Wasson Creek Watershed Restoration Plan

2022

Compiled by Alice Yeates (Stewardship Coordinator)
Based on 2018 report by Coos Watershed Association and Advisory Team recommendations

Wasson Creek Watershed, 2001

Table of Contents

Attached Separately

Appendix A. Approved Permits
Appendix B. Floodplain Hydrology Restoration Plan
Appendix C. Vegetation Plan
Appendix D. Upland Restoration Plan – *Approved by SSNERR Commission*
Appendix E. Access and Interpretation Plan
Appendix F. Inadvertent Discovery Plan

Overview

The Wasson Creek Watershed Restoration Project is designed to be the South Slough NERR's (SSNERR) latest and most innovative contribution to the science of coastal habitat restoration. These efforts, which SSNERR Stewardship, Research and Education Programs initiated nearly 30 years ago, along with the more recently established Coastal Training Program, continue to guide and educate coastal communities and managers about habitat restoration.

Since 1994, SSNERR has worked with technical advisors to restore the tidal and non-tidal wetlands along South Slough's Winchester Creek which were historically converted to support agricultural activities (e.g. Cornu & Sadro, 2002). SSNERR has restored approximately 55-acres of wetlands as part of the Winchester Tidelands Restoration Project (WTRP)(e.g., Cornu 2005), improving estuarine salmonid habitat throughout the Winchester system (e.g. Miller & Sadro, 2003), and testing methods for restoring lost coastal wetland habitat function and diminished ecosystem services. The Wasson Creek Watershed Restoration Project is the last site in the WTRP area in need of site-scale restoration. The Wasson Creek Project Area (Figure 1) was identified as a high priority restoration area in the SSNERR 2009 Upper Watershed Restoration Action Plan and the 2017-2022 Management Plan. The SSNERR acquired the recently harvested upper portion of the Wasson Creek drainage in 2012, providing the SSNERR with an opportunity to continue its innovative approach to restoration by demonstrating a holistic "ridgetop-to-estuary" approach to coastal restoration.

As with SSNERR's other WTRP projects the Wasson Creek watershed restoration project has the potential to restore critical tidal wetland habitat to numerous rare, endangered, and culturally important species including coho salmon, winter steelhead, and lamprey. But this innovative subbasin-scaled project has the additional benefit of also restoring or enhancing coastal forest habitat critical to the maintenance and growth of marbled murrelet and other key upland species populations.

The ridgetop-to-estuary Wasson Creek Watershed Restoration Plan (Plan) is designed to restore ecological value at the watershed level. This Plan seeks to target both terrestrial and aquatic habitats, using "Stage 0" principals (see Restoration Project Design below) to restore a wetland-stream complex in the lowlands, and silvicultural prescriptions to improve forest health in the uplands.

The Plan provides information on site location, gives a brief background on current conditions, and an overview of restoration objectives and approaches. The Plan is supplemented by six appendices, which provide greater detail on specific components of the project. The appendices include:

A) Project permits, which includes original permits and a summary of their status.
B) Floodplain Hydrological Restoration Plan, which details existing hydrological conditions and restoration methodologies for restoring a wetland-stream complex hydrology.
C) Vegetation Plan, which outlines native species planting and invasive plant removal in the floodplain and riparian zones.
D) Uplands Management Plan, which describes restoration thinning and planting activities for

upland areas.

E) Access and Interpretive Plan, which includes a conceptual overview of improvements to existing public access, restoration of a historic structure for public use and protection, and interpretive themes. [*To be attached once completed*]
F) Inadvertent Discovery Plan, which details actions to take if cultural resources are exposed.

Cultural Resources

The SSNERR and The Coos Watershed Association (CoosWA) worked closely with the Tribal Historic Preservation Offices from the Coquille Indian Tribe and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI) to complete an archeological survey and report for the 525-acre area within the Wasson Creek watershed. A cultural resources review was conducted for the entire Wasson subbasin and submitted to the State Historical Preservation Office (SHPO; Case No. 18-1234) and the US Army Corps. These documents are being revised and have been assigned a new Case No. (Appendix A). The cultural review is a confidential document and therefore could not be submitted with this report, but the original concurrence letter from SHPO and the Coquille Indian Tribe is attached in Appendix A. The CoosWA and SSNERR will continue to coordinate with SHPO and the Tribes to make sure that the design plans meet their needs, and an inadvertent discovery plan is in place for implementation (Appendix F).

Plan Development

Since 2015 SSNERR has worked with CoosWA, the Coquille Indian Tribe and a robust technical Advisory Team to develop the Wasson Creek Watershed Restoration Plan (OWEB Grant #215-2039). Original designs were completed in 2018 under the guidance of an Advisory Team consisting of representatives from the following entities: Coos WA, Coquille Indian Tribe (CIT), CTCLUSI, Bureau of Land Management (BLM), Institute for Applied Ecology, Oregon State University (OSU), OSU Extension, Oregon Department of Forestry (ODF), Oregon Department of Fish & Wildlife (ODFW), US Fish & Wildlife Service (USFWS), and US Forest Service (USFS), along with private consultants like Yankee Creek Forestry and Aplondontia Services. With initial designs approved by the advisory committee, the Coos WA submitted and received the required permits or concurrences (Appendix A). The permits have been subsequently updated and a summary of permit status is included in Appendix A. In 2021/2022 the SSNERR worked with the Advisory Team to incorporate latest restoration methodologies and expert suggestions, which have strengthened the Plan. The Plan is now ready to face potential project funding organizations' proposal review teams.

Project Area Location

The Wasson Creek Watershed Restoration Project lies within the SSNERR, a more than 6,000-acre protected area in the Coos estuary on the southern Oregon coast. The SSNERR is located on the traditional lands of the Miluk Coos people, who have managed these lands for abundance since

time immemorial. The continued connection of the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians, the Coquille Indian Tribe and the Confederated Tribes of the Siletz Indians to these lands and waters is important for restoration success. The Wasson watershed is approx. 525-acre, with 22-acre of lowlands (17-acre in the main and 5-acre on the upper valley) and 503-acre of upland forest. Wasson Creek is a tributary of Winchester Creek, the largest freshwater source to the South Slough estuary (Figure 1).

