Jacobs

# Biological Assessment

## Manastash Creek Bank Stabilization and Sno-Park Improvement Project

Prepared for:

Kittitas County Public Works

December 20, 2021

# Manastash Creek Bank Stabilization and Sno-Park Improvement Project

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| BA | Biological Assessment |
| BMP | best management practice |
| County | Kittitas County |
| dBA | A-weighted decibel |
| dbh | diameter at breast height |
| DNR | Washington State Department of Natural Resources |
| DPS | Distinct Population Segment |
| EFH | Essential Fish Habitat |
| ESA | Endangered Species Act |
| FHWA | Federal Highway Administration |
| Jacobs | Jacobs Engineering Group Inc. |
| MCR | Middle Columbia River |
| MM | minimization measure |
| NMFS | National Marine Fisheries Service |
| OHWM | ordinary high water mark |
| Project | Manastash Creek Bank Stabilization and Sno-Park Improvement Project |
| USFWS | U.S. Fish and Wildlife Service |
| WDFW | Washington State Department of Fish and Wildlife |
| WSDOT | Washington State Department of Transportation |

## EXECUTIVE SUMMARY

Kittitas County needs to repair an actively eroding bank on South Fork Manastash Creek that is undercutting Manastash Road and threatening loss of the roadway. The Manastash Creek Bank Stabilization and Sno-Park Improvement Project (Project) is located on Manastash Road from milepost 10.65 to milepost 11.01, west of the city of Ellensburg, Washington. The Project will repair the embankment and washed out portion of the roadway (approximately 280 linear feet), widen approximately 0.36 miles of Manastash Road opposite of the creek to accommodate parking for recreational access, and provide a turnaround for trailers, County maintenance equipment, emergency vehicles, fire apparatus, and other recreational vehicles. The Project will also prevent further erosion and roadway loss and provide bank protection while increasing aquatic habitat complexity and enhancing riparian habitat and floodplain connectivity. The proposed design incorporates a wood-studded rock revetment with up to 5 barbs to protect the bank and roadway and increase habitat value. The Project is proposed for construction beginning late summer 2022 and will be complete in one construction season.

**Table ES1: Project Effects Summary**

| Common Name | Listing Status | Potential Presence (Species Lists) | Potential Presence (Action Area) | Determination |
|---|---|---|---|---|
| Canada lynx | Threatened | Yes | No | May affect, not likely to adversely affect |
| Yellow-billed cuckoo | Threatened | Yes | No | No effect |
| Bull trout – Columbia River DPS | Threatened | Yes | Yes | May affect, not likely to adversely affect |
| Steelhead – MCR DPS | Threatened | Yes | Yes | Likely to adversely affect |

Notes: DPS = Distinct Population Segment. Species listed in order of I the US Fish and Wildlife Service Information for Planning and Consulting and National Marine Fisheries Service species lists (**Appendix A**).

# 1 INTRODUCTION

## 1.1 Federal Nexus

Jacobs Engineering Group Inc. (Jacobs) has prepared this Biological Assessment (BA) on behalf of Kittitas County Public Works (County) for the Western Federal Lands Highway Division of the Federal Highway Administration (FHWA). The Manastash Creek Bank Stabilization and Sno-Park Improvement Project (Project) includes funding from the FHWA Federal Lands Access Program Grant, which is administered through the Washington State Department of Transportation (WSDOT) Local Programs. The use of federal funds provides a federal nexus for this Project. Therefore, the Project is a federal action, and FHWA is the lead federal agency.

This BA addresses the proposed action in compliance with Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. Section 7 of the ESA requires that, through consultation (or conferencing for proposed species) with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat. This BA also evaluates the presence of Essential Fish Habitat (EFH) as indicated in the Magnuson Stevens Fishery Conservation and Management Act (Magnuson Stevens Act).

This BA evaluates the potential effects of the Project on federally-listed species and critical habitats under the jurisdiction of the USFWS and NMFS (**Appendix A**). This BA also evaluates the presence of Essential Fish Habitat (EFH) as indicated in the Magnuson Stevens Fishery Conservation and Management Act. Specific Project design elements are identified that avoid or minimize adverse effects of the proposed Project on listed species and/or critical habitat.

## 1.2 Location

The Project is located approximately 11 miles west of Ellensburg in Kittitas County, Washington in Sections 13 and 14, Township 17 North, Range 16 East Willamette Meridian (**Appendix B, Map 1**). The Project is on the South Fork Manastash Creek, within Water Resource Inventory Area 39, Upper Yakima River, and in sixth-field hydrologic unit code 170300010508, South Fork Manastash Creek. Site photographs are included in **Appendix C**.

## 1.3 Project Description

The Project will repair the eroded streambank and associated roadway embankment (approximately 280 linear feet), widen approximately 0.36 miles of Manastash Road opposite of the creek to accommodate parking for recreational access, and provide a turnaround at the end of the County road for trailers, County maintenance equipment, emergency vehicles, fire apparatus, and other recreational vehicles. Due to the deteriorated road condition, width-restriction lane closure, and active bank erosion, the immediate repair of the bank and roadway is necessary for continued access and use of Manastash Road. Manastash Road is the only access for several isolated rural residences and is classified as providing long term arterial access to United States Forest Service property that is likely needed for future use (USFS 2015, 2021). These repairs will provide safe and continued access for residents while enhancing riparian and floodplain connectivity through the added complexity and reconnection of channels.

At this location, South Fork Manastash Creek is located approximately 20 feet in elevation below Manastash Road. Erosion potential in the Project location is high due to impingement of creek flows into the eroded bank (**Appendix C, Photographs 1** and **2**). Consequently, the mechanism of failure is bank erosion at the toe of the slope, which in turn has caused sluffing and failure of the roadway embankment.

Manastash Road has been limited to a narrowed condition with jersey barrier placement at the top of bank and a continually decreasing roadway width (**Appendix C, Photographs 3** and **4, Appendix D, Sheet 1**).

The County is committed to minimizing impacts below the ordinary high water mark (OHWM) of South Fork Manastash Creek to the greatest extend possible. The embankment protection design requires a 2:1 engineered slope to protect, stabilize, and rebuild the roadway; however, this option would have required fill across almost the entire South Fork Manastash Creek main channel, which would have pushed the creek almost entirely into the braided side channels that occur within this section of the floodplain. To minimize impacts below the current ordinary high water mark (OHWM) and preserve as much functional width of the current main channel as possible, the County has redesigned the project to narrow roadside areas by removing ditches, using longer guardrail posts or barrier for safety, and moving slope stabilization rock as far landward as possible. This updated design resulted in minimizing the revetment extent into the channel by 7 feet and decreased the fill and area of impacts required below OHWM by almost half (**Appendix D, Sheet 4**). This project will also remove concrete debris currently located in the channel below the OHWM along the upstream end of the proposed revetement (**Appendix C, Photographs 5**).

A wood-studded rock revetment will be constructed at the toe of slope to rebuild the lost stream bank and roadway embankment and protect the roadway (**Appendix D, Sheet 2**). The revetment will be constructed using a combination of large rock and wood at a minimum 2H:1V slope. Rock will be used to establish a toe that incorporates logs with rootwads keyed into the revetment and secured in place at the toe. The wood and rock revetment will extend into the existing channel bed and will extend the length of the erosion area (approximately 280 linear feet). The revetment will extend from below to well above the OHWM, providing protection and energy dissipation at a variety of water surface elevations.

Up to five rock barbs will be placed within the revetment (**Appendix D, Sheet 2**). These barbs will be of varying lengths based on required deflection of flows, with the longest barb extending approximately 5.6 feet from the bank. The footprint of the barbs will be approximately 120 sf per barb. The barbs will be placed upstream from the revetment and will require approximately 40 cy of fill below the OHWM. Approximately 180 cubic yards of fill will be required below the OHWM for the construction of the revetment and barbs. The total footprint below the OHWM for the revetment and barbs is approximately 3,240 square feet (**Appendix D, Sheet 2**).Native plants including willow (*Salix* spp.) and cottonwood (*Populus balsamifera)* will be planted adjacent to the creek to restore riparian vegetation.

## 2 PROJECT DETAILS

The Project will repair the bank along the South Fork Manastash Creek on Manastash Road by constructing a wood-studded revetment. The Project will also widen the road for safe parking at the sno-park and create a turnaround. Project details are provided in the subsections below.

### 2.1 Project Timeline and Sequencing

The Project will likely begin in late summer 2022 and will take up to 20 weeks to complete. Work below the OHWM of South Fork Manastash Creek will require approximately 14 weeks to complete and will occur July through October during low flows and within an approved in-water work window. The Washington Department of Fish and Wildlife (WDFW) identified in-water work window is July 16 through September 30 (2018). However, to maximize flexibility and avoid additional construction seasons, the County is requesting a one-month extension on the work window, through October 31, 2022. The in-water work window is proposed from July 15 through October 31. This work window was approved and used for the Manastash Bridge Replacement project in 2017, approximately 0.4 mile downstream from the Project location.

Project sequencing will likely be mobilization; staging and traffic management including construction of temporary detour road; temporary erosion and sediment control and best management practice (BMP) installation; isolation and dewatering; revetment and barb construction; embankment construction; planting; roadway reconstruction, widened sno-park construction, paving; guardrail and signage; and demobilization.

### 2.2 Equipment

Equipment to be used will include but is not limited to excavators, mini-excavators, dozer, graders, dump trucks, front loaders, backhoe, generators, pumps (for groundwater management), pavement scarifier (to remove existing roadway), and paver.

### 2.3 Site Preparation and Vegetation Removal

Site preparation work will include delimiting the Project area with high-visibility fencing, placing BMPs for sediment and erosion control, and relocating utilities if necessary. Approximately 48,050 square feet of both upland and riparian vegetation will be removed. Clearing 41,350 square feet of upland vegetation, which does not provide any riparian function (e.g., trees in this area at too small to shade the creek), will be necessary for the construction of a temporary detour, road widening, and added parking that is south of the existing roadway (**Appendix D, Sheet 3**).

All habitat north of Manastash Road within the project area was considered riparian. Approximately 6,700 square feet of hillside between the road and the creek are within the clearing limits for the Project**.** The majority of this area is actively eroding bank and consists of bare soil and rock with minimal riparian habitat (e.g., small shrubs) adjacent to the creek; however, the removal of some small shrubs under 6 in dbh is anticipated for equipment access within the dry stream bed (**Appendix C, Photographs 5** and **6, Appendix D, Sheet 2**). Mature trees within this area are all adjacent to the roadway on the upper bank (rooted approximately 15 feet above the creek), however, they do provide some shade and were therefore considered riparian habitat (**Appendix C, Photograph 3**). Vegetation removal between the road and the creek includes the removal of approximately 11 ponderosa pine (*Pinus ponderosa*) and 3 Douglas-fir (*Pseudotsuga menziesii*) that range in size from 10-inch to 30-inch diameter at breast height (dbh). If possible, the larger trees will be avoided. Where applicable, trees larger than 12 inch dbh that cannot be avoided will be removed with root wad intact, stored onsite, and incorporated into the revetment. Vegetation under 6-inch dbh that will be removed to stabilize the bank, will include redosier dogwood

(*Cornus sericea*), mock orange *(Philadelphus lewisii*), willow (*Salix* sp.), Nootka rose (*Rosa nutkanai*), alder (*Alnus* spp.), snowberry (*Symphoricarpos albus*), and ocean spray (*Holodiscus discolor*). Where possible, the contractor will clear vegetation to ground level but will not grub to allow natural regeneration in areas where temporary impacts may occur. While this habitat provides some riparian function (e.g., shade from 14 trees), the majority of this area is bare soil and rock where the bank has already sloughed off or consists of small shrubs and herbaceous vegetation that provide little if any riparian function.

### 2.4 Temporary Detour, Access, and Staging

In order to stabilize the bank without road closures or several shifts in traffic patterns that impact the construction schedule, a temporary detour is proposed to the south of the existing roadway (**Appendix D, Sheet3**). After vegetation removal, suitable fill material will be brought in and placed to the elevation necessary for the detour roadway. After construction is complete and the roadway is open to traffic, the temporary detour fill will be removed to native ground elevation.

Equipment and material staging will occur within the Project area on the existing roadway, isolated from traffic, and potentially within a widened driveway area near the Project if the landowner allows. Existing County roads will be used to transport of equipment and materials to the Project site. The contractor is responsible for obtaining permits and clearances for the use of any alternate staging areas.

### 2.5 Work Area Isolation and Rewatering

Before bank stabilization occurs below the OHWM of South Fork Manastash Creek, the work areas will be isolated from flowing water using temporary stream isolation. The Project will occur during low-flow conditions. At lower flows, the isolation area is relatively shallow, typically 6 to 12 inches deep (**Appendix C, Photograph 7)**. The construction area below the OHWM will be isolated from the flows of South Fork Manastash Creek to minimize the effects of turbidity and allow construction in isolation. The isolation structures will be placed after the area to be isolated has been seined and blocked with nets to remove any fish that may be present. The upstream net will be placed first (directly upstream from where the isolation structure will be constructed). The creek diverts some water into at least one side channel downstream of this location. An additional net will be placed at the upstream end of any side channel adjacent to the isolation area to limit fish from accessing the area while the isolation structure is being constructed. The downstream net will then be used to seine the main channel from the upstream block net location to the downstream block net location.

Only the area around the bank stabilization will be isolated (**Appendix D, Sheet 2**). At no time will isolation span the width of South Fork Manastash Creek. Natural flow will be directed away from the isolation area using either sandbags, super sacks, or water bladders. The isolation structure will be placed to allow excess flows to divert into an active side channel within this braided section of the creek (**Appendix C, Photographs 8** and **9, Appendix D, Sheet 2**). The final isolation methodology will be determined by the contractor. The diversion barrier system may require the use of pumps (4" to 6" gas powered 'trash' pump) to manage hyporheic flows behind the barrier to maintain a dry work area. The dry work area will be accessed from the stream bank as prescribed in the construction contract.

For the purpose of permitting when calculating temporary fill volumes, it is assumed the isolation structures will consist of temporary fill such as sandbags or super sack(s). The amount of temporary fill below the OHWM required for the isolation is approximately 145 cubic yards. The duration of use will be during the approved in-water work window and may take up to 14 weeks.

The isolation structures will be placed starting at the upstream bank tie-in location and will be constructed in a horseshoe shape to isolate the work area before tying into the bank downstream of the bank

stabilization area. The isolation structure may be placed using a thumbed excavator or similar equipment. Plastic sheeting will likely be used in coordination with the isolation structure to more efficiently isolate flows.

As the isolation structure is constructed, qualified biologists will be on-site to monitor flows as they recede and remove any fish that become stranded behind the diversion following WSDOT Fish Exclusion Protocol and Standards (**Appendix E**). All fish captured or handled during dewatering activities will be reported. If needed to dewater holding pools behind the isolation structure, small pumps will have filtered intakes meeting NMFS screening criteria. Once the structure is in place and the isolated area is completely enclosed, block nets will be removed, and there will be no restriction to up or down stream movement of fish.

The isolated area of South Fork Manastash Creek will be the minimum size necessary for the construction of the revetment and barbs. The total isolated footprint below the OHWM will be approximately 8,465 square feet (**Appendix D, Sheet 2**). When construction of the revetment and barbs is complete, the isolation structures will be removed slowly starting at the downstream end to reintroduce water to the work area and minimize downstream turbidity.

### 2.6 Revetment and Barb Construction

The Project is located along a section of the Manastash Creek with a wide floodplain and several braided channels that are activated during high flows. The Project is located at the upper end of this floodplain where the creek forms a cutbank that is eroding the material below Manastash Road. Equipment access will occur from the dry stream bed (**Appendix D, Sheet 2**). The revetment and barbs will be constructed where the roadway and approach driveway continue to actively erode, so repairing the embankment will halt on-going erosion, improve water quality, and improve and maintain habitat. The upstream end of the revetment will taper with fill limits above the OHWM for protection between barbs.

The revetment will extend partially into the existing channel bed and the final height will be built above the 100-year water surface elevation. The revetment will extend the length of the erosion area (approximately 280 linear feet) and will "kick-out" slightly on the upstream end to deflect flows away from the bank. The revetment will extend from below to well above the OHWM, providing bank protection and energy dissipation. The revetment and barbs will require approximately 180 cubic yards of fill below the OHWM to provide 280 linear feet of bank protection (**Appendix D, Sheets 2 and 4**).

The revetment will be constructed using a combination of large rock and wood, with logs both keyed into the revetment and secured in place at the toe of the revetment. Working from the isolated work area or existing roadway, large logs with root wad will be placed throughout the repair area (**Appendix D, Sheets 2 and 4**), perpendicular to the bank. These logs will be placed with the root wads extending into the channel, angled slightly upstream. If necessary, these logs will be locked into place using earth anchors or cabled to large rock.

Large rock armoring will be placed on top of and around these logs to create an undulating rock toe. End dumping of fill material for roadway embankment will only occur in areas isolated by the rock toe or above the OHWM. Rock will be a mix of sizes to ensure proper protection of the roadway, with the largest rock placed at the toe of the revetment. Final hydraulic design will determine the amount, size, and placement of rock armoring. The final quantity of logs with root wads to be incorporated will be determined later in the design phase.

