### Parcel Numbers

| County Name | Parcel Number | Mapped | Notes (optional) |
|---|---|---|---|
| No parcels | | | |

### Recording Numbers

| Instrument Type | Recording Number | Notes |
|---|---|---|
| No recordings | | |

### Sponsor Clarification

✓**The above information is correct and complete**

### RCO Notes

✓**Property data verified by RCO Staff**

# Property Report: Mount Baker Snoqualmie National Forest (Worksite #1: Skykomish Headwaters

## Attachments

**PHOTOS (JPG, GIF)**

Photos (JPG, GIF)



# 254913 Primary

**PROJECT DOCUMENTS AND PHOTOS**

Project Documents and Photos

| File Type | Attach Date | Attachment Type | Title | Person | File Name, Number Associations | Shared |
|---|---|---|---|---|---|---|
| | 07/11/2022 | Design document | BDA Final Map.pdf | MollyA | BDA Final Map.pdf, 523120<br>Property: Mount Baker Snoqualmie National Forest | ✓ |
| | 03/30/2016 | Landowner acknowledgement form | Landownerack_usfs_skykomish | MollyA | Landownerack_usfs_skykomish.pdf, 254966<br>Property: Mount Baker Snoqualmie National Forest | ✓ |
| | 03/30/2016 | Video | Bobcat with salmon on post-release constructed dam | MollyA | EK000005.avi, 254914<br>Property: Mount Baker Snoqualmie National Forest | ✓ |
| | 03/30/2016 | Photo | Beaver dam constructed at release site, Mahoney | MollyA | DSC_0037.jpg, 254913<br>Property: Mount Baker Snoqualmie National Forest | ✓ |

WASHINGTON STATE Recreation and Conservation Office

# Property Report

## PROJECT: 16-1574 REST, SNOHOMISH WATERSHED RESTORATION USING BEAVER

Sponsor: Tulalip Tribes Program: Puget Sound Acq. & Restoration Status: Active
Project Start Date: 01/20/2018 Agreement End Date: 03/30/2023

PROPERTY: Mt. Baker Snoqualmie National Forest (2: Snoqualmie Headwaters Secondary Restorat)

### Property Basics

**Acquisition** ✓**Restoration**

### Property Location

**Property Name** Mt. Baker Snoqualmie National Forest
**Property Address (optional)**
**City**
**State** **Zip**

**Property Description** The property is owned by the U.S. Forest Service, under the jurisdiction of the Mount Baker Snoqualmie National Forest. We will relocate beavers to headwater tributaries of the Snoqualmi River for the purpose of restoring degraded salmon rearing habitat.
**Associated Worksite** Snoqualmie Headwaters Secondary Rest

### Landowner

**Landowner Name** Mt Baker Snoq. Natl Forest
**Address (optional)** 810 State Route 20
**City** Sedro-Woolley
**State** WA **Zip** 98284
**Landowner Type** Federal

### Control and Tenure

**Instrument Type** Landowner Agreement
**Timing** Proposed
**Term Type** Fixed # of years
**# Yrs** 10
**Expiration Date** 03/31/203
**Note**

### Parcel Numbers

| County Name | Parcel Number | Mapped | Notes (optional) |
|---|---|---|---|
| No parcels | | | |

### Recording Numbers

| Instrument Type | Recording Number | Notes |
|---|---|---|
| No recordings | | |

### Sponsor Clarification

✓**The above information is correct and complete**

### RCO Notes

✓**Property data verified by RCO Staff**

# Property Report: Mt. Baker Snoqualmie National Forest (Worksite #2: Snoqualmie Headwaters

## Attachments

**PHOTOS (JPG, GIF)**

Photos (JPG, GIF)

**PROJECT DOCUMENTS AND PHOTOS**

Project Documents and Photos

| File Type | Attach Date | Attachment Type | Title | Person | File Name, Number Associations | Shared |
|---|---|---|---|---|---|---|

No attachments match filter criteria