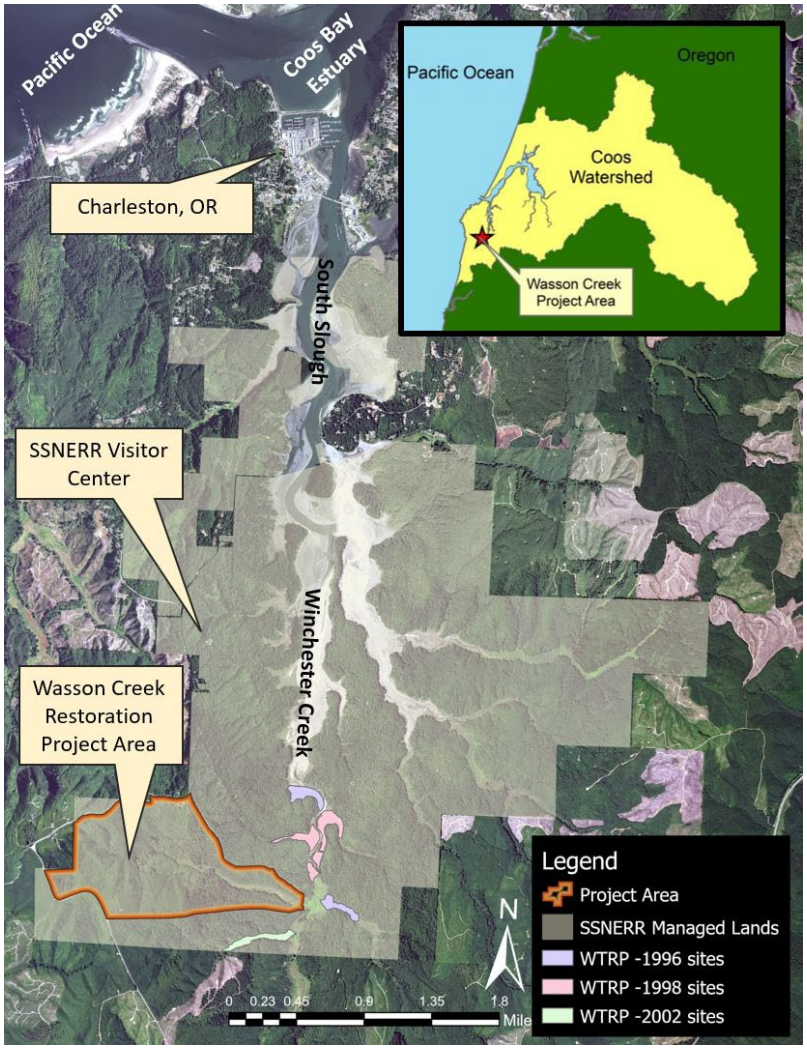


Figure 1: Wasson Creek Project Area (orange polygon) within the South Slough NERR and Coos Watershed (insert).

Topographic and hydrologic features in the Wasson Creek watershed influence the restoration needs and restrict use of restoration methodologies. The 22-acre Wasson Creek floodplain is divided, about 3,500-ft up the valley (along the central axis), by a geologic constriction (~90-ft wide)(Figure 2). Above the constriction a 5-acre floodplain is defined as the Upper Valley, while the 17-acre Main Valley extends below the constriction to the confluence with Winchester Creek at the downstream end. Based on hydrologic conditions, the Main Valley is further assigned three management areas, Main Valley Upper, Main Valley Middle, and Main Valley Lower (Figure 2).

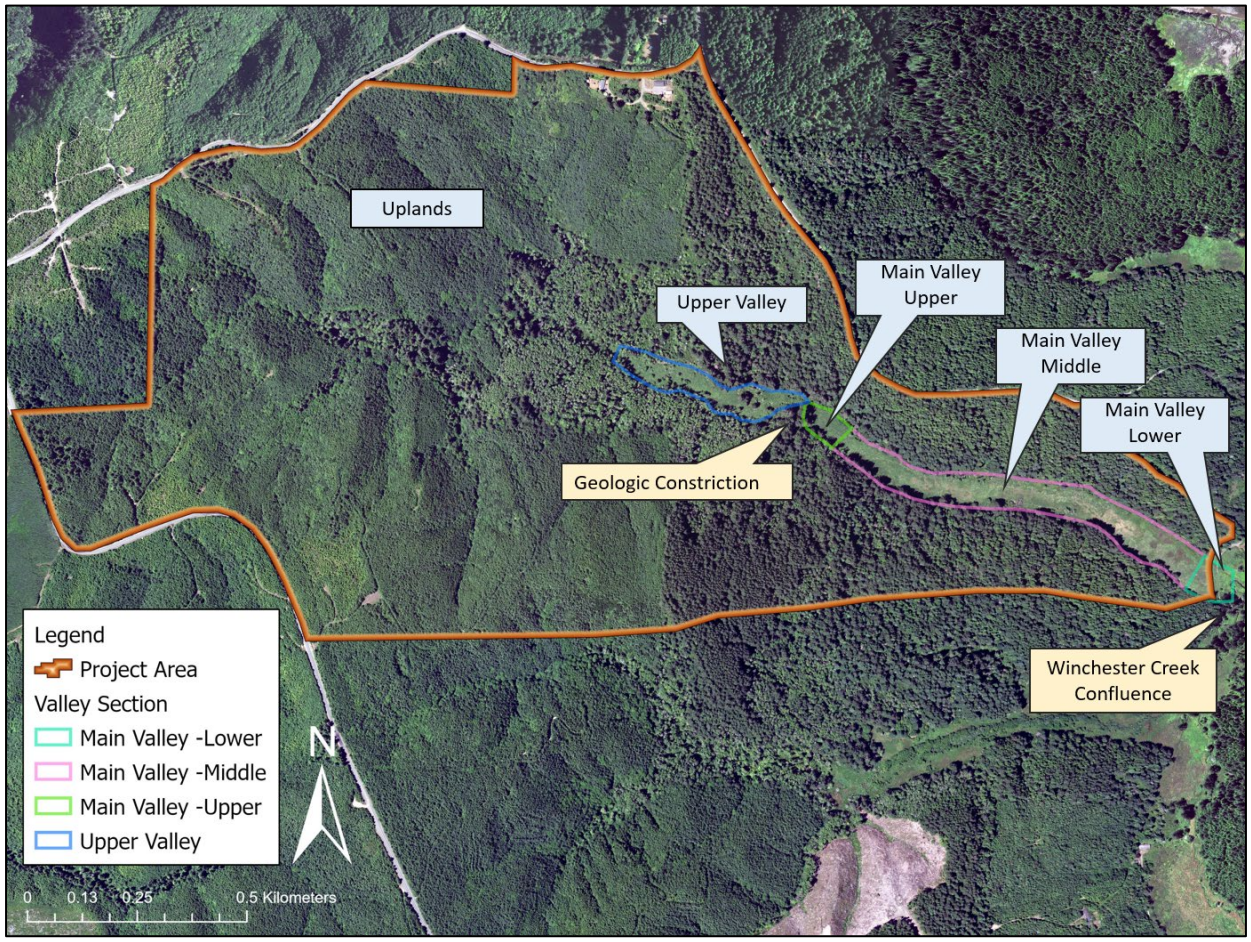


Figure 2: Wasson Creek watershed restoration project area with the floodplains defined by >1% slope to the west and Winchester Creek to the east. A geologic constriction separates the Upper from the Main Valley. The Main Valley includes three management areas; Lower, Middle, and Upper.