Up to five rock barbs will be placed within the revetment (**Appendix D, Sheet 2**). These barbs will be of varying lengths based on required deflection of flows, with the longest barb extending approximately 5.6 feet from the bank. The footprint of the barbs will be approximately 120 sf per barb. The barbs will be placed upstream from the revetment and will require approximately 40 cy of fill below the OHWM. Approximately 180 cubic yards of fill will be required below the OHWM for the construction of the revetment and barbs. The total footprint below the OHWM for the revetment and barbs is approximately 3,240 square feet (**Appendix D, Sheet 2**).Roadway Embankment

When the revetment is completed to an elevation above the 100 year-flood elevation, the roadway embankment will be constructed using suitable fill material at a minimum 2H:1V slope (**Appendix D, Sheet 4**). Embankment material will be placed with equipment operating from the roadway above the creek.

### 2.7 Planting and Site Restoration

Native riparian vegetation will be incorporated within the rock revetment, in suitable areas at the toe of the revetment, on the impacted banks, and within the barbs where possible (**Appendix D, Sheets 6 and 7**). Willow cuttings will provide the best likelihood for success, with cottonwood poles planted in areas just above the OHWM that have saturation during the growing season. Plants will be harvested from a local source or purchased from a native plant nursery. Disturbed roadside, the temporary detour footprint, and new non-riparian embankment areas that are not rock will be seeded with a native roadside and erosion control mix and stabilized with mulch cover prior to Project completion (**Appendix D, Sheet 6**).

### 2.8 Roadway Reconstruction and Demobilization

The existing roadway will be widened, repaved, and a turnaround constructed (**Appendix D, Sheet 6**). The roadway approaches will be reconstructed with fill, paved, striped, guardrail installed, and signage placed as the last order of work before completion. BMP placement will prevent any discharge during paving activities.

The existing impervious surface in the project area prior to the washout was approximately 17,255 square feet. Post-Project, total impervious surface will be approximately 28,190 square feet due to the increased width associated with the sno-park and road widening. There is net increase of 10,935 square feet of new impervious surface from widening the road and creating a turnaround. All stormwater associated with this increase in new impervious surface will be collected and treated through infiltration in roadside ditches south of the roadway. To minimize fill within the creek, a ditch will not be installed north of the roadway. Instead, the roadway will be reconstructed to existing condition with no increase in runoff towards the creek compared to pre-washout conditions.

# 3 PROJECT ACTION AREA

The action area includes all areas that could be affected directly or indirectly by the proposed action and is not limited to the actual work area (Project area). The action area represents the geographic extent of the physical, biological, and chemical impacts of the Project. The Project area and secondary Project features are considered when defining the action area. Secondary Project features include staging areas.

The Project area is defined as the Project footprint, work area, and immediate vicinity of the proposed action. The Project area includes the roadway adjacent to the bank stabilization; the detour footprint; the bank below the roadway; the proposed road widening and turnaround; and those areas below the OHWM where the temporary diversion, toe of slope for the revetment, barb construction, and grading will occur.

The Project action area will include potential effects from visual and audible disturbance, terrestrial habitat impacts, and impacts to aquatic environments. Work below the OHWM will occur, which includes worksite isolation restricted to the minimum size necessary to stabilize the bank. The Project will not provide access to currently inaccessible lands or facilitate future growth.

## 3.1 Terrestrial Zone of Impact

Noise associated with construction is the furthest-reaching potential impact. To determine the Project's terrestrial noise impacts, three noise attenuation distances were calculated:

1) construction noise attenuation to ambient levels,

2) construction noise attenuation to traffic noise levels, and

3) traffic noise attenuation to ambient levels.

### 3.1.1 Ambient Noise

The ambient sound level used in this noise analysis is based on population density in the Project area. Based on the number of houses in the general vicinity of the proposed Project, this area has an estimated average population of less than 100 people per square mile (**Appendix B, Map 2**). Using data from the *WSDOT Biological Assessment Preparation for Transportation Projects–Advanced Training Manual* (2020), this population density correlates to an estimated ambient noise level of 35 decibels using an A-weighted scale (dBA).

### 3.1.2 Construction Noise

The bank stabilization will require numerous types of equipment. **Table 1** includes a list of potential equipment, their use, and the typical maximum noise level as measured from 50 feet away (WSDOT 2020). Based on this equipment list and using the WSDOT rules for combining noise levels, the Project is expected to have a combined maximum noise level of 94 dBA at 50 feet from Project activities.

### 3.1.3 Traffic Noise

Traffic noise associated with Manastash Road is estimated to be 57.3 dBA at 50 feet from the roadway based on County data for average vehicles per day and the posted speed limits (WSDOT 2020).

**Table 1: Construction Equipment, Use, and Reference Maximum Noise Levels**

| Equipment | Use | Lmax (dBA)* |
|---|---|---|
| Dump Truck | Material removal and delivery | 91 |
| Excavator | Demolition and new construction | 87 |
| Dozer | Temporary detour construction | 86 |
| Pavement Scarifier | Asphalt removal | 84 |
| Backhoe | General purpose demolition and new construction | 84 |
| Chain Saw | Clearing and grubbing | 83 |
| Roller | Paving detour route and rebuilding roadway | 82 |
| Paving | Asphalt (Paver + Dump Truck) | 82 |
| Front End Loader | General purpose new construction | 81 |
| Grader | Roadway work | 79 |
| Compactor (ground) | Temporary detour route and rebuild roadway | 75 |
| Pickup Truck | Personnel, equipment and material transport | 75 |
| Pumps | Dewatering isolation areas | 74 |
| Flat Bed Truck | Equipment and material transport | 74 |
| Generator | Supplying portable power for power tools and lighting | 73 |
| Compressor (air) | Providing compressed air for pneumatic construction tools | 68 |

Note: Lmax = maximum decibel level.
*Noise levels are based on Table 7-4 Average maximum noise levels at 50 feet from common construction equipment (WSDOT 2020)

### 3.1.4 Noise Attenuation Calculation

The following noise attenuation measurements were calculated to determine the appropriate noise impact zone. Noise attenuation was calculated using the Base 10-Log equation, per the WSDOT noise assessment methodology (2020). For all calculations, the action area was assumed to be a soft site due to the forested habitat and riparian vegetation in the Project vicinity.

Distance from Construction Noise to Ambient Noise

$$\text{Distance (D)} = 50 * 10^{((\text{construction} - \text{ambient})/25)}$$

$$D=50*10^{((94-35)/25)}$$

D = 11,454 feet (2.17 miles)

Distance from Traffic Noise to Ambient Noise

$$\text{Distance (D)} = 50 * 10^{((\text{traffic} - \text{ambient})/15)}$$

$$D=50*10^{((57.3-35)/15}$$

D = 1,533 feet (0.29 miles)

Distance from Construction Noise to Traffic Noise

Distance (D) = 50 * 10^((construction – traffic)/10)

D=50*10^((94-57.3)/10)

D = 233,868 feet (44.29 miles)

Because traffic noise attenuates to ambient noise levels closer than construction noise attenuates to ambient noise levels, the traffic noise attenuation of 1,533 feet cannot be used as the Project noise impact zone (WSDOT 2020). The distance where construction noise and traffic noise are the same is 44.29 miles, which is farther than the distance where construction noise attenuates to ambient noise (2.17 miles). Therefore, this distance is not appropriate either. Based on the calculations above, the Project noise impact zone potentially extends 2.17 miles from the Project corridor, or the area where construction noise attenuates to expected ambient sound levels. **Appendix B, Map 2** provides a graphic representation of the physical extent of the action area based on the information above. Note this representation is extremely conservative, as it doesn't take into effect vegetation, topography, or other factors that reduce noise attenuation at distance.

### 3.2 Aquatic Zone of Impact

The Project will require work below the OHWM. Isolating the area around the bank stabilization from the South Fork Manastash Creek will minimize the extent and duration of downstream effects. Flows will be present in South Fork Manastash Creek, and therefore the potential exists for turbidity to extend downstream during installation and removal of the isolation structures. Introduction of water to the new streambed areas could also result in a flush of turbid water in South Fork Manastash Creek. However, this turbidity is expected to be small and localized based on the relatively clean cobble substrate and BMPs that will be required to be used to minimize the zone of impact. The bottom substrate within the work area is clean cobble and gravels, and any coarse sediment mobilized from the stream bottom as a result of the activity will quickly fall out of suspension and settle in the streambed.

The Washington State Department of Ecology currently manages a stream gauge on the main stem Manastash Creek, downstream of the Project at Cove Road, and historically managed a stream gauge closer to the Project at the Manastash Road crossing, which was removed in 2009. Based on current and historic gauge data, flows in South Fork Manastash Creek at the time of construction (July through September) will likely range from 10 to 40 cubic feet per second. The contractor will be required to maintain compliance with state water quality standards (Washington Administrative Code 173-201A-400), which allow a 200-foot mixing zone from the Project area when flows are between 10 and 100 cubic feet per second. Elevated turbidity will not be allowed to extend beyond this mixing zone. In addition, there may be a slight backwater effect from the isolation structure, but this will be minimal due to allowing flows to bypass the work area.

The total isolated footprint will be approximately 8,465 square feet to allow for bank stabilization to occur in isolation. At no time will isolation span the entire South Fork Manastash Creek. Based on the above, the aquatic zone of impact includes the area below the OHWM of South Fork Manastash Creek, extending downstream approximately 200 feet from the project area. The total aquatic zone of impact is approximately 600 linear feet of South Fork Manastash Creek (**Appendix B, Map 2**).

### 3.3 Action Area Determination

The action area is defined as the furthest extent of the Project's physical, chemical, or biological impacts. Water quality impacts are expected to extend no farther than 200 feet downstream from the Project

isolation area in South Fork Manastash Creek (**Appendix B, Map 2**). Terrestrial noise impacts extend the farthest distance of all Project-related impacts (up to 2.17 miles); therefore, the Project action area extent is based on the terrestrial noise impact zone (**Appendix B, Map 2**).

## 4 IMPACT AVOIDANCE AND MINIMIZATION MEASURES

The contractor will implement several minimization measures (MM) to avoid or minimize impacts to species, habitats, and the environment. A summary of these measures is below.

**MM 1** – Bank stabilization and channel work below the OHWM will only occur in isolation from active flows.

**MM 2** – All work below the OHWM will be conducted during the approved in-water work window.

**MM 3** – All equipment will be inspected for leaks prior to work each day.

**MM 4** – All equipment that works below the OHWM will contain vegetable oil or other biodegradable alternative to hydraulic fluid.

**MM 5** – Equipment staging and fueling will occur more than 50 feet from the OHWM of the South Fork Manastash Creek.

**MM 6** – Equipment will access the creek once a day.

**MM 7** – Worksite isolation and fish exclusion will be conducted by qualified biologists in accordance with the 2016 WSDOT Fish Exclusion Protocols and Standards (**Appendix E**).

**MM 8** – If small pumps are used to dewater holding pools or hyporheic flows, they will be screened to NMFS criteria. Once fish are removed from the area behind the isolation area, pumps will not require screening.

**MM 9** – During removal of containment measures, water will be reintroduced to the isolation area slowly, starting at the downstream end, to minimize turbidity and allow natural equilibration to occur.

**MM 10** – BMPs such as wattles or silt fence will be used to prevent the discharge of any material into flowing water.

**MM 11** – Vegetation removal required for access or the temporary detour that is not part of the permanent impact limits (such as the sno-park) will be cut, but not grubbed, to allow natural regeneration.

**MM 12** – The contractor will be required to maintain state water quality standards at all times by preventing elevated turbidity beyond 200 feet from the work area.

**MM 13** - The contractor will be required to develop and follow a Temporary Erosion and Sediment Control Plan, Spill Prevention, Control, and Containment Plan, and Water Quality Monitoring Plan. These plans will ensure protection of the aquatic resource during construction.

**MM 14** - Large rock used for the revetment and barbs will be clean and free of any debris.

**MM 15** – Electrofishing will not be used.

# 5 ENVIRONMENTAL BASELINE

## 5.1 Aquatic Resources

The Project is in the South Fork Manastash Creek subwatershed (hydrologic unit code (HUC) 170300010508, approximately 49.1 square miles). The South Fork Manastash Creek joins the North Fork Manastash Creek approximately 3 miles downstream of the Project area, and then flows as Manastash Creek into the Yakima River (**Appendix B, Map 3**). The North Fork Manastash Creek Is in the North Fork Manastash Creek subwatershed (HUC 170300010509, approximately 21.0 square miles). The two forks of Manastash Creek join at the upper extent of the Manastash Creek-Yakima River subwatershed (HUC 170300010511, approximately 41.6 square miles). Manastash Creek is a right-bank (south) tributary to the upper Yakima River, entering at river mile 154.5. Flows in the lower portion of the Manastash Creek-Yakima River subwatershed for the last 5 years range from 13 to 34 cubic foot per second during the summer (Station 39J070 at Cove Road; Ecology n.d.).

The South Fork Manastash Creek is on the 303(d) impaired water quality list for water temperature above and below the Project area. In addition, sections of the main stem of Manastash Creek are listed as Clean Water Act Section 303(d) Category 5 waters for temperature, dissolved oxygen and bacteria.

Between 2009 and 2016, four fish barriers on the lower reaches of Manastash Creek were removed or replaced with fish screens (Kittitas County Conservation District [KCCD] n.d.). Most of the stream length has suitable fish habitat. However, fish movement is limited due to heavy water usage in the lower 5 miles of Manastash Creek. The creek contains excellent spawning and rearing habitat for anadromous salmonids, but instream flows are severely impacted by irrigation diversions during the irrigation season. Kittitas Reclamation District is currently supplementing flows in the lower reach of Manastash Creek.

According to the WDFW SalmonScape database, Manastash Creek supports spring chinook, steelhead, coho, and bull trout. Many restoration actions in Manastash Creek, including the removal of the Keach-Jensen Diversion in 2011 and the more recent removal of the Reed Diversion in 2016, allow limited access to the action area by these species. Manastash Creek also supports resident salmonids such as rainbow, cutthroat, and brook trout, and other non-salmonids (WDFW n.d.). Many miles of spawning and rearing habitat remain relatively undisturbed upstream of the diversions (Haring 2001).

Both the North Fork and South Fork Manastash Creek flow through a narrow canyon before reaching a broad alluvial plain at approximately river mile 5.5. Annual precipitation ranges from greater than 60 inches in the upper watershed to approximately 10 inches near the Yakima River. Snowmelt is the primary source of water for the watershed (USBR 2013). The South Fork Manastash Creek watershed is largely undeveloped; the primary land use is forestry. The headwaters of the north fork and south fork occur in heavily forested land within the Okanogan-Wenatchee National Forest. The lower areas of the watershed are privately owned, whereas the upper watershed includes both public and private lands. The lower 5 miles of the main stem flow through fields and pastures within the Kittitas Valley.

The Project area is in the lower portion of the South Fork Manastash Creek subwatershed, where commercial logging and recreation in the 1970s and 80s heavily impacted the riparian vegetation (Haring 2001). Improved Forest Practice Rules should assist in the recovery of forest riparian areas. Poor riparian condition was also identified in the South Fork Manastash Creek for 5 to 7 miles downstream of the Okanogan-Wenatchee National Forest boundary, which includes the Project area. Several historic diversions on the main stem Manastash Creek limited flows reaching the Yakima River and as well as fish access to the upper reaches (USBR 2013; Haring 2001). Several projects in the last few decades have received funding with the goal of improving habitat and restoring instream flows (Yakima Basin Fish and

Wildlife Recovery Board). These projects include a Kittitas County Conservation District project that removed several diversions and add fish screens on the mainstem Manastash Creek (KCCD n.d.; Yakima Basin Fish and Wildlife Recovery Board 2021).

The Project is located along a section of the South Fork Manastash Creek where the creek meanders across a floodplain downstream of a section of the creek that is constrained by steep canyon walls. This broader floodplain is approximately 400 to 500 feet wide and extends approximately 1.5 miles downstream of the Project before the canyon constrains the floodplain again. Within this wider floodplain, the creek consists of several braided channels that are activated during high flows. These channels span the width of the floodplain where recent beaver activity has led to the formation of several smaller ponds on these side channels. The main channel currently runs along the south side of the floodplain. The Project is located at the upper end of this floodplain where the creek forms a cutbank that is eroding the material below Manastash Road. The revetment and barbs will be constructed where the roadway and approach driveway continue to actively erode, so repairing the embankment will halt on-going erosion, improve water quality, and improve and maintain habitat.

### 5.2 Uplands Overview

The Project area is east of the Cascade Range west of the Kittitas Valley, which is characterized by low rainfall, cold winters, and hot, dry summers. The immediate Project area is generally characterized by a few rural residences and managed timber lands. The land immediately adjacent to the Project is predominately privately owned, and the Washington State Department of Natural Resources (DNR) owns the parcel southeast of the Project.