Current Conditions and Problems

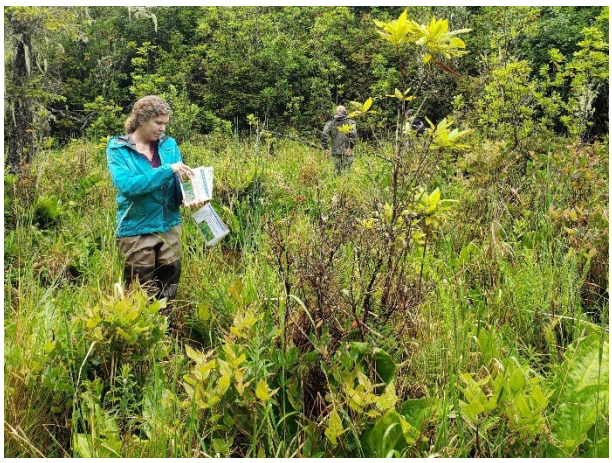
The Wasson Creek watershed supports populations of several estuarine- dependent fish species, two of which are targeted evolutionarily significant anadromous fish; coho salmon (*Oncorhynchus kisutch*), winter steelhead (*Oncorhynchus mykiss*) and sea-run and resident cutthroat trout (*Oncorhynchus clarki clarki*), a federally listed species of concern. Several species with cultural importance to local Tribal Nations utilize Wasson Creek, in addition to coho salmon, these include both Pacific and western brook lamprey (*Entosphenus tridentatus* and *Lampetra richarsonii* respectively).

The basin is within the nesting zone and forest type of the endangered marbled murrelet (*Brachyramphus marmoratus*); however, current forest conditions do not support this species. Prior to SSNERR establishment in 1974, and acquisition of the western portion in 2012, the Wasson Creek subbasin's timber was harvested multiple times and its floodplain converted to pasture and crop lands. The constructed ditches in the floodplain, established to support

agricultural activities in the floodplain, resulted in fractured stream and floodplain connectivity, and resulted in diminished fish habitat. Also, the remnants of high-density tree planting without the recommended thinning in the uplands and simplified floodplain plant community resulted in degraded bird and wildlife habitats (Figure 3 & Attachment 1).

a) **Wasson Creek**

b) **Reference**



c)

d)

Figure 3: Simplified habitats and in the Wasson Creek watershed. Images show a disconnected floodplain dominated by the invasive plant, reed canary grass (Phalaris arundinacea) (a), and a dense forest stand with poor branch development and sparce understory (c). Complex habitats at the Tom's Creek reference site in SSNERR (b) and Cummins Creek reference site (d) provide reference conditions.

There are eight fundamental "problems" that the Wasson Creek Watershed Restoration Project is designed to address:

1) **Constructed ditches.** Wasson Creek currently flows through an incised, historically constructed ditch that borders the south side of the valley, with a seasonally active ditch bordering the north side of the valley. The incised ditches still drain the floodplain, severely limiting wetland function and habitat complexity for fish and other aquatic species.
2) **Dense forests and few riparian zone trees.** The Wasson Creek subbasin includes

around 500-acres of forested upland, a majority of which has been harvested multiple times since the early 20th century. As a result, upland forest communities in the subbasin feature stands with overly crowded tree densities and repressed understory habitats. These conditions result in slow growing forests that are structurally simple, exhibiting few later successional or old growth characteristics. The absence of riparian zone trees or shrubs means limited opportunities for the natural recruitment of large woody debris to enhance the habitat complexity of the Wasson Creek floodplain.

3) **Limited large wood.** As part of the 2010-2011 aquatic habitat inventory (AQI) of South Slough basin, the CoosWA assessed the aquatic habitat of Wasson Creek (OWEB #210-2023; Cornu *et al*., 2012). The AQI results indicated that the frequency and volume of large wood debris (LWD) in Wasson Creek does not meet habitat benchmarks (Moore *et al*., 2006; Watershed Professionals Network, 1999). These deficits can be attributed to the lack of adjacent late successional forest and riparian plant communities that supply key wood pieces to Wasson Creek.
4) **Poor soils.** The same AQI also revealed that the percent of sand, silt, and organics exceeds valuesconsidered to be optimal for fish habitat (Cornu *et al*., 2012).
5) **Invasive plant dominance.** Floodplain wetlands in the lower Wasson Creek drainage, that were once dominated with native sedge/bulrush/twinberry/crab apple plant communities, are now hydrologically disconnected from Wasson Creek and dominated by invasive reed canary grass (*Phalaris arundinacea*). The upland edge plant community is dominated by other non-native, invasive species including Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), Canadian thistle (*Cirsium arvense*), and cotoneaster (*Cotoneaster spp.*).
6) **Fractured habitat**. Habitat connectivity in the Wasson Creek drainage is fragmented for aquatic, wetland, and upland species alike. Due to fractured hydrology from wetland ditching, the presence of invasive species, and simplified upland communities, salmonid and wildlife habitat availability and connectivity is a problem in the Wasson Creek watershed.
7) **Limited cultural resources.** Simplified plant communities, dominated by invasive species, provide few opportunities for the cultural connections that are abundant in healthy wetland systems. Many culturally important wetland and forest plant species were lost or reduced in abundance in the Wasson Creek watershed.
8) **Loss of forested tidal swamps.** As with many freshwater tidal areas in Oregon, forested tidal swamps were lost in the tidal portion of Wasson Creek. Approximately 2-acres of forested tidal swamp fringes Winchester Creek and the lower 100-ft reach of Wasson Creek's southern ditch.