South Fork Manastash Creek flows through a narrow canyon before reaching a broad alluvial plain at approximately river mile 5.5. The Manastash Creek watershed is largely undeveloped; the primary land use is agricultural crop production in the lower watershed and forestry in the upper watershed.

The vegetation and habitat in the action area is characterized as Northern Rocky Mountain dry-mesic montane mixed conifer forest. The lower elevations of the watershed, above the valley floor, are characterized as Columbia Basin foothill and canyon dry grassland (Washington Natural Heritage Program 2015). These habitats are found in the interior Columbia Basin where riverine canyons are adjacent to plateaus or cliffs.

Vegetation and topography in the action area are foothills or incised canyons with Douglas-fir (*Pseodotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) associated ecotypes. Other slopes in the action area to the east are characteristic of rocky grassland, sagebrush (*Artemisia* spp.), antelope bitterbrush (*Purshia tridentata*), perennial bunch grasses, and non-native cheatgrass (*Bromus* spp.). Steep basalt outcroppings and open rock and grassland slopes dominate this terrain.

Riparian buffers in the Project area are somewhat altered from previous land uses, but in general are intact and consist of willow, cottonwood, dogwood (*Cornus sericea*) and alder (*Alnus incana*).

## 6 FEDERALLY PROPOSED AND LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

The following section provides the justification for a **No Effect** determination for yellow-billed cuckoo (**Table** 2) and describes why effect determinations are not applicable for designated critical habitats for bull trout or steelhead. The Project may affect Canada lynx, Columbia River Distinct Population Segment (DPS) bull trout and Middle Columbia River (MCR) summer-run DPS steelhead, which is addressed and justified below.

**Table 2: Project Effects Summary**

| Common Name | Listing Status | Potential Presence (Species Lists) | Potential Presence (Action Area) | Determination |
|---|---|---|---|---|
| Canada lynx | Threatened | Yes | No | May affect, not likely to adversely affect |
| Yellow-billed cuckoo | Threatened | Yes | No | No effect |
| Bull trout – Columbia River DPS | Threatened | Yes | Yes | May affect, not likely to adversely affect |
| Steelhead – Middle Columbia River DPS | Threatened | Yes | Yes | Likely to adversely affect |

Notes: Species listed in order of the USFWS Information for Planning and Consulting and NMFS species lists (**Appendix A**).

### 6.1 Species and Designated Critical Habitat Excluded from Further Assessment

**Yellow-billed Cuckoo**: The Western United States DPS Yellow-billed cuckoo (*Coccyzus americanus*) is listed as threatened in Washington State. In the breeding range, yellow-billed cuckoos prefer open lowland deciduous woodlands with clearings and shrubby vegetation. No nesting records exist for eastern Washington, despite the presence of apparently suitable riparian corridors, occasional past sightings during the summer, and documented breeding in eastern Oregon and southern Idaho (Wiles 2016).

Reports of individual cuckoos have been very rare in recent decades, with only about 20 records made between 1950 and 2000 (16 in eastern Washington; Tweit 2005; Wiles 2016). Yellow-billed cuckoo require large tracts of willow-cottonwood or mesquite forest or woodland for their nesting season habitat. Western yellow-billed cuckoos rarely nest at sites less than 50 acres (20 hectares) in size, and sites less than 37 acres (15 hectares) are considered unsuitable habitat (79 FR 48551).

The action area is in a narrow canyon with narrow bands of cottonwood and willow riparian habitat interspersed with Douglas-fir and ponderosa pine. The Project will remove approximately 6,700 square feet of riparian trees and shrubs that are not suitable as nesting habitat. Due to the lack of suitable nesting habitat in the Project action area, the Project will have **No Effect** on Yellow-billed cuckoo, and they are not further addressed in this assessment.

**Bull Trout-Designated Critical Habitat**: The USFWS finalized the revised critical habitat designation for bull trout on October 18, 2010. Critical habitat Unit 11 includes the Upper Yakima River and its tributaries. However, there is no critical habitat designated within Manastash Creek or its tributaries (USFWS 2015). The closest designated critical habitat is approximately 11 river miles downstream within the Yakima

River. As such, an effect determination is not applicable for bull trout-designated critical habitat, and it is not further addressed in this assessment.

**Steelhead-Designated Critical Habitat**: The NMFS finalized the critical habitat designation for MCR Steelhead on September 2, 2005 (NMSF 2005). The Upper Yakima subbasin does include designated critical habitat in Manastash Creek and its tributaries, but it ends at the confluence of the South Fork Manastash Creek and North Fork Manastash Creek. This is approximately 3.4 river miles downstream from the Project action area. Critical habitat has not been designated in the Project action area. As such, an effect determination is not applicable for MCR steelhead-designated critical habitat, and it is not further addressed in this assessment.

### 6.2 Canada Lynx

The Canada lynx (*Lynx canadensis*) is listed as threatened in Washington State. USFWS is the lead regulatory agency for this listing.

#### 6.2.1 Status/Presence in the Action Area

Canada lynx is listed as threatened in Washington State. The distribution of lynx in Washington State is closely associated with the high elevation forest that are generally above 4,500 feet (Lewis 2016). Canada lynx are most likely to occur in areas that receive deep snow and have high-density populations of snowshoe hare (*Lepus americanus*), the principal prey of lynx. The largest contiguous block of this type of habitat occurs in north-central Washington along the east slope of the Cascade Mountain range. Further south, these habitats become smaller and disjunct, making them unsuitable to support resident populations of lynx (WDFW 1993). Canada lynx are known to make long distance movements in search of prey, which may explain the handful of sightings that have been documented in the County. The most recent potential sighting in the County occurred in 2001 and the closest potential sighting was observed by a trapper in October 1995 approximatively 1.4 miles northwest of the Project site (WDFW 2021).

The Project area is located at about 2,700 feet in elevation. The action area ranges from approximately 2,400 feet to 4,360 feet in elevation and contains mid-elevation coniferous forest, shrub-steppe and basalt hillsides with sagebrush and bunch grasses, and rural residences. Suitable Canada lynx habitat may occur at higher elevations within the action area that are more than 1-mile from the work area. While there is the potential Canada Lynx may occur at higher elevations within the action area, this species is highly transient and are known for making long distance movements in search of prey.

### 6.3 Columbia River DPS Bull Trout

The Columbia River DPS bull trout (*Salvelinus confluentus*) is listed as threatened under the ESA in Kittitas County. USFWS is the lead regulatory agency for this listing.

#### 6.3.1 Status/Presence in the Action Area

The action area is within the bull trout Yakima River Core Area of the MCR Recovery Unit. In the Yakima core area, some populations exhibit life history forms different from what they were historically. Migration between local populations and to and from spawning habitat is generally prevented or impeded by:

1) headwater storage dams on irrigation reservoirs;

2) connectivity between tributaries and reservoirs; and

3) altered flow patterns, low instream flows, high water temperatures, and other habitat impediments within lower portions of spawning and rearing habitat and the main stem Yakima River.

Currently, the connectivity in the Yakima Core area is truncated to the degree that not all populations are able to contribute gene flow to a functional metapopulation.

Bull trout have the most specific habitat requirements of salmonids. Bull trout require colder water temperature than most salmonids—below 59 degrees Fahrenheit (15 degrees Celsius) throughout their lifecycle. The Project action area is between the Yakima River and the colder headwaters of the upper Manastash Creek and its tributaries. The Project is located approximately 11 river miles from the Yakima River.

Bull trout use of the Manastash Creek drainage has not been documented. In 2017, 15 eDNA samples were collected between July and late September in the South Fork Manastash Creek, which indicated no presence of bull trout (Mid-Columbia Fisheries Enhancement Group 2017). The lack of observations, reds, or eDNA detections within Manastash Creek indicate if bull trout are present within the creek, they are at very low densities. Bull trout use within the lower reaches of Manastash Creek is considered extremely unlikely given the poor habitat conditions, warmer temperatures, and variable flows. Even the upper watershed, which contains more suitable habitat for bull trout, has been evaluated on several occasions for bull trout presence and bull trout were undetected (Bureau of Reclamation [BOR] 2013).

The WDFW SalmonScape database documents Manastash Creek in the action area as potential for presence due to the removal of barriers, though bull trout have not been documented in Manastash Creek (n.d.). Higher water temperatures in late summer, sporadic flows, and the distance from the known presence in the Yakima River indicate bull trout presence in the Project action area is highly unlikely .

### 6.4 Middle Columbia River Summer-Run DPS Steelhead

MCR summer-run DPS steelhead (*Oncoryhnchus mykiss*) are listed as threatened under the ESA in Kittitas County. NMFS is the lead regulatory agency for this listing.

#### 6.4.1 Status/Presence in the Action Area

The MCR DPS steelhead extends over an area of approximately 35,000 square miles in the Columbia plateau of eastern Washington and eastern Oregon. The DPS includes all naturally spawned populations of steelhead in drainages upstream of the Wind River, Washington, and the Hood River, Oregon (exclusive), up to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin.

In the Pacific Northwest, summer steelhead enter freshwater between May and October and require several months to mature before spawning. The adult migration is protracted over a relatively long period. Spawning does not occur until the following March through July (Peven 1992). Unlike other anadromous salmonids, some steelhead adults (kelts) return to the ocean after spawning and may spawn more than once during their lifetime.

Adult steelhead typically begin to migrate into the Yakima River Basin with most fish crossing Prosser Dam between September and December. Another peak migration period over Prosser Dam occurs between late February and early April when fish that were holding through the winter in deep pools in the lower Yakima River begin their upstream migration to spawn in tributaries of the upper Yakima River, such as Manastash Creek. This is reflected in the summaries of the adult fish counts at Prosser Dam. After further upstream migration, adult steelhead will again hold in deeper pools in the main stem river near the mouth of

smaller tributary streams in which they will spawn. They then wait for freshets within these tributaries to begin their spawning runs.

Between 2000 and 2020, Steelhead passage over Roza Dam ranged from 29 (2006) to 459 (2015) individuals per year (Yakama Nation Fisheries n.d.). A Bureau of Reclamation study between 2002 and 2006 radio tagged 351 adult steelhead at Roza Dam, of which zero were tracked to the Manastash Creek system (2009).

It is assumed that adult steelhead migration and spawning timing within Manastash Creek would be similar to Taneum and Swauk Creeks, also in the Upper Yakima River subbasin, where adult migration timing is available from radiotelemetry data. The radiotelemetry data indicate that the steelhead begin entering the tributary streams in late March and generally remain within the tributaries until the end of the first week in May. Peak activity appears to occur during the month of April. Run timing is somewhat variable from year to year based on water temperature and flow, and during any given year, run timing varies with individual fish. However, the radiotelemetry data regarding peak migration and spawning time for the upper Yakima River is similar to run timing data for other tributaries supporting mid-Columbia steelhead.

Steelhead run timing is concurrent with peak spring runoff flows in small tributaries, allowing them to migrate to and from headwater spawning reaches. Thus, critical flows for adult steelhead migration range from early March to mid-May, although in some years with late run timing, out-migration may not be complete until June.

Steelhead eggs incubate from late March through June, and fry emerge from late spring to August. Their use of tributaries for rearing is variable, depending upon population size, and both weather and flow at any given time. Generally, juveniles rear in tributaries for 2 to 3 years (range from 1 to 7 years) before migrating downstream as smolts. Fry and smolts disperse downstream through the Yakima River in late April through June.

# 7 EFFECTS ANALYSIS

## 7.1 Direct Effects

A direct effect is the direct or immediate effect of the Project on a species or its habitat. According to ESA regulatory definitions, direct effects occur at or close to the time of the action itself. Direct effects for the Project are noise associated with construction, in-water work, fish handling and removal, water quality impacts, vegetation removal, and habitat alteration.

### 7.1.1 Terrestrial Noise

Construction noise from the Project is conservatively expected to extend approximately 2.17 miles from the Project area before returning to baseline conditions. Any listed terrestrial species within this area during construction would be exposed to elevated noise levels, and, if not habituated, could be displaced from the area. The higher-elevation portions of the action area away from the Project area may contain suitable habitat for Canada lynx. However, the Project will be completed in late summer/early fall when even transient presence of these species is unlikely. The chance of exposure to elevated sound levels by any listed terrestrial species is discountable. In addition, based on timing, the effect from an increase in sound levels is insignificant.

### 7.1.2 In-Water Work

In-water work will include placement and removal of the isolation structure and bypass. The isolation structure will be placed after the Project area has been seined and blocked with nets to remove any fish that may be present. The isolation structure will be partially placed from the bank, where possible, prior to any equipment entering the wetted width of the stream channel. Equipment will only operate in the area behind the isolation structures and will not enter actively flowing water. At no time will isolation span the entire South Fork Manastash Creek.

Work will occur after the project area has been isolated from flowing water. It is likely that hyporheic flows will be present, and groundwater could be encountered during excavation activities. The area of excavation and potential disruption of hyporheic flows will occur over a relatively small area, approximately 8,465 square feet adjacent to the right bank of Manastash Creek. The Contractor will be required to pump any groundwater or hyporheic flows to an upland area for infiltration. This pumping and removal of hyporheic flows will occur for a maximum of 14 weeks, during the construction of the revetment and barbs. Based on the short duration and limited area of fill below the OHWM (3,240square feet), the interception of hyporheic flows and resultant impact on temperatures and water quality in South Fork Manastash Creek is insignificant.

Species present in the aquatic zone of impact during this in-water work could be exposed to the direct effect of equipment operation. Based on Project timing, adult steelhead and bull trout presence is discountable in the aquatic zone of impact during construction. Spawning adult steelhead and out-migrating smolts will have left Manastash Creek prior to construction. Rearing steelhead may be present in the creek during construction, but at relatively low densities. Bull trout presence in the aquatic zone of impact during construction is also discountable, based on low densities of prey species, lower flows, and warmer water temperatures acting as a thermal barrier in the lower reaches of Manastash Creek.

### 7.1.3 Fish Handling and Removal

The areas where the isolation structures will be placed will be seined and isolated prior to work below the OHWM. Bull trout presence in Manastash Creek is discountable based on low densities of prey species, lower flows, and warmer water temperatures. Based on project timing, adult and out-migrating steelhead

presence is also discountable in the aquatic zone of impact during construction. Rearing steelhead may be present in the river during construction, but at relatively low densities. Any steelhead and bull trout that are in the dewatered area will be herded by nets and likely voluntarily leave the work area during dewatering activities. Construction of the isolation structure and dewatering of the existing channel will proceed slowly, to allow any fish to voluntarily leave as flows recede. If necessary, any pools will be pumped with small-capacity, screened pumps (meeting NMFS screening criteria), to remove any remaining fish by hand. Electrofishing will not be used. Knotless nylon sanctuary-type nets will be used, and handling will be minimized. All fish will be released downstream of the project area. Qualified biologists will be on-site to remove any stranded fish from the dewatered abandoned stream channel.

#### 7.1.4 Turbidity

The revetment and barbs will mostly be constructed in the isolated section after isolation and bypass measures are placed and the area is dewatered. There will likely be short-term and localized turbidity during the isolation and diversion structure placement and again during removal. The substrate of the Project action area is small to medium cobble, with little to no fine sediment accumulation due to active flows. Short-term impacts to water quality will not extend beyond 200 feet downstream of the Project area, but any listed species in this area during construction would be exposed to elevated turbidity.

Based on Project timing, adult steelhead and bull trout presence is discountable in the aquatic zone of impact during construction. Spawning adult steelhead and out-migrating smolts will have left Manastash Creek prior to construction. Bull trout presence in the aquatic zone of impact during construction is also discountable based on low densities of prey species, lower flows, distance from the Yakima River, and warmer water temperatures.

#### 7.1.5 Vegetation Removal

Construction of the detour, widened roadway, access to the dry streambed, and revetment will require vegetation removal. Approximately 48,050 square feet of both upland and riparian vegetation will be removed. All habitat north of Manastash Road within the project area was considered riparian. This area includes approximately 6,700 square feet of steep hillside between the road and the creek**.** The majority of this area is actively eroding bank and consists of bare soil and rock with minimal riparian habitat (e.g., small shrubs) adjacent to the creek; however, the removal of some small shrubs under 6 in dbh is anticipated for equipment access within the dry stream bed. Mature trees within this area are all adjacent to the roadway on the upper bank (rooted approximately 15 feet above the creek), however, they do provide some shade and were therefore considered riparian habitat (**Appendix C, Photograph 3**). The riparian vegetation in these areas is mostly cottonwood, Douglas-fir, willow, rose, alder, and snowberry. Native riparian vegetation will be incorporated within the rock revetment and in suitable areas at the toe of the revetment, on the impacted banks, and within the barbs where possible. Willow cuttings will provide the best likelihood for success, with cottonwood planted in areas just above the OHWM that have saturation during the growing season. Where possible, vegetation in areas that are not permanently altered will be cut, but not grubbed, to promote natural regeneration. Effects from vegetation removal are short-term and localized, as the area will be restored with native species once the revetement is installed.