Restoration Project Design

The Wasson Creek Watershed Restoration Plan is a ridgetop-to-estuary project that includes variable density thinning in the uplands and Stage 0 restoration principles in the lowlands (Powers et al. 2018; Behan et. al. 2021). Variable density thinning is an emerging forest practice that

restores heterogeneity in dense second growth stands by creating “skips and gaps” within a thinned stand. By creating more availability to resources such as light, water, nutrients and space to understory vegetation, this thinning method reintroduces the variability associated with old-growth forests into a regenerating stand (Carey, 2003; Carey and Johnson, 1995; Carey et al., 1999a; Comfort et al., 2010). Stage 0 restoration is a restoration method that establishes site conditions to allow natural processes (the power of surface water hydrology, sediment deposition, large wood recruitment, and beaver activity) to do virtually all the work establishing self-forming wetland-stream complexes (Powers et al. 2018). To achieve these restoration elements, multiple restoration techniques are used in this project allowing for the varied conditions and restoration objectives throughout the watershed. This section gives an overview of restoration methods and objectives for each management area, where management areas are delineated as Uplands, Upper Valley, Main Valley Upper, Main Valley Middle, and Main Valley Lower (Figure 2). Detailed descriptions of methodologies and maps can be found in Appendices B-D.

Uplands

The Wasson Creek upland (503-ac) contains stands that have been assessed as high (148-ac), mid (139-ac) and low (88-ac) priority areas and stands that will be left unmanaged (128-ac) (Figure 4). Variable density thinning restores heterogeneity in dense second growth stands by creating “skips and gaps” within a stand (Harrington 2009). “Skips” are patches that receive no treatment; “gaps” are areas that are cleared of overstory trees. A matrix of lightly thinned forest is left between skips and gaps that comprises much of the remainder of the stand. Variable density thinning allows for the natural recruitment of species already within the system. It also provides an opportunity to facilitate recruitment of species that are underrepresented, have been disproportionally impacted (e.g. by disease) and/or that are culturally important. Several species, including recently developed disease resistant varieties of Port-Orford-cedar and a variety of culturally important species, are recommended for planting in both thinned areas and gaps following treatment. See Figure 4 for map of Uplands management area and Appendix D for further details.

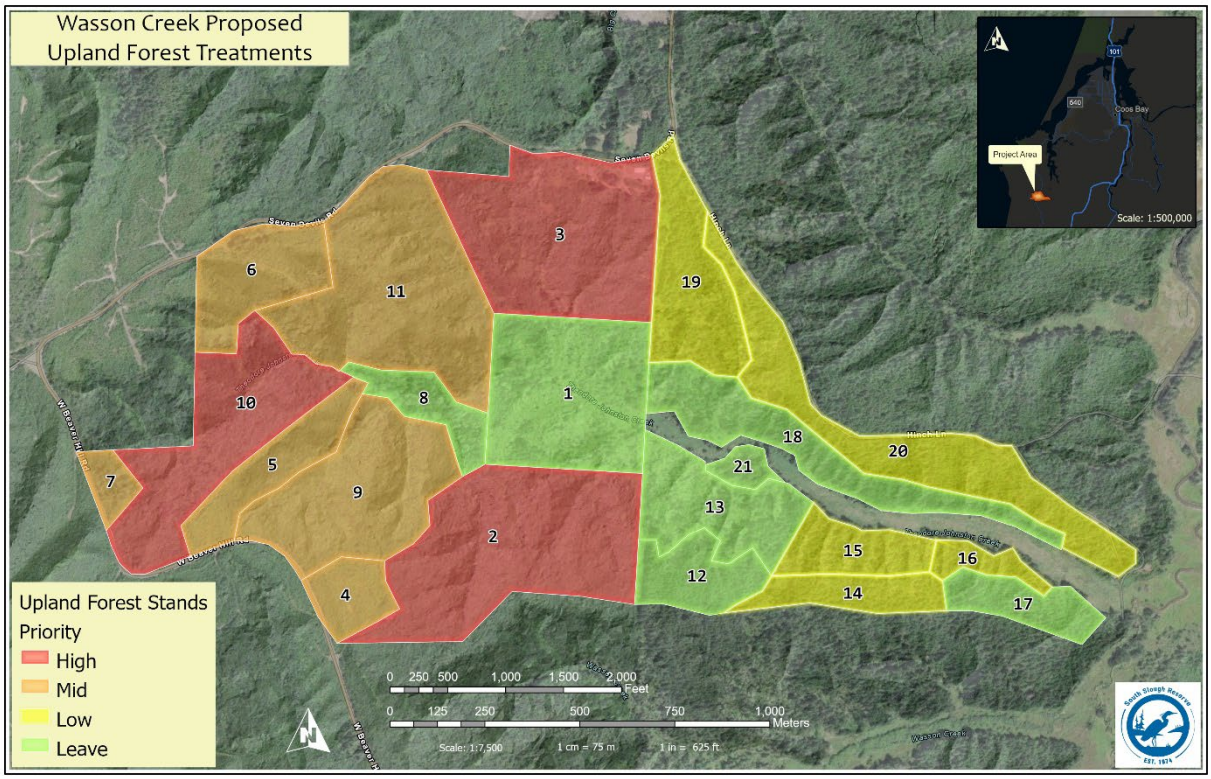


Figure 4: Wasson Creek Restoration Uplands Management Area. Prioritization for restoration is based on number of trees per acre, tree size, and age of stand, where the densest stands with smallest and youngest trees have the highest priority. Leave areas are due to sensitive site conditions or are relatively old and healthy forests.

The uplands management plan (Appendix D) was approved by the SSNERR Commission on April 30th, 2021, and work was completed in stands 4, 5, and 6 in Spring 2021.

Upper Valley

In the Upper Valley management area (5-acres; Figure 5) the channel has not been diverted into sidewall ditches and has retained a dynamic wetland-stream complex. The core problems in this area are the dominance of reed canary grass and below optimal large wood densities. Although beaver activity has been documented in this area populations are likely restricted due to loss of riparian and wetlands trees and shrubs. Due to access restrictions, we cannot utilize heavy machinery in this area. The management strategy in this area includes planting Sitka spruce for long term establishment of large wood and dense plantings of willow and other native shrubs to both increase hydrologic complexity by encouraging beaver activity and to shade out reed canary grass.
See Appendix C Planting Plan for further details.

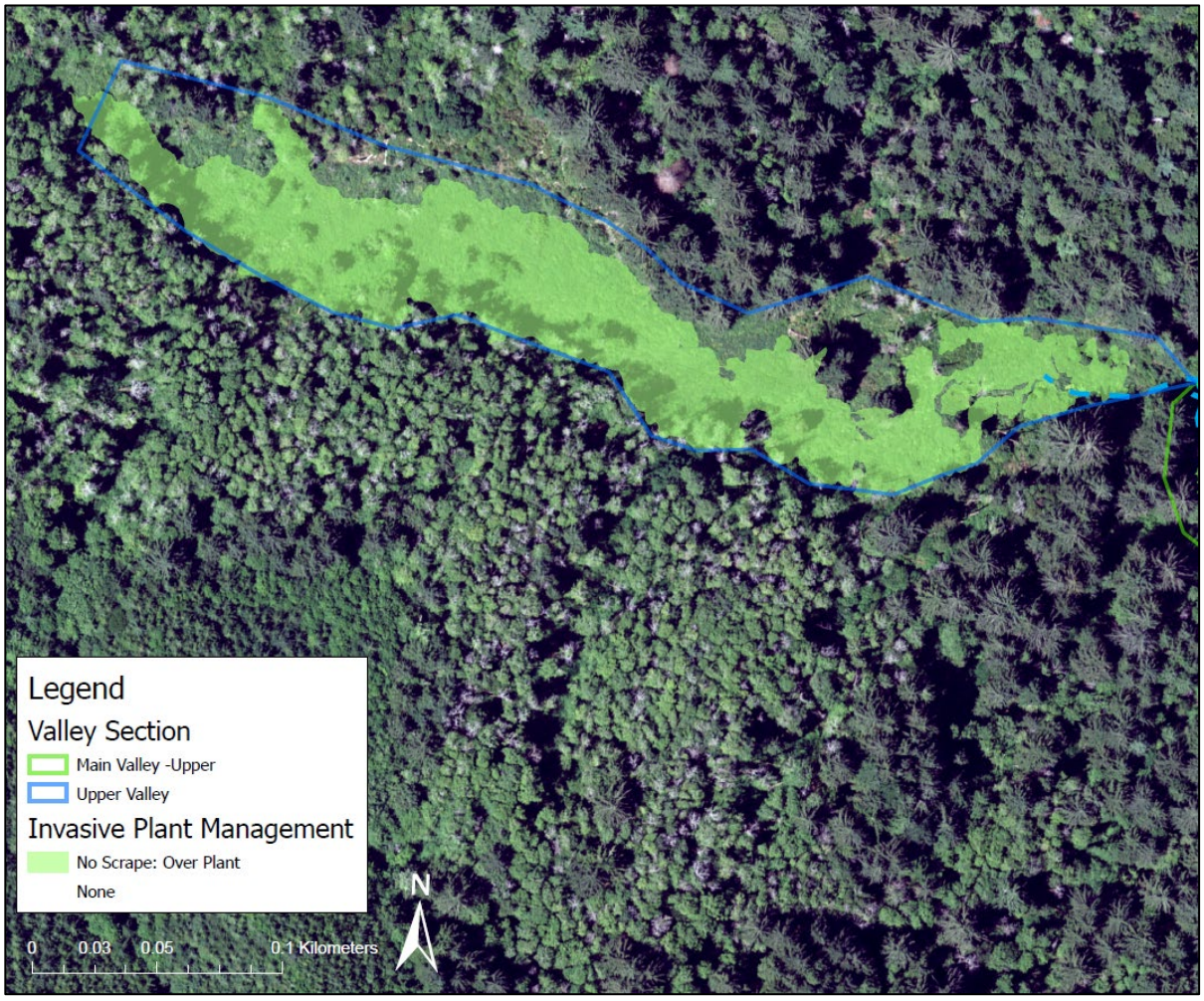


Figure 5: Upper Valley management area showing reed canary grass dominated areas shaded green. Invasive plant management in this area will be through shading, by planting dense stands of willows and native shrubs.

Main Valley Upper

The Main Valley Upper management area (1.4-ac) is characterized by a relatively intact Wasson Creek stream channel network and floodplain soils that are saturated virtually year-round (Figure 6). The objective for this area is to transition flow from within existing natural stream channels entering the management area out onto the floodplain instead of flowing into the historically constructed south ditch as it does now. Beaver Dam Analogs (BDAs) will be installed in the stream channels to slow the movement of water and increase sediment deposition, which will then reduce channel depth and thus ultimately encourage the stream to overflow its banks. In addition to BDAs, high densities of wood (>30 pieces/acre) will be distributed across the floodplain to slow flow and encourage development of complex flow pathways. Reed canary grass will be managed by overplanting with dense willow stakes and other native shrubs.
See Appendix B and C for further details.