#### 7.1.6 Short-Term Aquatic Habitat Loss

The direct effect to habitat will be the short-term displacement caused by isolating and dewatering approximately 8,465 square feet of active South Fork Manastash Creek channel. Any species present will not have access to this section of South Fork Manastash Creek for the duration of the Project. This will be short term, lasting approximately 14 weeks. At no time will isolation span the entire South Fork Manastash

Creek. If present, steelhead and bull trout will be able to move up- and downstream of the project area during construction.

This short-term habitat loss is an insignificant effect to steelhead and bull trout based on the small size of the impact, timing during low flows, and highly unlikely chance for adult steelhead and bull trout presence.

## 7.2 Delayed Consequences

Delayed consequences are caused by the action and occur after the action is completed. The Project restores lost roadway and improves parking at the sno-park, but does not create a new facility, does not increase access or use, does not increase capacity for parking or travel along the road, and does not have new development contingent on it. The bank stabilization will return the roadway to its original width and provide safer parking for the sno-park that is already defined at this location.

### 7.2.1 Effects from New Impervious Surface

The existing impervious surface in the project area prior to the washout was approximately 17,255 square feet. Post-project, total impervious surface will be approximately 28,190 square feet. There is net increase of 10,935 square feet of new impervious surface from widening the road and creating a turnaround.

All stormwater associated with this increase in new impervious surface will be collected and treated through infiltration in roadside ditches south of the roadway. To minimize fill within the creek, a ditch will not be installed north of the roadway. Instead, the roadway will be reconstructed to existing condition (e.g., crowned) with no increase in runoff towards the creek compared to pre-washout conditions. There will be no impacts to creek water quality from new impervious surface.

### 7.2.2 Altered Predator-Prey Relationships

The Project will not impact suitable food items or prey species of any listed species. There may be a short-term displacement to access and foraging during work below the OHWM, but the amount of displaced area is insignificant when compared to the amount of suitable aquatic habitat elsewhere in South Fork Manastash Creek.

### 7.2.3 Long-Term Habitat Alteration

The revetment and barbs will cover approximately 3,240 square feet of currently available aquatic habitat is degraded due to continuing bank erosion. The amount of permanent habitat alteration is insignificant compared to suitable habitat elsewhere in South Fork Manastash Creek.

The revetment and barbs will be constructed where the roadway and approach driveway continue to actively erode, so repairing the embankment will halt on-going erosion, improve water quality, and improve and maintain habitat. In addition, the habitat in the aquatic zone of impact is degraded due to bank erosion and lack of riparian vegetation. More suitable habitat is available elsewhere within the higher elevations of South Fork Manastash Creek. Habitat alteration of 280 linear feet (3,240 square feet) of shoreline and aquatic habitat is insignificant when compared to that available elsewhere within this watershed.

The Project will have a beneficial effect on channel complexity, channel roughness, in-stream habitat, and riparian habitat. Repairing the ongoing erosion with wood and rock and planting the revetment, within the barbs where possible, and shoreline area will have long-term beneficial effects, providing increased

vegetative cover, lower water temperatures, and an increase in both aquatic habitat complexity and riparian habitat.

#### 7.2.4 Indirect Land Use Impacts

No land use impacts are associated with the Project. No indirect effects from land use are associated with Project construction.

### 7.3 Interrelated and Interdependent Actions and Activities

No interrelated or interdependent actions or activities are associated with Project construction.

### 7.4 Cumulative Effects

Cumulative effects are the effects of future state or private actions, not involving federal activities that are reasonably certain to occur within the Project action area (Section 402.02 of Title 50 of the Code of Federal Regulations (50 CFR 402.02)). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Endangered Species Act.

The majority of the action area is on Federal (US Forest Service) or state property (DNR or WDFW). Non-watershed recovery actions, such as forest management activities like timber harvest and fire restoration efforts are reasonably certain to occur in the action area. The effects of these future actions are not known; however, required standards and guidelines for resource protection will minimize the potential for cumulative, long-term impacts to species recovery.

# 8 EFFECT DETERMINATIONS

The Project will have **No Effect** on yellow-billed cuckoo. Refer to Section 7.1 for the justification of this effect determination and additional information on why effect determinations were not applicable for designated critical habitat for bull trout or steelhead.

## 8.1 Effect Determinations for Listed Species

### 8.1.1 Canada Lynx

The Project May Affect, but is Not Likely to Adversely Affect, Canada lynx.

The Project **May Affect** Canada lynx because:

- Canada lynx presence cannot be precluded within the action area because it contains mid-elevation forests which has the potential to support snowshoe hare.
- Canada lynx are known to occur at elevations above 4,000 feet in Washington and the action area includes elevations up to 4,360 feet.

However, the Project is Not Likely to Adversely Affect Canada lynx because:

- The work area is located at approximately 2,700 feet, which is outside the known habitat range for Canada lynx in Washington State. The closest potential habitat occurs on the outer limits of the action area away from the work area on surrounding ridges. Canada lynx presence during construction is discountable.
- Canada lynx are highly transient and are not anticipated to occur near the work area where there are high levels of disturbance from adjacent residences and increased summer traffic volumes. The small increase in ambient noise and disturbance is insignificant.

### 8.1.2 Columbia River DPS Bull Trout

The Project May Affect, but is Not Likely to Adversely Affect, Columbia River DPS bull trout.

The Project **May Affect** bull trout because:

- Bull trout presence cannot be precluded in South Fork Manastash Creek during construction due to the removal of downstream barriers.
- The Project will be constructed with in-water work and will isolate and dewater approximately 8,465 square feet of South Fork Manastash Creek.
- Fish handling may occur during dewatering activities.
- Construction will temporarily limit access to approximately 8,465 square feet of aquatic habitat.
- A minor and short-term increase in turbidity will be associated with the in-water work.
- Approximately 6,700 square feet of riparian vegetation will be removed.
- The Project will create approximately 10,935 square feet of new impervious surface.

- The Project will permanently alter approximately 3,240 square feet of currently available aquatic habitat.

However, the Project is **Not Likely to Adversely Affect** bull trout because:

- Bull trout have not been documented in the aquatic zone of impact.

- The Project will be completed from July through September. Bull trout presence in the aquatic zone of impact is discountable due to low source population levels in the Yakima River, distance to the Yakima River, warmer temperatures that may act as a thermal barrier in the lower Manastash Creek watershed, and lack of an abundance of prey species.

- Shoreline habitat in the aquatic zone of impact is degraded due to bank erosion, and the loss of access will be short term (14 weeks) and temporary. There is access to more suitable habitat at higher elevations in the South Fork Manastash Creek. Exclusion from the project area will be an insignificant effect when compared to the amount of suitable habitat elsewhere.

- The approximate 3,240 square feet of currently available aquatic habitat is degraded due to continuing bank erosion and aggraded sediment. The Project will stabilize the bank and incorporate large woody debris to increase habitat complexity and habitat value.

- Turbidity will be limited to within 200 feet of Project activities. Any increases in turbidity will be localized and short term in nature. The effect of turbidity will be insignificant due to BMPs and construction methods that will limit the extent and duration. In addition, the likelihood of bull trout being exposed to increased turbidity is discountable due to low numbers in the Yakima River subpopulation and the distance to the Yakima River and elevated water temperatures acting as a thermal barrier in the lower watershed.

- The temporary loss of 6,700 square feet of riparian shrubs is insignificant compared to the amount of riparian habitat in the South Fork Manastash Creek corridor. Willow and cottonwood will be incorporated into the riparian areas where permanent vegetation removal is proposed. Over time, this vegetation will restore riparian function.

- Restoring channel complexity and roughness with the addition of rock and large woody debris, and restoring riparian vegetation is an entirely beneficial effect, providing increased bank resiliency to erosion, lowering water temperatures, and increasing aquatic and shoreline complexity.

- Stormwater from the minor amount of new impervious surface will collect in roadside ditches south of the roadway and infiltrate. There will be no discharge to South Fork Manastash Creek beyond the amount that occurred during pre-washout conditions. Effects from the 10,935 square feet of new impervious surface will be insignificant based on 100% infiltration.

- The 3,240square feet of currently available aquatic habitat is degraded due to continuing bank erosion. Repairing the embankment will halt on-going erosion, improve water quality, and improve and maintain habitat. The amount of permanent habitat alteration is insignificant compared to suitable habitat elsewhere in South Fork Manastash Creek.

#### 8.1.3 Middle Columbia River Summer-Run DPS Steelhead

The Project **May Affect**, **and is Likely to Adversely Affect**, MCR summer-run DPS steelhead.

The Project **May Affect** steelhead because:

- Steelhead presence cannot be precluded in the aquatic zone of impact during construction due to the removal of downstream barriers.
- The Project will be constructed with in-water work.
- Construction will temporarily limit access to approximately 8,465 square feet of aquatic habitat.
- Fish handling may occur during dewatering activities.
- A minor and short-term increase in turbidity will be associated with the in-water work.
- Approximately 6,700 square feet of riparian vegetation will be removed.
- The Project will create approximately 10,935 square feet of new impervious surface.
- The Project will permanently alter approximately 3,240 square feet of currently available aquatic habitat.

The Project is **Likely to Adversely Affect** steelhead because:

- The Project will be completed from July through September. Spawning adults or out-migrating juveniles will not likely be present during construction due to the run timing presented above. However, steelhead rearing juveniles could be present in the aquatic zone of impact during construction.
- The removal of the Reed Diversion in late 2016 allowed access to the Project action area. Juvenile steelhead presence would be limited to first-year fry emergence. Though the expected numbers of juvenile steelhead are expected to be relatively low, this size class would be difficult to remove during dewatering, and any young-of-year steelhead would be exposed to Project effects.
- Isolation and dewatering will occur. Any steelhead present in the 8,465 square feet isolation area will be captured, removed from the Project area, and placed downstream.
- Turbidity will be limited to within 200 feet of Project activities. Though any increases in turbidity will be localized and short term in nature, any steelhead juveniles would be exposed to turbidity.

Though the Project is likely to adversely affect steelhead, several Project elements and components will either beneficially affect steelhead or minimize the potential for adverse effects. These include the following:

- Restoring channel complexity and roughness with the addition of rock and large woody debris, and restoring riparian vegetation is an entirely beneficial effect, providing increased bank resiliency to erosion, lowering water temperatures, and increasing aquatic and shoreline complexity.
- The temporary loss of 6,700 square feet of riparian shrubs is insignificant compared to the amount of riparian habitat in the Manastash Creek corridor.

- Willow and cottonwood will be incorporated into the riparian areas where permanent vegetation removal is proposed. Over time, this vegetation will restore riparian function.

- Stormwater from the minor amount of new impervious surface will collect in roadside ditches south of the roadway and infiltrate. There will be no discharge to South Fork Manastash Creek beyond the amount that may occur based on the roads existing condition. Effects from the 10,935 square feet of new impervious surface will be insignificant based on 100% infiltration.

- Isolation and fish handling will only be conducted by qualified individuals.

- The 3,240 square feet of currently available aquatic habitat is degraded due to continuing bank erosion. Repairing the embankment will halt on-going erosion, improve water quality, and improve and maintain habitat. The amount of permanent habitat alteration is insignificant compared to suitable habitat elsewhere in South Fork Manastash Creek.

# 9 ESSENTIAL FISH HABITAT ASSESSMENT AND EFFECT DETERMINATION

Pursuant to the Magnuson-Stevens Fisheries Conservation and Management Act and the 1996 Sustainable Fisheries Act, EFH evaluation of impacts is necessary for the Project. EFH is defined by the MSFCMA in Sections 600.905–930 of Title 50 of the Code of Federal Regulations (50 CFR 600.905–930) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Yakima River and its tributaries are designated as EFH for Pacific salmon, which includes Chinook and coho populations (Pacific Fishery Management Council 2014). The aquatic zone of impact includes habitats that have been designated as EFH for coho and Chinook salmon.

The assessment of potential effects to Pacific salmon EFH from the proposed Project are the same as is described within Section 7 of this BA, which addresses potential project impacts to listed species and designated critical habitats. Specific elements that could affect EFH for Pacific salmon are temporary water quality impacts, in-water work, temporary habitat loss, and habitat alteration. Impact avoidance and minimization measures that are applicable to the protection of EFH are presented in Section 4.

Essential fish habitat for ground fishes and Pacific salmon is present in the project action area. The project will result in a minor, temporary effect on water quality and temporarily isolate habitats during work below the OHWM. The habitat in the project area is degraded and very low quality due to the on-going bank erosion, velocities, and lack of channel roughness. The scale and duration of Project impacts at the fishery level will be negligible. The proposed temporary and short-term stream isolation of this stretch of creek does not preclude access to quality habitat. The project area does not provide spawning habitat, and it's unlikely it is used for breeding, feeding, or rearing.

WSDOT Local Programs interpretation of the NMFS guidance regarding EFH assessments requires an adverse effect determination if the project results in any reduction in the quantity or quality of EFH. Therefore, given the minor short-term loss of aquatic habitat during isolation and potential for short-term turbidity only during the placement and removal of the isolation structure, the project **May Adversely Affect** EFH for Pacific Salmon.

Minimization measures implemented during construction will minimize any short term impacts that could potential occur to Pacific salmon EFH. There is no permanent reduction of quantity or quality of EFH associated with this Project. Once complete, the Project will improve water quality for Pacific salmon EFH.

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# APPENDIX A
# USFWS AND NMFS SPECIES LISTS

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405
http://www.fws.gov/wafwo/

In Reply Refer To: October 29, 2021
Consultation Code: 01EWFW00-2022-SLI-0116
Event Code: 01EWFW00-2022-E-00355
Project Name: Manastash Road Creek Bank Stabilization and Snow Park Improvement

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website: http://wdfw.wa.gov/mapping/phs/ or at our office website: http://www.fws.gov/wafwo/species_new.html. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at http://www.fws.gov/pacific/eagle/for information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: http://www.nmfs.noaa.gov/pr/laws/mmpa/.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:
National Marine Fisheries Service: http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

Attachment(s):

- Official Species List

# Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

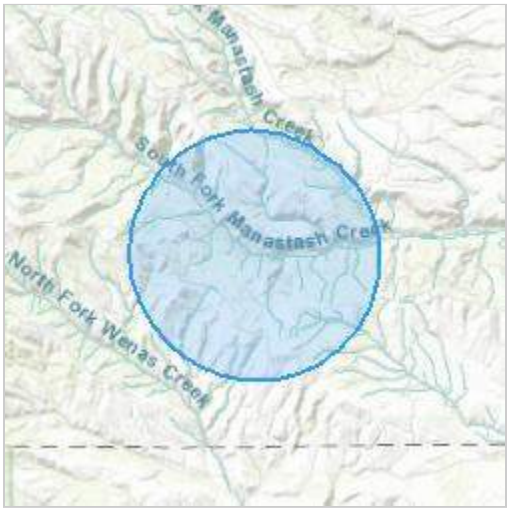
**Washington Fish And Wildlife Office**
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

# Project Summary

Consultation Code: 01EWFW00-2022-SLI-0116
Event Code: Some(01EWFW00-2022-E-00355)
Project Name: Manastash Road Creek Bank Stabilization and Snow Park Improvement
Project Type: TRANSPORTATION
Project Description: The project will repair the eroded streambank and associated roadway embankment (approximately 350 linear feet), widen approximately 0.36 miles of Manastash Road to accommodate parking for recreational access and provide a turnaround at the end of the County road for trailers, County equipment, emergency vehicles, fire apparatus, and other recreational vehicles. the project is located west of the city of Ellensburg, Washington and construction is proposed beginning summer 2022 and will be completed in one construction season.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.96076775,-120.79294966706561,14z




Counties: Kittitas County, Washington

# Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Mammals

| NAME | STATUS |
|---|---|
| Canada Lynx *Lynx canadensis*<br>Population: Wherever Found in Contiguous U.S.<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/3652 | Threatened |

## Birds

| NAME | STATUS |
|---|---|
| Yellow-billed Cuckoo *Coccyzus americanus*<br>Population: Western U.S. DPS<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/3911 | Threatened |

## Fishes

| NAME | STATUS |
|---|---|
| Bull Trout *Salvelinus confluentus*<br>Population: U.S.A., conterminous, lower 48 states<br>There is **final** critical habitat for this species. The location of the critical habitat is not available.<br>Species profile: https://ecos.fws.gov/ecp/species/8212 | Threatened |