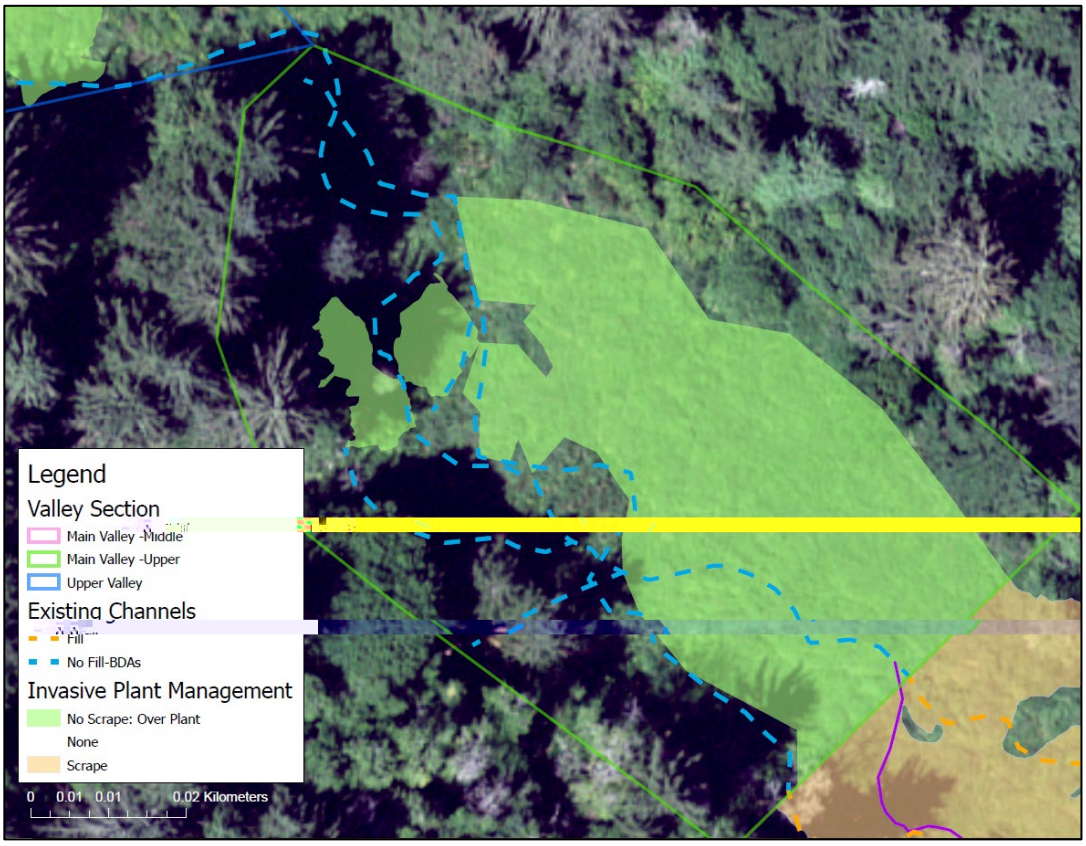


Figure 6: Main Valley Upper management area showing reed canary grass dominated areas shaded green and existing channels. Invasive plant management in this area will be through shading, by planting dense stands of willows and native shrubs. Hydrological alterations in this area will be created by installing beaver dam analogs (BDAs) and encourage beaver activity.

Main Valley Middle

The Main Valley Middle management area (14-acres) is characterized by a simplified incised stream channel network in the far upper portion and a deeply down-cut constructed ditch which crosses the floodplain to become the site's southern ditch (Figure 7). This southern ditch carries most of the Wasson Creek streamflow to its confluence with Winchester Creek. A second constructed ditch begins on the north side of the floodplain around one-third down this management area. Floodplain soils in this area are seasonally saturated during winter months (though often not entirely) and dry during summer and early fall months. Reed canary grass dominates the plant community in this area and, along with other invasive species, will be removed by mechanically scraping those areas to maximum root depth (approx. 1-1.5-ft). The resulting surface will be graded to a 1% grade line slope from the upstream end to confluence. Scraped materials will be used to fill ditches and direct flow away from the valley edges. A small fish passage channel, excavated with target dimensions of 6-in. depth and 3-5-ft width, will meander through the management area. Large wood will be placed and partially buried throughout the floodplain (20 pieces/acre). For the valley floor, a slough sedge "straw" mix will be used for erosion control and seeding. This material will be augmented with plugs from existing patches and a diverse seed mix of native wetland forbs, grasses, and rushes. The riparian buffer and forested wetlands will be planted with a mix of hardwoods, shrubs, and Sitka spruce. The public access trail, that crosses the floodplain about 800-ft from confluence, will be replaced by a boardwalk. See Appendix B, C, and E for further details.

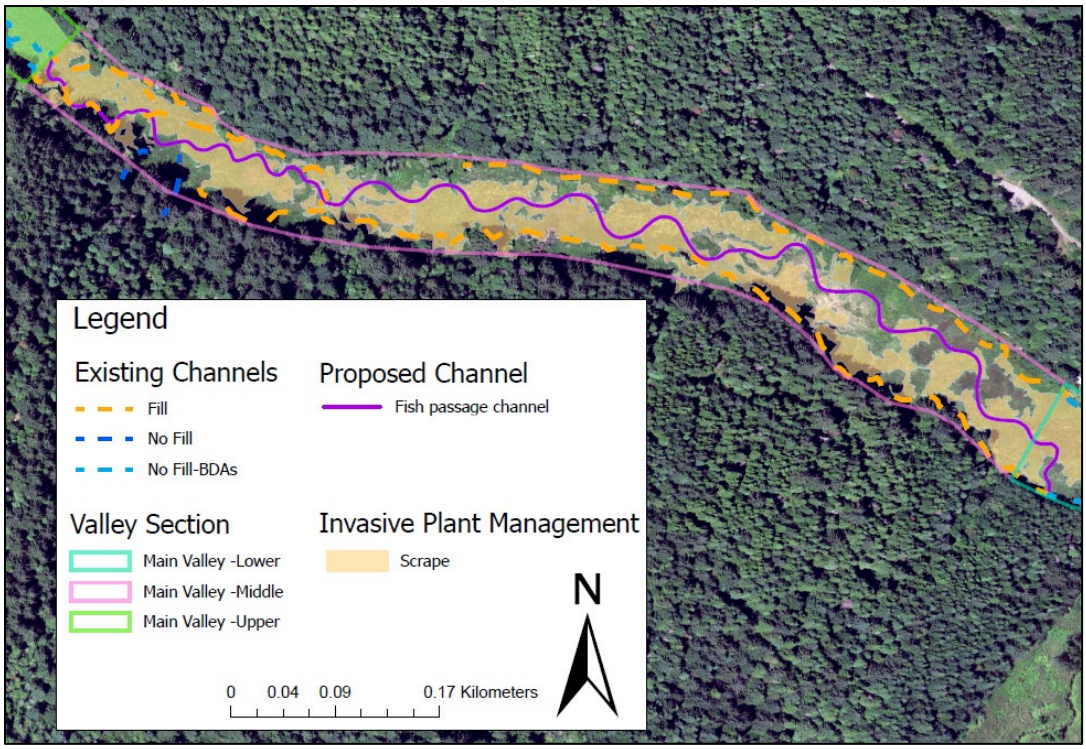


Figure 7: Main Valley Middle management area showing reed canary grass dominated areas (shaded yellow), existing channels (dashed lines) and proposed fish passage channel (solid line). Invasive plants in this area will be scraped to below root level and over planted with native wetland species. Existing channels in this area will be filled using scraped materials.