## Insects

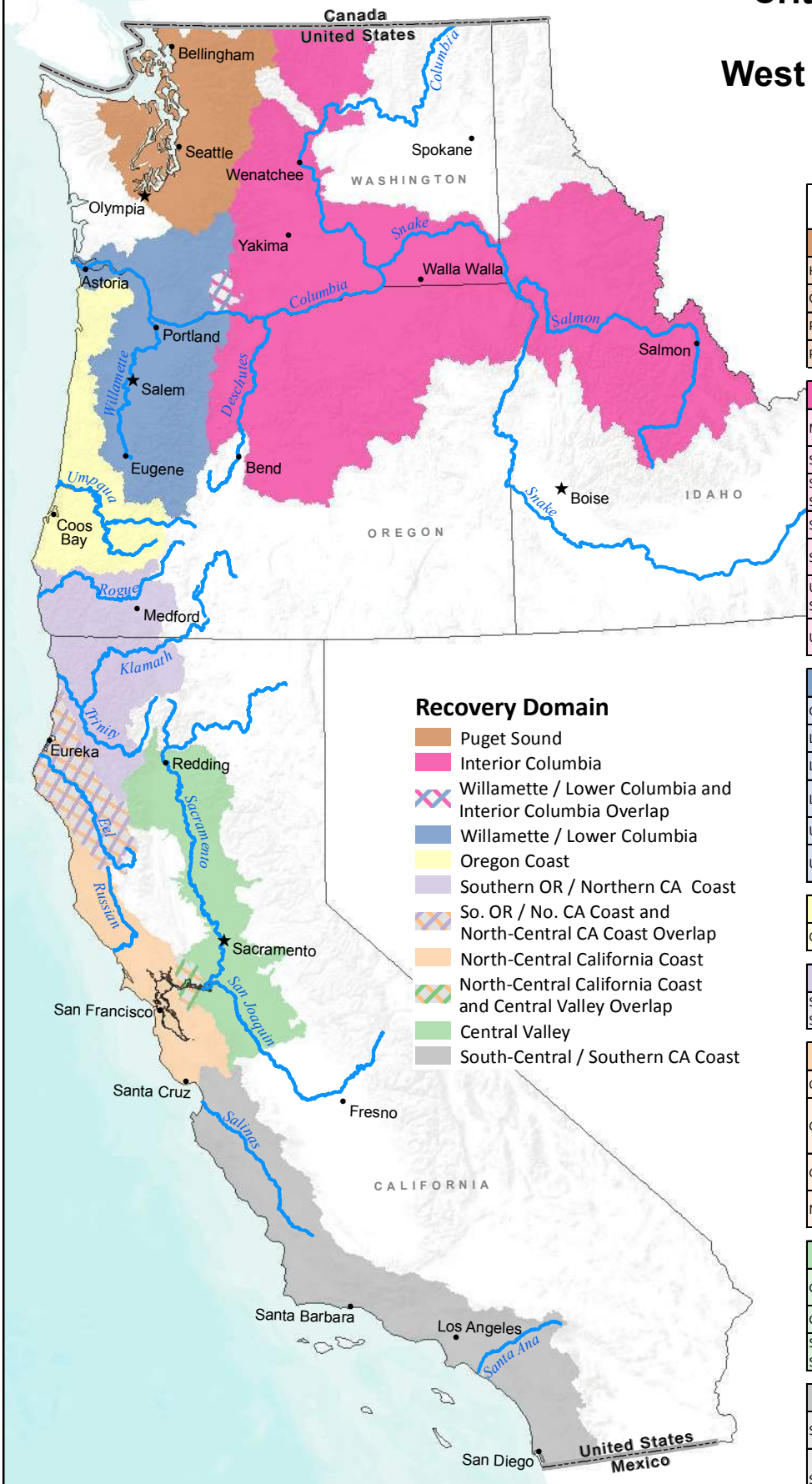
| NAME | STATUS |
| --- | --- |
| Monarch Butterfly *Danaus plexippus* | Candidate |

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

# Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead




Updated July 2016

| Evolutionarily Significant Unit / Distinct Population Segment | ESA Status | Date of ESA Listing | Date of CH Designation |
|---|---|---|---|
| **Puget Sound Recovery Domain** | | | |
| Hood Canal Summer-run Chum Salmon | T | 3/25/1999 | 9/2/2005 |
| Ozette Lake Sockeye Salmon | T | 3/25/1999 | 9/2/2005 |
| Puget Sound Chinook Salmon | T | 3/24/1999 | 9/2/2005 |
| Puget Sound Steelhead | T | 5/11/2007 | 2/24/2016 |
| **Interior Columbia Recovery Domain** | | | |
| Middle Columbia River Steelhead | T | 3/25/1999<br>1/5/2006 | 9/2/2005 |
| Snake River Fall-run Chinook Salmon | T | 4/22/1992 | 12/28/1993 |
| Snake River Spring / Summer-run Chinook Salmon | T | 4/22/1992 | 10/25/1999 |
| Snake River Sockeye Salmon | E | 11/20/1991 | 12/28/1993 |
| Snake River Steelhead | T | 8/18/1997<br>1/5/2006 | 9/2/2005 |
| Upper Columbia River Spring-run Chinook Salmon | E | 3/24/1999 | 9/2/2005 |
| Upper Columbia River Steelhead | T | 8/18/1997<br>1/5/2006 | 9/2/2005 |
| **Willamette / Lower Columbia Recovery Domain** | | | |
| Columbia River Chum Salmon | T | 3/25/1999 | 9/2/2005 |
| Lower Columbia River Chinook Salmon | T | 3/24/1999 | 9/2/2005 |
| Lower Columbia River Coho Salmon | T | 6/28/2005 | 2/24/2016 |
| Lower Columbia River Steelhead | T | 3/19/1998<br>1/5/2006 | 9/2/2005 |
| Upper Willamette River Chinook Salmon | T | 3/24/1999 | 9/2/2005 |
| Upper Willamette River Steelhead | T | 3/25/1999<br>1/5/2006 | 9/2/2005 |
| **Oregon Coast Recovery Domain** | | | |
| Oregon Coast Coho Salmon | T | 2/11/2008 | 2/11/2008 |
| **Southern Oregon / Northern California Coast Recovery Domain** | | | |
| Southern OR / Northern CA Coasts Coho Salmon | T | 5/6/1997 | 5/5/1999 |
| **North-Central California Coast Recovery Domain** | | | |
| California Coastal Chinook Salmon | T | 9/16/1999 | 9/2/2005 |
| Central California Coast Coho Salmon | E | 10/31/1996 (T)<br>6/28/2005 (E)<br>4/2/2012 (RE) | 5/5/1999 |
| Central California Coast Steelhead | T | 8/18/1997<br>1/5/2006 | 9/2/2005 |
| Northern California Steelhead | T | 6/7/2000<br>1/5/2006 | 9/2/2005 |
| **Central Valley Recovery Domain** | | | |
| California Central Valley Steelhead | T | 3/19/1998<br>1/5/2006 | 9/2/2005 |
| Central Valley Spring-run Chinook Salmon | T | 9/16/1999 | 9/2/2005 |
| Sacramento River Winter-run Chinook Salmon | E | 11/5/1990 (T)<br>1/4/1994 (E) | 6/16/1993 |
| **South-Central / Southern California Coast Recovery Domain** | | | |
| South-Central California Coast Steelhead | T | 8/18/1997<br>1/5/2006 | 9/2/2005 |
| Southern California Steelhead | E | 8/18/1997<br>5/1/2002 (RE)<br>1/5/2006 | 9/2/2005 |

ESA = Endangered Species Act, CH = Critical Habitat, RE = Range Extension
E = Endangered, T = Threatened,

Critical Habitat Rules Cited

- 2/24/2016 (81 FR 9252) Final Critical Habitat Designation for Puget Sound Steelhead and Lower Columbia River Coho Salmon
- 2/11/2008 (73 FR 7816) Final Critical Habitat Designation for Oregon Coast Coho Salmon
- 9/2/2005 (70 FR 52630) Final Critical Habitat Designation for 12 ESU's of Salmon and Steelhead in WA, OR, and ID
- 9/2/2005 (70 FR 52488) Final Critical Habitat Designation for 7 ESU's of Salmon and Steelhead in CA
- 10/25/1999 (64 FR 57399) Revised Critical Habitat Designation for Snake River Spring/Summer-run Chinook Salmon
- 5/5/1999 (64 FR 24049) Final Critical Habitat Designation for Central CA Coast and Southern OR/Northern CA Coast Coho Salmon
- 12/28/1993 (58 FR 68543) Final Critical Habitat Designation for Snake River Chinook and Sockeye Salmon
- 6/16/1993 (58 FR 33212) Final Critical Habitat Designation for Sacramento River Winter-run Chinook Salmon

ESA Listing Rules Cited

- 4/2/2012 (77 FR 19552) Final Range Extension for Endangered Central California Coast Coho Salmon
- 2/11/2008 (73 FR 7816) Final ESA Listing for Oregon Coast Coho Salmon
- 5/11/2007 (72 FR 26722) Final ESA Listing for Puget Sound Steelhead
- 1/5/2006 (71 FR 5248) Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead
- 6/28/2005 (70 FR 37160) Final ESA Listing for 16 ESU's of West Coast Salmon
- 5/1/2002 (67 FR 21586) Range Extension for Endangered Steelhead in Southern California
- 6/7/2000 (65 FR 36074) Final ESA Listing for Northern California Steelhead
- 9/16/1999 (64 FR 50394) Final ESA Listing for Two Chinook Salmon ESUs in California
- 3/25/1999 (64 FR 14508) Final ESA Listing for Hood River Canal Summer-run and Columbia River Chum Salmon
- 3/25/1999 (64 FR 14517) Final ESA Listing for Middle Columbia River and Upper Willamette River Steelhead
- 3/25/1999 (64 FR 14528) Final ESA Listing for Ozette Lake Sockeye Salmon
- 3/24/1999 (64 FR 14308) Final ESA Listing for 4 ESU's of Chinook Salmon
- 3/19/1998 (63 FR 13347) Final ESA Listing for Lower Columbia River and Central Valley Steelhead
- 8/18/1997 (62 FR 43937) Final ESA Listing for 5 ESU's of Steelhead
- 5/6/1997 (62 FR 24588) Final ESA Listing for Southern Oregon / Northern California Coast Coho Salmon
- 10/31/1996 (61 FR 56138) Final ESA Listing for Central California Coast Coho Salmon
- 1/4/1994 (59 FR 222) Final ESA Listing for Sacramento River Winter-run Chinook Salmon
- 4/22/1992 (57 FR 14653) Final ESA Listing for Snake River Spring/summer-run and Snake River Fall Chinook Salmon
- 11/20/1991 (56 FR 58619) Final ESA Listing for Snake River Sockeye Salmon
- 11/5/1990 (55 FR 46515) Final ESA Listing for Sacramento River Winter-run Chinook Salmon

# APPENDIX B
# MAPS

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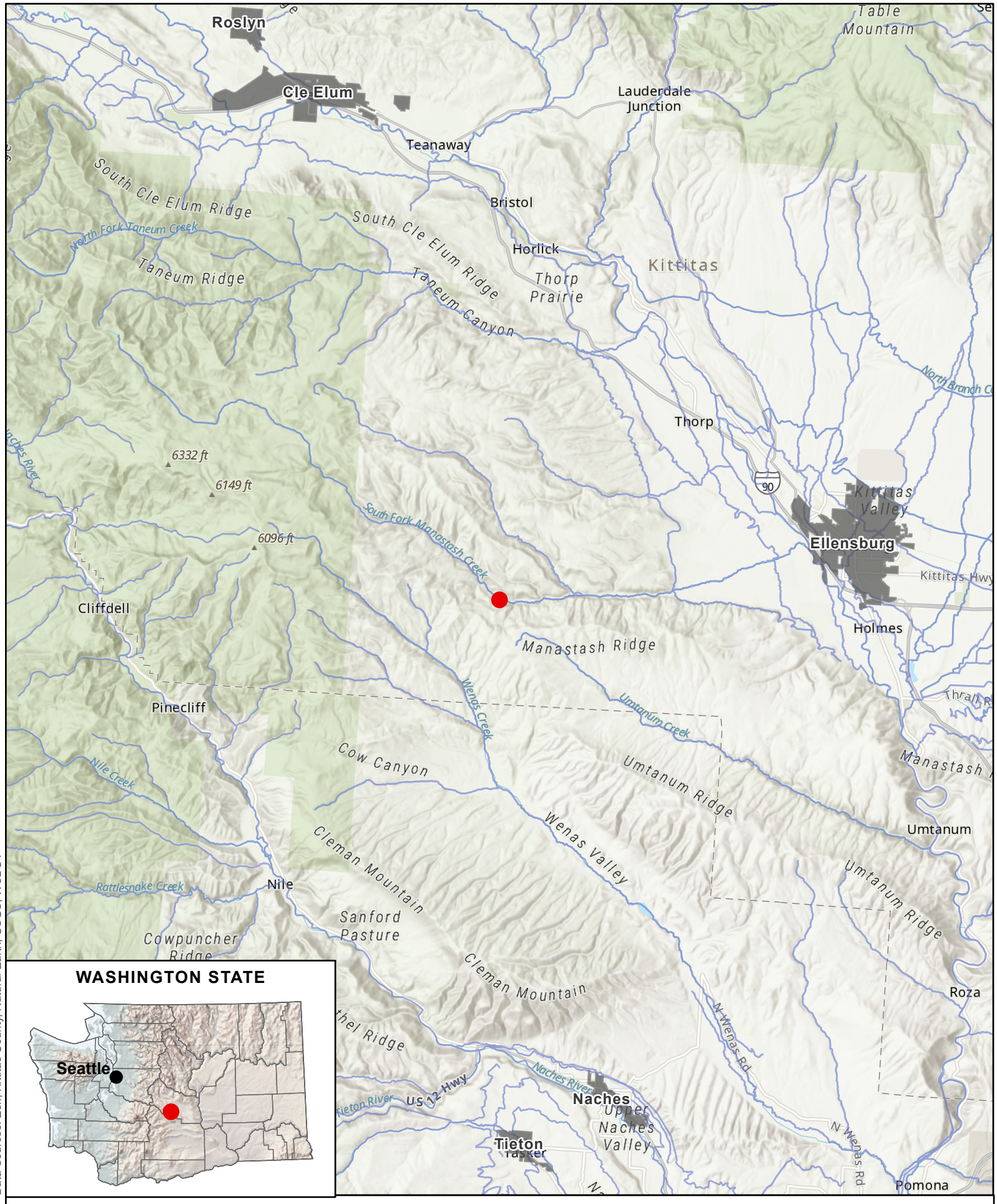
# Map 1: Vicinity



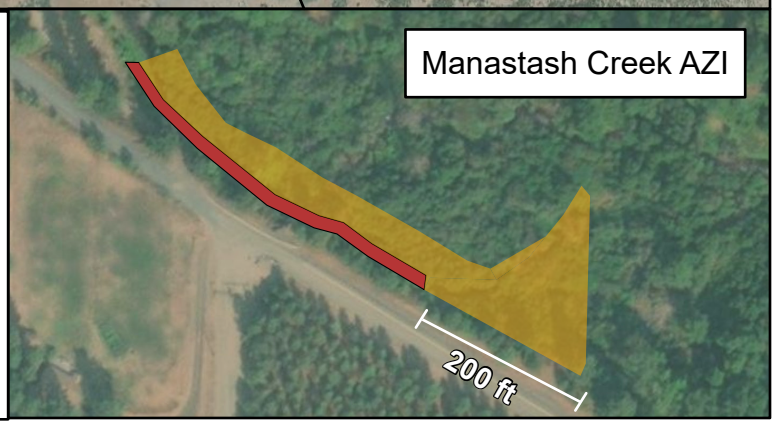

Data Sources: Esri, Kittitas County, Natural Earth, USGS, WSDOT

# Map 2: Aquatic and Terrestrial Zones of Impact


Terrestrial Zone of Impact
Aquatic Zone of Impact
Isolation Structure
NHD Flowline
Manastash Road

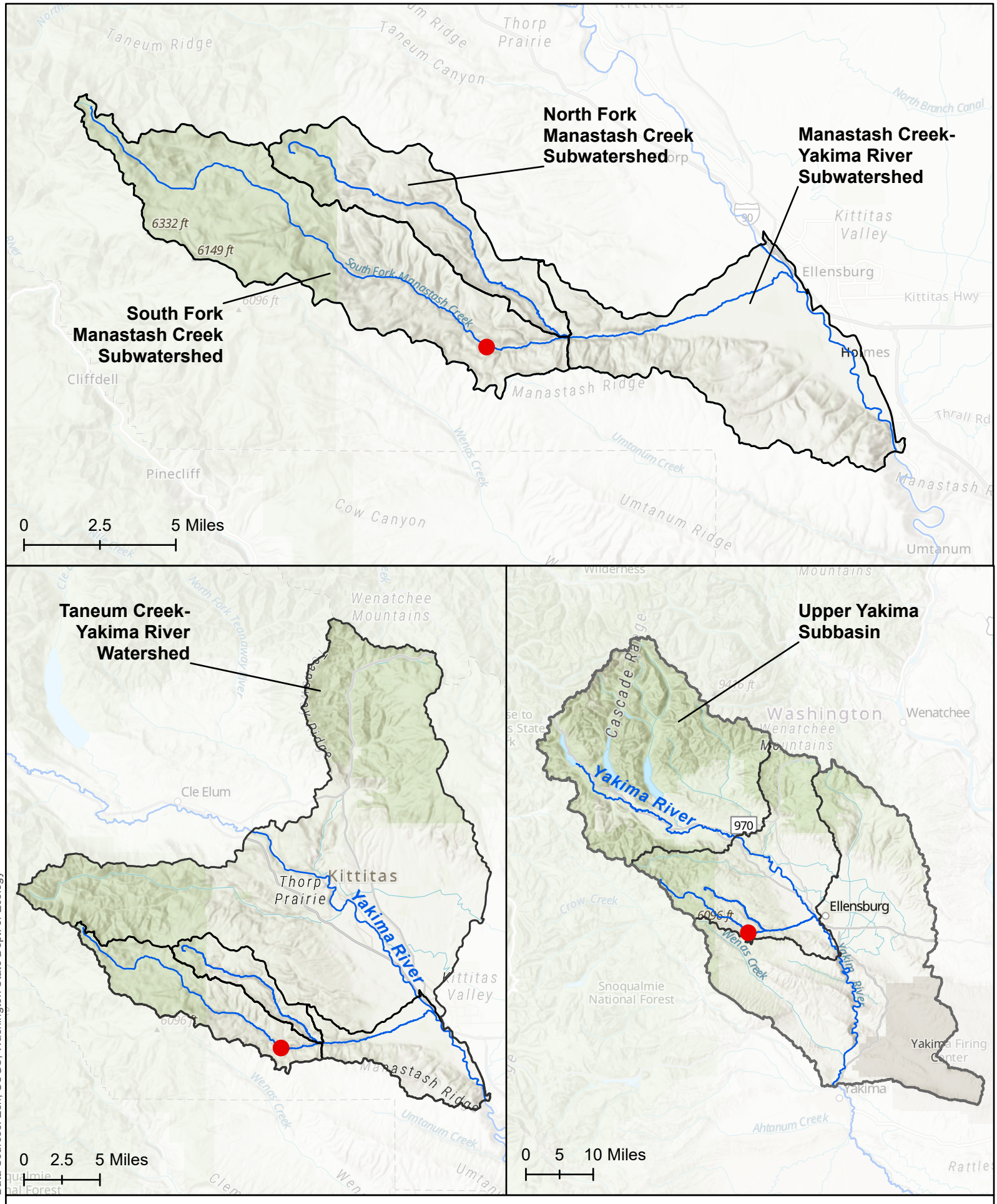
0 0.5 1
Mile

N




Data Sources: Esri, Kittitas County, USGS

# Map 3: Subwatersheds, Watershed and Subbasin



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# APPENDIX C
# PHOTOGRAPHS

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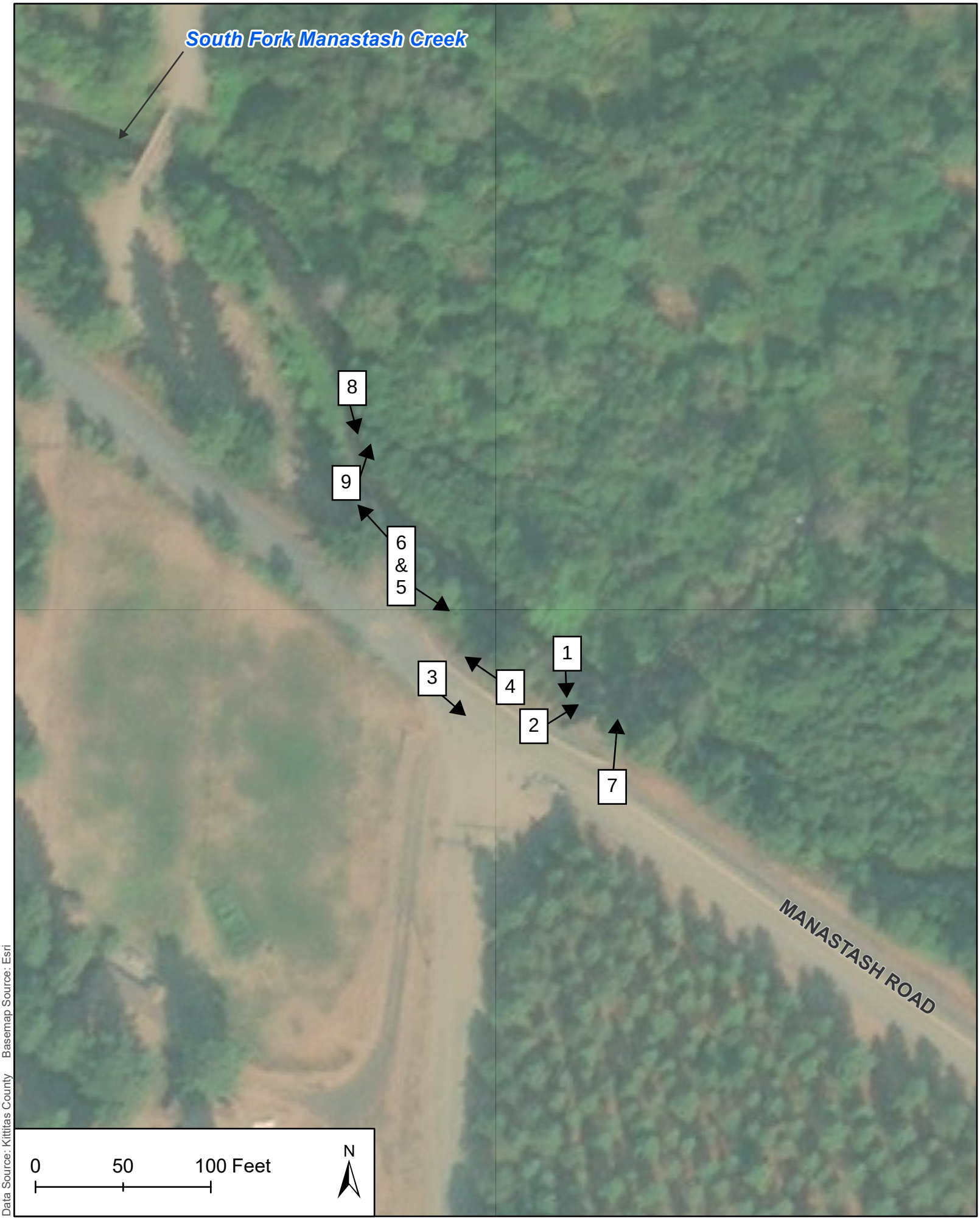
**Figure C-1. Location and Direction of Photographs**



**Photograph 1.** Manastash Road erosion area, looking south towards the road (December 2016).

**Photograph 2.** Above the area of erosion, looking northeast (downstream) (September 3, 2021).

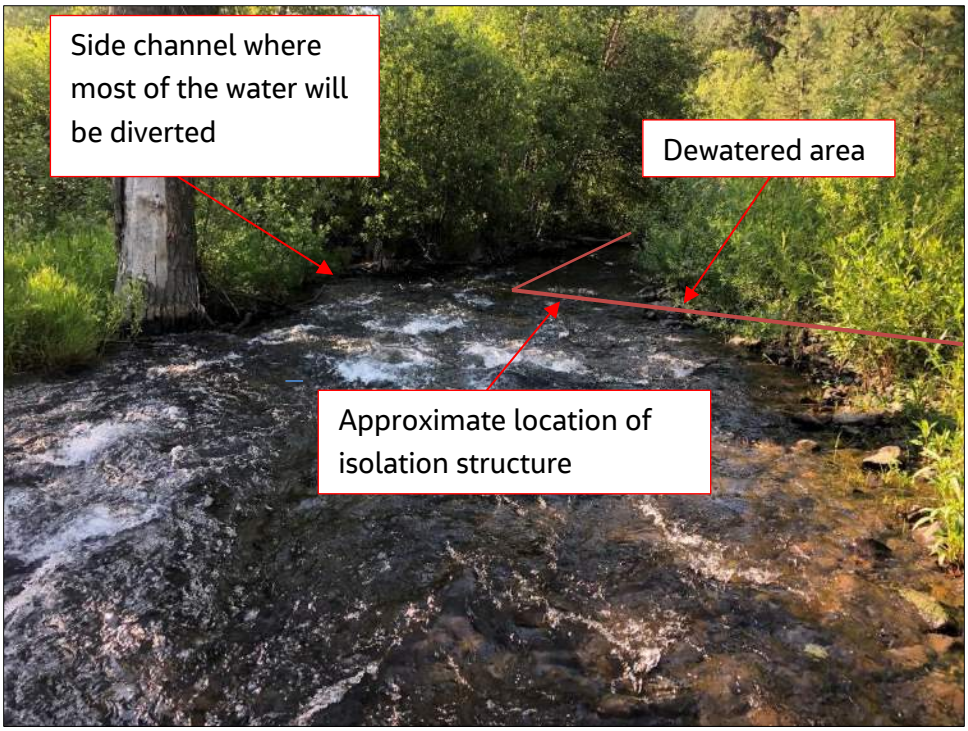
**Photograph 3.** Manastash Road at the erosion area looking southeast at single lane and current turnaround (July 1, 2021).


**Photograph 4.** Erosion area looking northwest (upstream) (July 1, 2021).


**Photograph 5.** Upper end of proposed revetment where concrete debris will be removed from below OHWM, looking southeast (downstream) (November 8, 2021).


**Photograph 6.** Riparian vegetation upstream of erosion, looking northwest (upstream) where equipment will access the dry streambed (September 3, 2021).

**Photograph 7.** Channel directly downstream of erosion area, looking north (September 3, 2021).




**Photograph 8.** Location of diversion structure and side channel upstream of erosion area, looking southeast (downstream, July 1, 2021).


**Photograph 9.** Location of **Photograph 12**, looking north (upstream) during lower flow conditions (November 8, 2021).

# APPENDIX D
# DRAWINGS AND SITE PLANS

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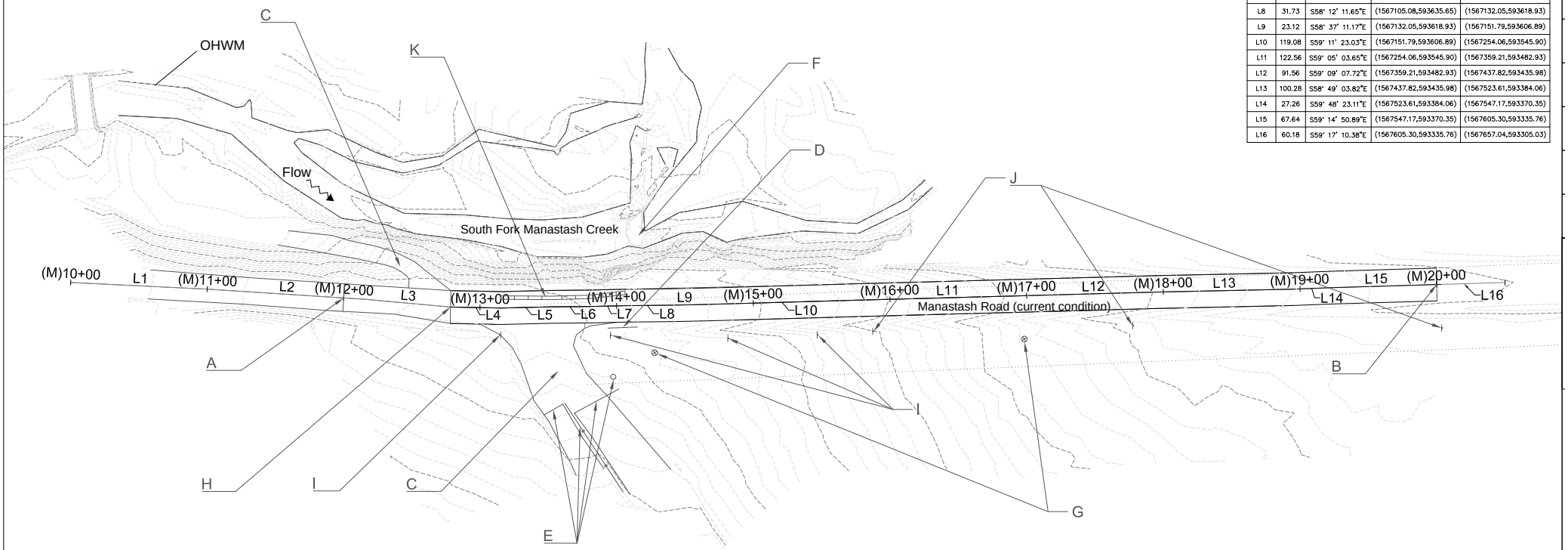
# Plan View - Existing Conditions

PT. SE ¼ SEC 14. & SW ¼ SEC 15 T17N R16E, W.M.

| Line Table: (M) Line | | | | |
|---|---|---|---|---|
| Line # | Length | Direction | Start Point | End Point |
| L1 | 100.56 | S54° 47' 05.54"E | (1566771.52,593867.64) | (1566853.68,593809.65) |
| L2 | 115.17 | S53° 52' 31.21"E | (1566853.68,593809.65) | (1566946.71,593741.75) |
| L3 | 62.74 | S52° 26' 03.09"E | (1566946.71,593741.75) | (1566996.44,593703.50) |
| L4 | 37.29 | S56° 24' 28.63"E | (1566996.44,593703.50) | (1567027.50,593682.87) |
| L5 | 35.76 | S58° 58' 22.93"E | (1567027.50,593682.87) | (1567058.14,593664.44) |
| L6 | 28.64 | S58° 04' 07.77"E | (1567058.14,593664.44) | (1567082.45,593649.29) |
| L7 | 26.42 | S58° 55' 15.46"E | (1567082.45,593649.29) | (1567105.08,593635.65) |
| L8 | 31.73 | S58° 12' 11.65"E | (1567105.08,593635.65) | (1567132.05,593618.93) |
| L9 | 23.12 | S58° 37' 11.17"E | (1567132.05,593618.93) | (1567151.79,593606.89) |
| L10 | 119.08 | S59° 11' 23.03"E | (1567151.79,593606.89) | (1567254.06,593545.90) |
| L11 | 122.56 | S59° 05' 03.65"E | (1567254.06,593545.90) | (1567359.21,593482.93) |
| L12 | 91.56 | S59° 09' 07.72"E | (1567359.21,593482.93) | (1567437.82,593435.98) |
| L13 | 100.28 | S58° 49' 03.82"E | (1567437.82,593435.98) | (1567523.61,593384.06) |
| L14 | 27.26 | S59° 48' 23.11"E | (1567523.61,593384.06) | (1567547.17,593370.35) |
| L15 | 67.64 | S59° 14' 50.89"E | (1567547.17,593370.35) | (1567605.30,593335.76) |
| L16 | 60.18 | S59° 17' 10.38"E | (1567605.30,593335.76) | (1567657.04,593305.03) |




**General Notes**

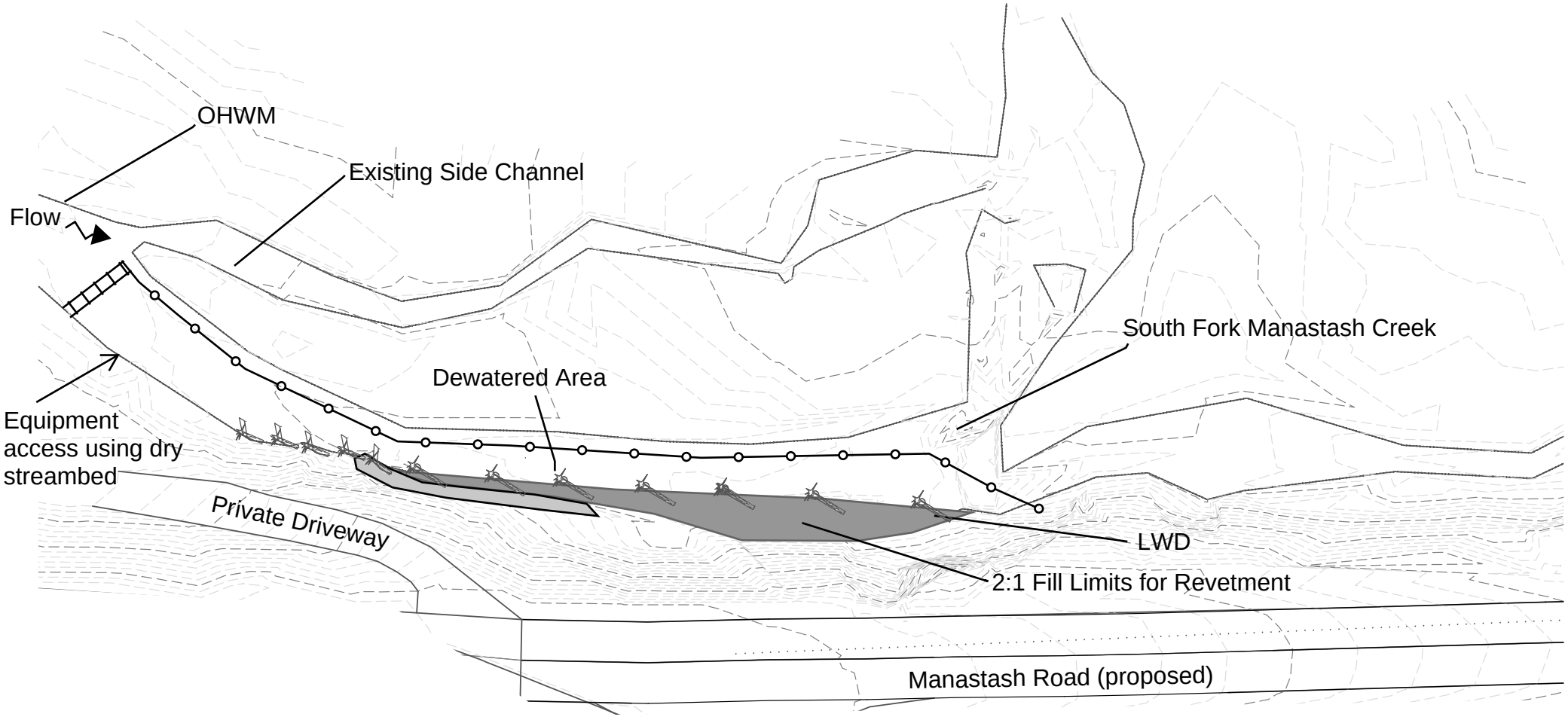
1. All stationing is based on centerline of roadways unless otherwise noted.
2. Unless otherwise provided for in these plans and specifications, all materials and workmanship shall be in accordance with the requirements of the 2022 edition of the State of Washington, Department of Transportation Standard Specifications for Road and Bridge Construction and Title 12 of the Kittitas County Code.
3. Approved construction plans shall be on the job site at all times when project is under construction.
4. It will be the contractor's responsibility to contact all utility companies in order to assure that all lines, conduits, poles, vaults, and other appurtenances are properly located.