Main Valley Lower

The Main Valley Lower management area (1.6-acres; Figure 8) is characterized by semi-regular fresh water tidal flooding and seasonally and tidally influenced soil saturation. Both constructed ditches connect to Winchester Creek at the lower end of this management area. Restoration design elements that continue in this area from the upstream management area include scraping of reed canary grass, surface grading, excavation of fish passage channel and large wood placement (approx. 25 pieces/acre). Due to sensitivities in this management section some areas in the lower floodplain will not be scraped, and all ground disturbance will be closely monitored. The lowest reaches of the existing constructed ditches will not be filled all the way to their confluence with Winchester Creek to create a gradual ditch to maintain creek transition. Transition areas will be approx. 200-ft on the southern ditch and 600-ft on the northern ditch. BDAs will be used to reduce channel depth and encourage floodplain connections and beaver activity. The fish passage channel will connect to the southern ditch via an existing drainage depression. This management area will be planted with Sitka spruce forested tidal swamp associated species, using log cribs, and partially buried large wood. The public trail that crosses the floodplain and extends into the existing spruce swamp will be replaced by a boardwalk.
See Appendix B, C, and E for further details.

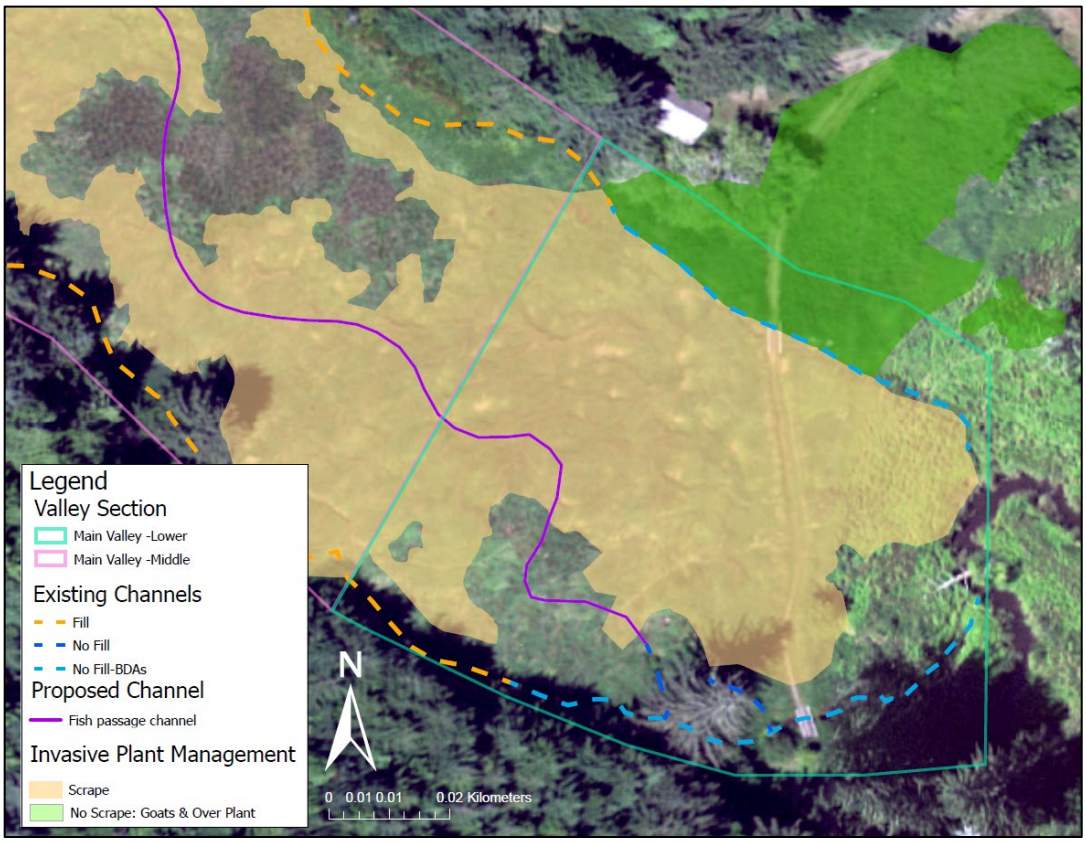


Figure 8: Main Valley Lower management area showing reed canary grass (yellow), Himalayan blackberry (green), existing channels (dashed lines) and proposed fish passage channel (solid line). Invasive plant management includes scraping (reed canary grass), goat browsing (blackberry) and overplanting with native species. Existing ditches will either have beaver dam analogs (BDAs) installed (light blue), left untouched (dark blue), or filled (orange). The fish passage channel will connect to an existing drainage that flows into the southern ditch.

Public Awareness and Educational Activities

Although the SSNERR has implemented several wetland restoration projects, this will be the most accessible for public and formal education programs. The existing Wasson Creek Loop Trail is a popular hiking trail and provides a significant opportunity for increasing the accessibility to trails in the Reserve. Appendix E proposes changes to the existing trail, outlines interpretive objectives, and details restoration plans for protection and use of a historic structure. An outreach and communication plan, from pre-restoration through implementation, has been developed but is not included in this document. Improvement to the trail section that extends from Wasson Creek to the mouth of Anderson Creek, restored in 2002, will provide access to a good comparison with an older restoration project which used different restoration techniques. This trail can be used as an interpretive hike where the public can learn about the project's history, goals, and its benefit to water, people, and wildlife. The Coquille Indian Tribe and the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians have agreed to develop interpretive information on cultural connections (past and present) in the Wasson watershed and coastal area. The Wasson Creek project site would also be a great place for an outdoor classroom where local students could learn about a wide range of ecology topics such as native plant identification, pollinators, wildlife, restoration methods, and much more! Students and/or volunteers can also partake in wildlife surveys (macroinvertebrate, bird, beaver, and fish) and vegetation monitoring, either to teach them ecological monitoring methods or as part of official post-project effectiveness monitoring.

Timeline

Table 1 provides a projected timeline for completing different elements of the Wasson Creek Restoration Project. This timeline is dependent on successful acquisition of funds in 2022/2023 and is subject to change. Detailed timelines for individual tasks can be found in Attachment 2.