**Construction Notes**

A. Start of Project: Sta. 2+00 = N593751.03 E1566934.00
B. End of Project: Sta. 10+00 = N593330.56 E 1567614.05
C. Existing Driveway: Access to driveways shall be maintained throughout the project.
D. Existing mail box to be moved temporarily moved during project.
E. Existing infrastructure to be preserved and protected throughout project.
F. Existing Log Jam in creek.
G. Existing Over Head Utility Poles to be protected and preserved throughout project.
H. End of County Road (end of pavement).
I. Existing Signs to be removed and preserved for reinstallation after construction.
J. Existing sign post to be removed.
K. Existing Jersey Barrier to be removed.

GRAPHIC SCALE
40 0 20 40 80
1 inch = 40 ft.

# Plan View - Isolation Structure and Fill Limits



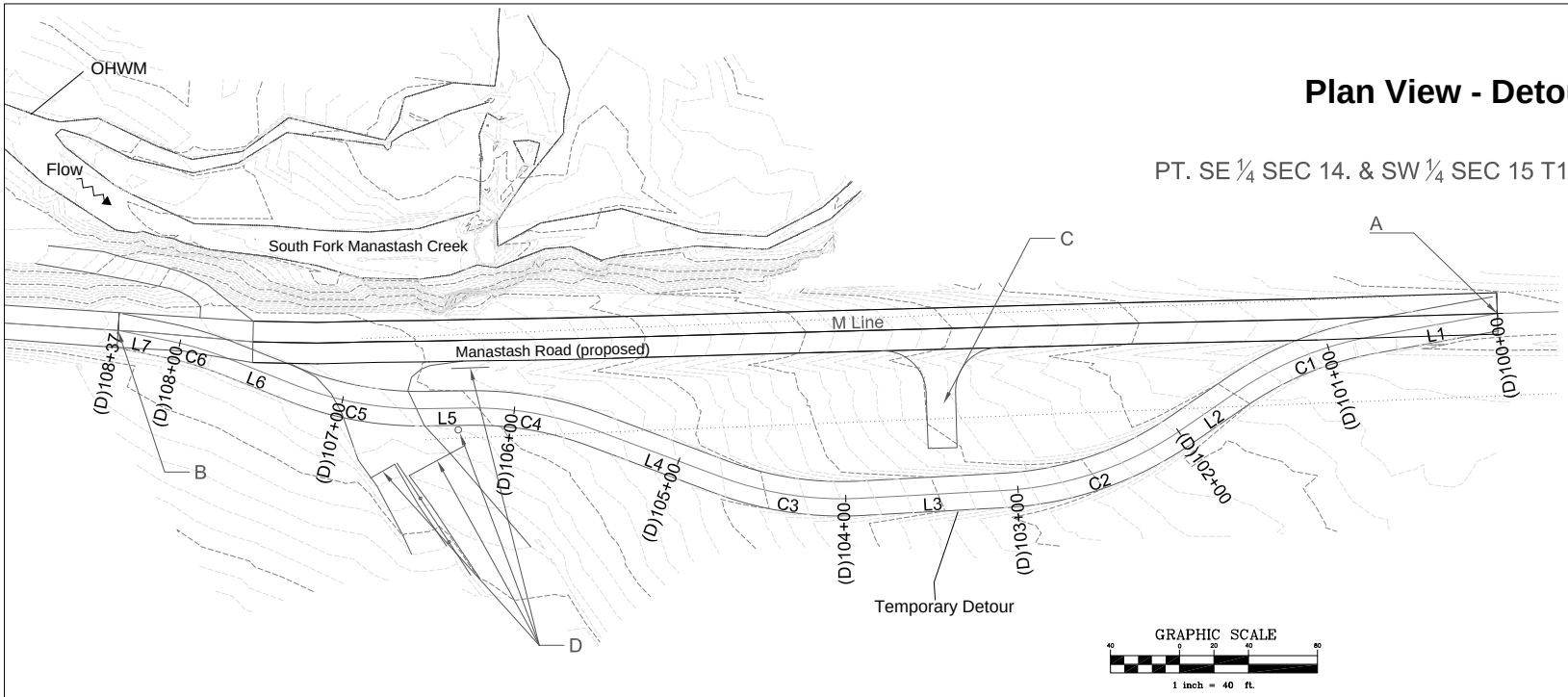

***Not to Scale**

| VOLUME / AREA BELOW OHWM | CREEK |
|---|---|
| LENGTH OF PROJECT | 280 LF |
| EXCAVATION (PERMANENT) | 25 CY |
| FILL (PERMANENT) | 180 CY |
| FILL (TEMP. - ISO. STRUCTURES) | 145 CY |
| TEMP. DEWATERED AREAS | 8,465 SF |

Sand bags
Super sacks
Large Woody Debris
Permanent Fill
Removal of Concrete Debris
Rock Barb

# Plan View - Detour

PT. SE ¼ SEC 14. & SW ¼ SEC 15 T17N R16E, W.M.




GRAPHIC SCALE

40 0 20 40 80

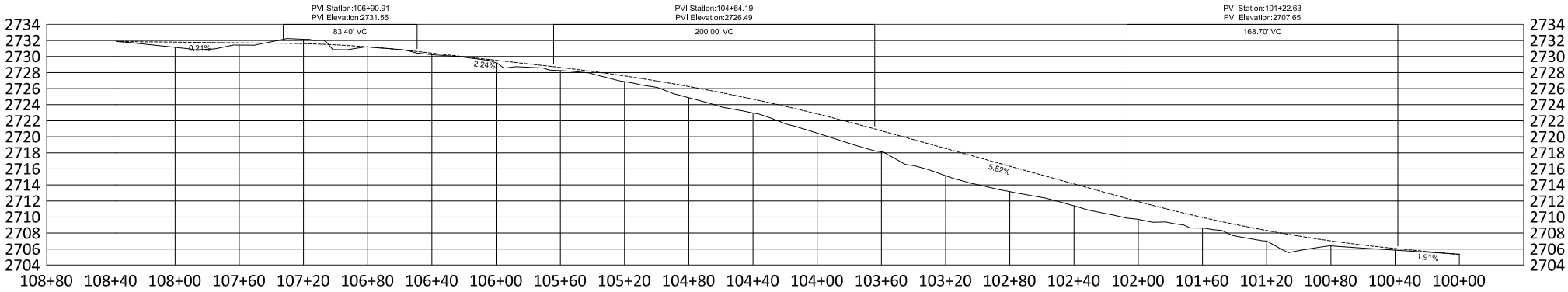
1 inch = 40 ft.

Line Table: (D) Line

| Line # | Length | Direction | Start Point | End Point |
|---|---|---|---|---|
| L1 | 75.08 | N67° 57' 34.76"W | (1567614.05,593330.56) | (1567544.46,593358.74) |
| L2 | 39.94 | S88° 01' 03.40"W | (1567462.49,593373.23) | (1567422.58,593371.85) |
| L3 | 83.32 | N60° 41' 44.48"W | (1567317.77,593397.33) | (1567245.11,593438.11) |
| L4 | 77.88 | N37° 03' 40.36"W | (1567183.40,593491.98) | (1567136.47,593554.13) |
| L5 | 24.86 | N58° 28' 25.57"W | (1567081.45,593604.07) | (1567060.26,593617.07) |
| L6 | 40.38 | N35° 50' 09.93"W | (1567002.69,593670.46) | (1566979.05,593703.20) |
| L7 | 30.15 | N46° 03' 16.78"W | (1566955.71,593730.10) | (1566934.00,593751.03) |

Curve Table: (D) Line

| Curve # | Radius | Length | Chord Direction | Start Point | End Point |
|---|---|---|---|---|---|
| C1 | 200.00 | 83.86 | N79° 58' 15.68"W | (1567544.46,593358.74) | (1567462.49,593373.23) |
| C2 | 200.00 | 109.21 | N76° 20' 20.54"W | (1567422.58,593371.85) | (1567317.77,593397.33) |
| C3 | 200.00 | 82.50 | N48° 52' 42.42"W | (1567245.11,593438.11) | (1567183.40,593491.98) |
| C4 | 200.00 | 74.74 | N47° 46' 02.96"W | (1567136.47,593554.13) | (1567081.45,593604.07) |
| C5 | 200.00 | 79.02 | N47° 09' 17.75"W | (1567060.26,593617.07) | (1567002.69,593670.46) |
| C6 | 200.00 | 35.67 | N40° 56' 43.36"W | (1566979.05,593703.20) | (1566955.71,593730.10) |



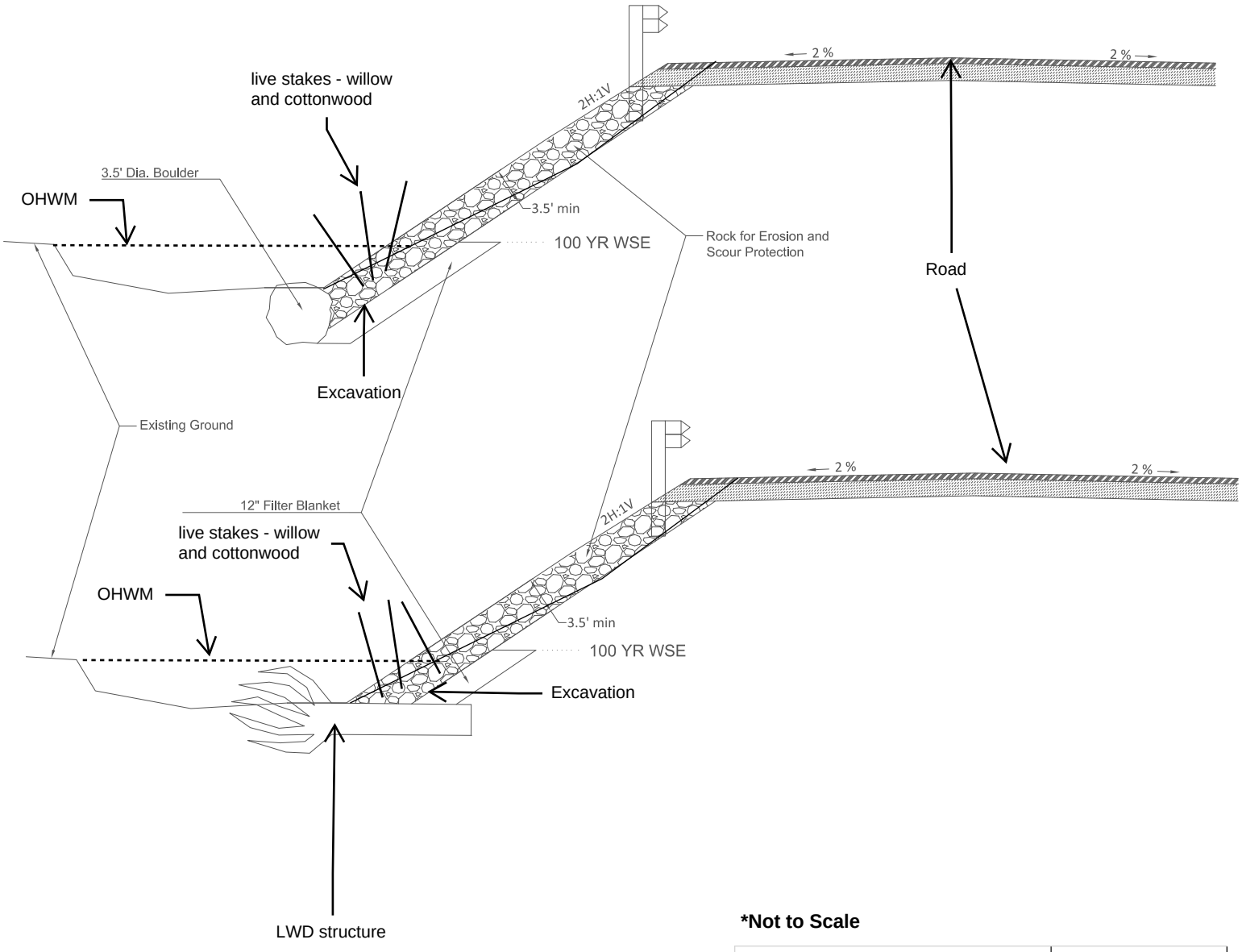

**General Notes**

1. All stationing is based on centerline of roadways unless otherwise noted.
2. Unless otherwise provided for in these plans and specifications, all materials and workmanship shall be in accordance with the requirements of the 2022 edition of the State of Washington, Department of Transportation Standard Specifications for Road and Bridge Construction and Title 12 of the Kittitas County Code.
3. Approved construction plans shall be on the job site at all times when project is under construction.
4. It will be the contractor's responsibility to contact all utility companies in order to assure that all lines, conduits, poles, vaults, and other appurtenances are properly located. It will be the contractor's responsibility to adjust the manholes and valve cases prior to grinding and to the final grade after paving.
5. The completed surface shall meet the requirements of special provision XXXX.

**Construction Notes**

A. Start of Detour: Sta. 100+00 = Sta. 10+00 (N593305.03 E1567657.04)
B. End of Detour: Sta. 108+37 = Sta. 2+00 (N593751.03 E156634.00)
C. Truck Turnaround (Location/material/extents conceptual only)
D. Gate/Infrastructure to be protected and preserved

# Proposed Revetment and Planting Details




***Not to Scale**

| VOLUME / AREA BELOW OHWM | CREEK |
|---|---|
| LENGTH OF PROJECT | 280 LF |
| EXCAVATION (PERMANENT) | 25 CY |
| FILL (PERMANENT) | 180 CY |
| FILL (TEMP. - ISO. STRUCTURES) | 145 CY |
| TEMP. DEWATERED AREAS | 8,465 SF |