Table 1: Estimated Wasson Creek Watershed Restoration Project timeline from 2021-2026

Year/Month	Project Component
2021	
Apr. 30	SSNERR Commission approved Appendix D: Wasson Uplands Restoration Plan
May	USFWS funds awarded to Friends of South Slough Reserve for forest thinning
Dec.	Coquille Tribal Community Fund awarded to Coos WA for willow planting
2022	
Apr.-May	Completed 45-acres of forest thinning
July	Present full plan to SSNERR Commission for approval (sans Appendix E)
Jul.-Dec.	Apply for funding
Aug.-Dec.	Update permits
Sep.-Dec.	Preparation for and planting in Upper Valley management area (Appendix C)
2023	
Jan.-Apr.	Contracting services for uplands work
May-Dec.	Forest thinning (Appendix D)
Jul.-Sept.	Install beaver dam analogs
2024	
Jan.-Dec.	Continue forest thinning as needed (Appendix D)
Jan.-Mar.	Contracting services for lowlands Main Valley management area
Jun.-Dec.	Main Valley restoration work (Appendix B and C)
2025	
Jan.-Dec.	Monitoring and adaptive management
Aug.-Dec.	Report writing
Nov.-Dec.	Preparation for and planting in Upper Valley management area (Appendix C)
2026	
Jan.-Jul.	Monitoring and adaptive management
Aug.-Dec.	Report writing

Budget

Table 2 provides estimated project costs for upland forest restoration, stream and floodplain restoration, trails and public access, and restoration of historic shed separately. This budget may change due to fluctuating costs and additional information. SSNERR will apply for grant funding for operational costs, listed below, and Reserve staff will provide in-kind supervision and monitoring support. This does not include money already received from the USFWS administered by Friends of South Slough ($64,203), and Coquille Tribal Community Grant administered by Coos WA ($5,000). Detailed budget available upon request.

Table 2: Estimated grant funding request for the Wasson Creek Watershed Restoration Project. Does not include in-kind provided by SSNERR or partners, nor funding received from other entities.

Restoration Component	Estimated Grant Funding
Upland forests restoration	$1,932,519
Stream and floodplain restoration and monitoring	$1,217,802
Public access	$268,332
Historic shed restoration	$50,000
Grand Total	$3,485,654

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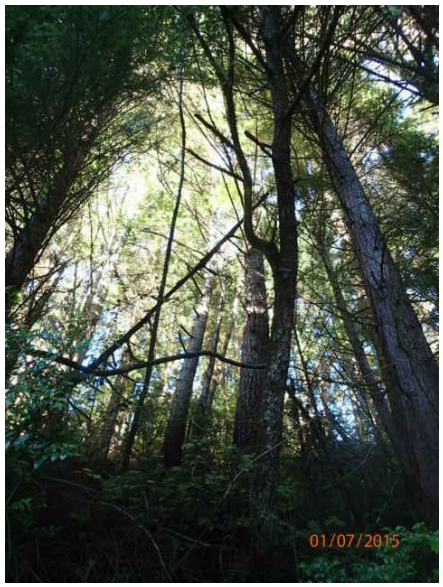
Attachment 1. Photoset 1. Photos of the ditched Wasson Creek. Photos 1 & 2 are at the lower end of the valley looking upstream and downstream respectively. Photos 3 & 4 are about a third up the valley, again looking upstream and downstream respectively.

Photoset 2. Photos of the vast monoculture of reed canary grass within the Wasson valley with Photo 3 showing a section with a mixof native species and reed canary grass. Photo 4 is the more historic plant community just upstream of the geologic constriction.

Photoset 3. Photos showing the overstocked, planted stands of Wasson's upland forests that are in dire need of restoration thinning toreintroduce heterogeneity, conserve biodiversity, and increase the overall ecological function of the basin.



Attachment 2: Timeline

Table 1: Restoration timeline assuming successful funding. Management areas are designated as Uplands, Upper Valley (UV), and Main Valley (MV) Upper (MVU), Middle (MVM), and Lower (MVL). Although South Slough Reserve (SSNERR) will oversee the entire project, different entities (teams) are listed for implementation of specific tasks. Teams include SSNERR, Coos Watershed Association (Coos WA), Friends of South Slough (FOSS), and Contractors (TBP via public bid).

Date	Task	Management Area	Team
2021			
Apr. 30	SSNERR Commission approved Appendix D: Wasson Uplands Restoration Plan	Uplands	SSNERR
May	USFWS funds awarded to FOSS for forest thinning ($64,203)	Uplands	FOSS
Dec.	Coquille Tribal Community Fund awarded to Coos WA for willow planting ($5,000)	UV	Coos WA
2022			
Apr.-May	Completed 45-acres of forest thinning	Uplands	Contractor
Jul.	Fuel reduction work and fuelbreak	Uplands	SSNERR
Jul. 21	Present full plan to SSNERR commission	Excl. Appendix E	SSNERR
Jul.-Sept.	Apply for NERRS IIJA funds	All remaining	SSNERR
Aug.-Dec.	Update permits	MV & UV	Coos WA
Sep./Oct.	Willow planting preparation	UV	Coos WA
Nov./Dec.	Plant willows and native shrubs	UV	Coos WA/SSNERR
2023	Year 1 (if awarded IIJA funds in 2022)		
Jan.-Apr.	Contract preparation	Uplands	SSNERR
May.-Dec.	Forest thinning & tree placement	Uplands & UV	Contractor
Jun.	Willow maintenance & protection	UV	Coos WA
Jul./Aug.	Install BDAs Mow RCG	MVL MVL	Contractor/SSNERR
2024	Year 2		
Jan.-Mar.	Contract preparation Forest thinning cont. as needed	MV Uplands	SSNERR Contractor
Apr./May.	Beaver dam surveys	MV & UV	SSNERR
Jun./July	Earth moving, tree placement	MVM & MVU	Contractor
Jul.	Install BDAs Mow RCG Vegetation monitoring	MVL & MVU MVL UV	Contractor/SSNERR Contractor SSNERR
Aug.	Earth moving Cultural resource monitoring Construct log cribs Boardwalk installation	MVL MVL MVL MVL	Contractor CIT Coos WA Contractor
<Sept. 15	Fish salvage Earth moving fill channels	MV MV	Coos WA Contractor
Oct.-Dec.	Planting and erosion control	MV	Coos WA
2025	Year 3		
Jan.-Dec.	Post-restoration monitoring & adaptive management	All	SSNERR
Jul.	Install BDAs as needed	MVU&MVL	Coos WA/SSNERR
Aug./Dec.	Report writing	All	SSNERR
Sept./Oct.	Willow planting prep	UV	Coos WA
Nov./Dec.	Plant willows	UV	Coos WA
2026	Year 4		
Jan./Feb.	Plant willows	UV	Coos WA
Jan.-Jul.	Post-restoration monitoring & adaptive management	All	SSNERR
Jun.	Willow maintenance and protection	UV	Coos WA
Aug.-Dec.	Report writing	All	SSNERR