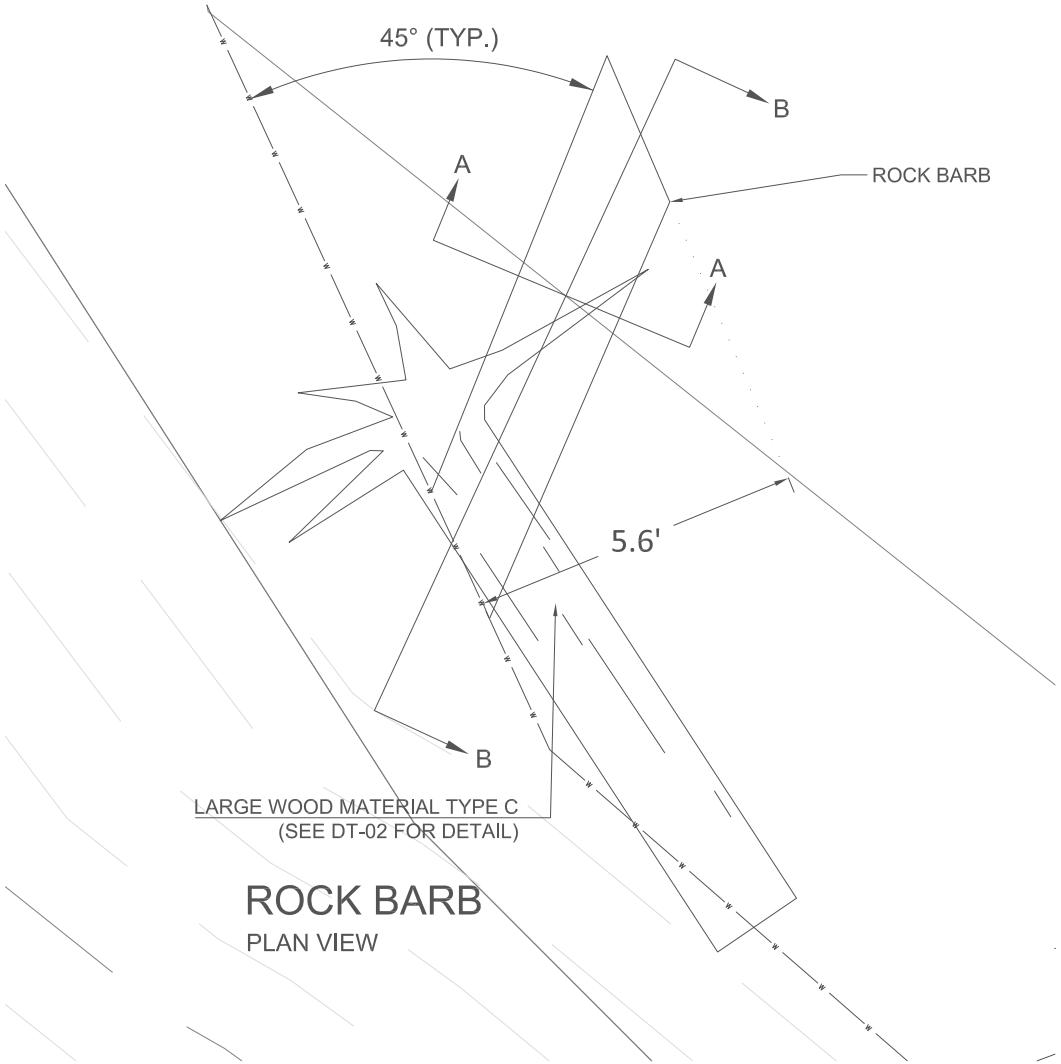
**Construction Notes**

A. 3.5' Dia. Boulder

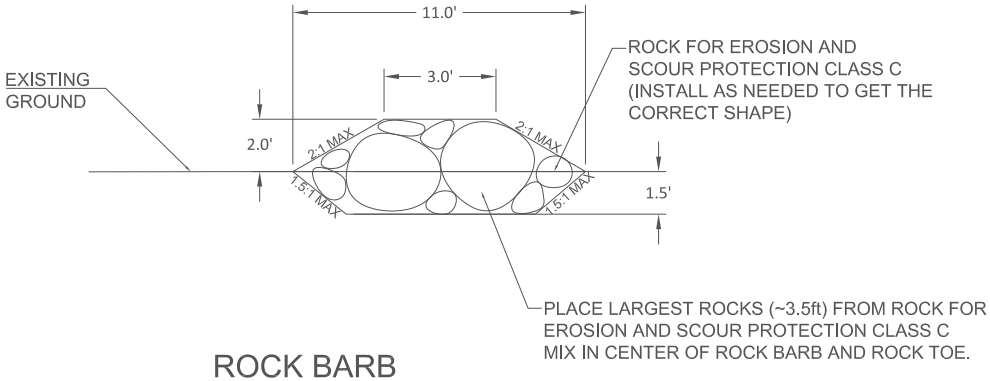
B. Live Stakes per planting schedule

C. Rock for erosion and scour protection minimum 3.5' deep.

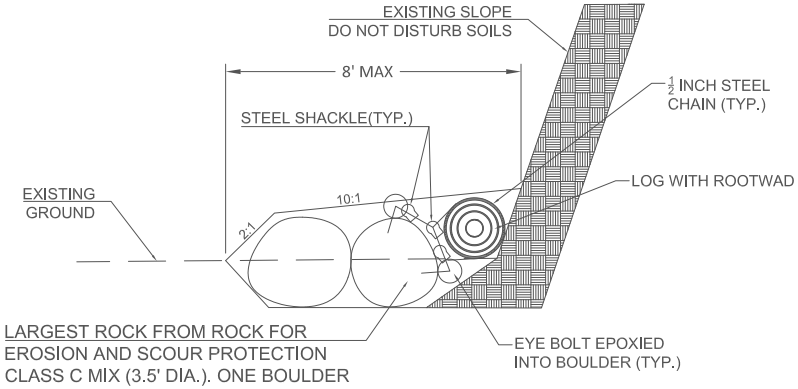
# Proposed Rock Barb Details




ROCK BARB
PLAN VIEW

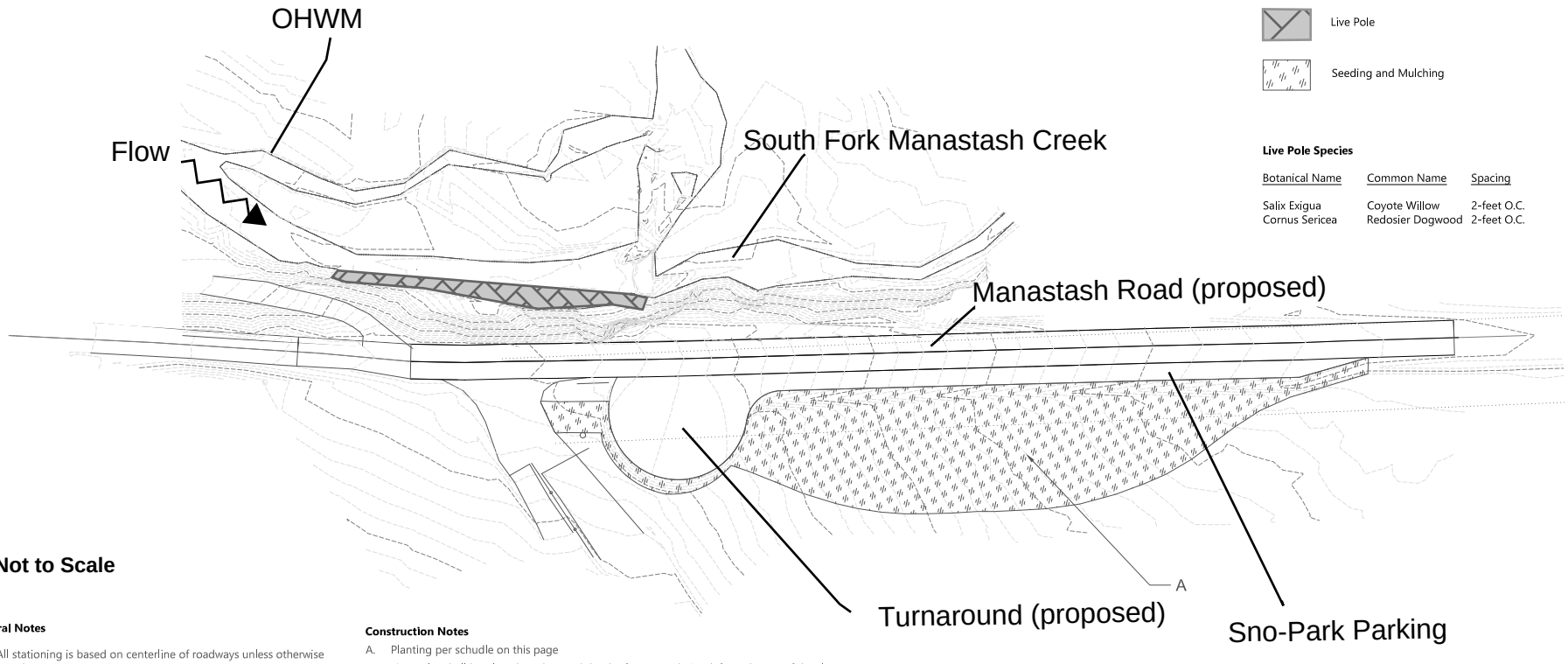



ROCK BARB
SECTION A-A




ROCK BARB
SECTION B-B

# Plan View - Project Elements and Planting Plan




Live Pole

Seeding and Mulching

**Live Pole Species**

| Botanical Name | Common Name | Spacing |
|---|---|---|
| Salix Exigua | Coyote Willow | 2-feet O.C. |
| Cornus Sericea | Redosier Dogwood | 2-feet O.C. |

***Not to Scale**

**General Notes**

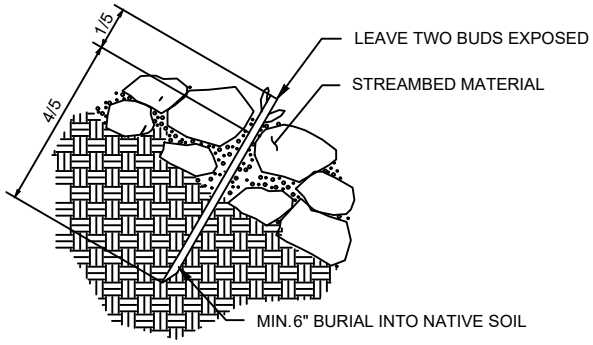
1. All stationing is based on centerline of roadways unless otherwise noted.
2. Unless otherwise provided for in these plans and specifications, all materials and workmanship shall be in accordance with the requirements of the 2022 edition of the State of Washington, Department of Transportation Standard Specifications for Road and Bridge Construction and Title 12 of the Kittitas County Code.
3. Approved construction plans shall be on the job site at all times when project is under construction.
4. It will be the contractor's responsibility to contact all utility companies in order to assure that all lines, conduits, poles, vaults, and other appurtenances are properly located. It will be the contractor's responsibility to adjust the manholes and valve cases prior to grinding and to the final grade after paving.

**Construction Notes**

A. Planting per schudle on this page

B. Live poles shall be placed on the south bank of Manastash Creek from the toe of the slope to the ordinary high water mark. Seeding and mulching shall be placed on all areas of disturbed soil.

# TYPICAL PLANTING DETAILS




## LIVE STAKE PLANTING DETAIL

SCALE: NTS

3
PLT3

**NOTES:**

1. **AVOID STRIPPING BARK OR BRUISING POLES DURING INSTALLATION. DO NOT USE AXE OR SLEDGE FOR DRIVING POLES. USE AN IRON BAR OR STAR DRILL TO PREPARE HOLES FOR LIVE STAKES.**

2. **COYOTE WILLOW MAY BE HARVESTED ONSITE.**

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# APPENDIX E
# 2016 WSDOT FISH EXCLUSION PROTOCOL AND STANDARDS

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# WSDOT Fish Exclusion Protocols and Standards

Work below the Ordinary High-Water Mark (or Mean Higher High-Water Mark) shall, in general, be conducted in isolation from flowing waters. Exceptions to this general rule or performance measure include: 1) implementation of the work area isolation and fish capture and removal protocols described in this document; 2) placement or removal of small quantities of material (e.g., wood or rock), or structural best management practices (e.g., turbidity curtain), under site conditions where potential exposures and effects to fish life are minimized without isolation from flowing waters[1]; and, 3) work conducted under a declared emergency, under emergency conditions, or where flow conditions prevent safe implementation of work area isolation and fish capture and removal protocols.

Implementation of the work area isolation and fish capture and removal protocols shall be planned and directed by a WSDOT biologist, or qualified biologist under contract to WSDOT, possessing all necessary knowledge, training, and experience (the directing biologist). If electrofishing will or may be used as a means of fish capture, the directing biologist shall have a minimum of 100 hours electrofishing experience in the field using similar equipment, and any individuals operating electrofishing equipment shall have a minimum of 40 hours electrofishing experience under direct supervision. All individuals participating in fish capture and removal operations shall have the training, knowledge, skills, and ability to ensure safe handling of fish, and to ensure the safety of staff conducting the operations.( See Appendix A for requirements)

The directing biologist shall work with Maintenance, Construction, and/or Environmental staff (as appropriate) to plan the staging and sequence for work area isolation, fish capture and removal, and dewatering. This plan should consider the size and channel characteristics of the area to be isolated, the method(s) of dewatering (e.g., diversion with bypass flume or culvert; diversion with sandbag, sheet pile or similar cofferdam; etc.), and what sequence of activities will provide the best conditions for safe capture and removal of fish. Where the area to be isolated is small, depths are shallow, and conditions are conducive to fish capture, it may be possible to isolate the work area and remove all fish life prior to dewatering or flow diversion. Where the area to be isolated is large, depths are not shallow, where flow volumes or velocities are high, and/or conditions are not conducive to easy fish capture, it may be necessary to commence with dewatering or flow diversion staged in conjunction with fish capture and removal. The directing biologist shall use his/her best professional judgment in deciding what sequence of activities is likely to minimize exposure of fish to conditions causing stress or injury (including stranding, exposure to extremes of temperature or reduced dissolved oxygen, risk of injury resulting from electrofishing, etc.).

[1] WSDOT shall make this determination with consultation or input from the regulatory agencies with jurisdiction, including the Washington State Department of Fish and Wildlife (WDFW), U.S. Fish and Wildlife Service (FWS), and NOAA-National Marine Fisheries Service (NMFS) as appropriate; also, this exception shall not permit work that requires in-water excavation or that presents a risk of increased turbidity beyond the immediate work area or for a duration of more than 15 minutes.

The directing biologist shall plan work area isolation, fish capture and removal, and dewatering with consideration for the following: habitat connectivity and fish habitat requirements; the duration and extent of planned in-water work; anticipated flow and temperature conditions over the duration of planned in-water work; and, the risk of exposure to turbidity or other unfavorable conditions during construction. If the area to be isolated includes only a portion of the wetted channel width (e.g., large or deep rivers where diversion from the entirety of the wetted channel is difficult or impossible), or if the bypass flume or culvert will effectively maintain connectivity and fish passage for the duration of construction activities, it may be less important whether the fish are herded (and/or captured and released) upstream or downstream of the isolated work area. However, if the area to be isolated includes the entire wetted channel width, and especially if conditions make it unlikely that connectivity (i.e., upstream/downstream fish passage) can be effectively maintained for the duration of construction activities, then the directing biologist should carefully consider whether to herd fish (and/or capture and release fish) upstream or downstream of the isolated work area.

If conditions upstream of the isolated work area will or may become unfavorable during construction then fish should be herded or released to a downstream location; this situation is probably most common where the waterbody in question is small, where seasonal flows are substantially diminished, and conditions of elevated temperature and/or reduced dissolved oxygen are foreseeable. However, the directing biologist shall also consider whether planned in-water work presents a significant risk of downstream turbidity and sedimentation; fish herded or released to a downstream location may be exposed to these conditions.

If large numbers of fish are to be herded (and/or captured and released), and in order to avoid overcrowding or concentrating fish in areas where their habitat needs cannot be met, it may be appropriate to relocate fish both upstream and downstream of the isolated work area. At locations where habitat connectivity or quality is poor, including along reaches upstream and/or downstream of the isolated work area, the directing biologist should carefully consider whether relocated fish can meet their minimum habitat requirements for the duration of planned in-water work. On rare occasions it may be appropriate to relocate fish at a greater distance upstream and/or downstream (e.g., thousands of feet or miles), so as to ensure fish are not concentrated in areas where their habitat needs cannot be met, or where they may be exposed to unfavorable conditions resulting from construction. On those rare occasions where relocation to a greater distance is deemed necessary, the WSDOT shall provide notice to the agencies with jurisdiction in advance of the operations.

Plans for staging work area isolation, fish capture and removal, and dewatering must comply with WSDOT safety requirements. Safe implementation is a high priority. The directing biologist shall design and adjust the plan as necessary to ensure the safety of all individuals implementing the plan. Under some conditions it may be appropriate to conduct work without isolation from flowing waters, without placement of block nets, fish capture or removal; for a discussion of this topic see page 1.

In order to comply with WSDOT safety requirements, work in or around water outside of daylight hours is not generally permissible. If, under unusual circumstances, the directing biologist identifies work that will or may be necessary outside of daylight hours, he/she shall coordinate and gain approval for this work with appropriate managers (including the WSDOT safety officer and/or supervisors with authority).

## Work Area Isolation

The directing biologist shall determine appropriate locations for the placement of block nets, based on site characteristics and a consideration of the type and extent of planned in-water work. Sites that exhibit reduced flow volume or velocity, uniformity of depth, and good accessibility are preferred; sites with heavy vegetation, large cobble or boulders, undercut banks, deep pools, etc. should be avoided due to the difficulty of securing and/or maintaining nets. Sites with a narrow channel cross-section ("constriction") should be avoided if foreseeable flow conditions might overwhelm or dislodge the block nets, posts, or anchors.

Except when planning and intending to herd fish upstream, and upstream block net shall be placed first. With a block net secured to prevent movement of fish into the work area from upstream, a second block net should be used as a seine to herd fish in a downstream direction. Where the area to be isolated includes a culvert(s), deep pools, undercut banks, or other cover attractive to fish (e.g., thick overhanging vegetation, rootwads, logjams, etc.) it may be appropriate to isolate a portion or portions of the work area, rather than attempting to herd fish from the entirety of the work area in a single downstream pass. Fish capture and removal will be most successful if an effort is made to strategically focus and concentrate fish in areas where they can be easily seined and netted. Care shall be taken not to concentrate fish where they are exposed to sources of stress or to leave them concentrated in such areas for a long duration (e.g., more than 30 minutes).

Depending upon site characteristics, and the planned staging and sequence for work area isolation and dewatering, it may or may not be necessary to place a downstream block net. Typically, however, site characteristics and/or the duration of planned in-water work will necessitate placement of a net(s) to prevent movement of fish into the work area from downstream. If groundwater seepage or site drainage has a tendency to re-wet the area, if the area to be isolated is low-gradient or subject to a backwatering influence, or if the area to be isolated is large and considerable effort will be expended in capturing and removing fish life, a downstream block net should be placed. If foreseeable flow conditions over the duration of planned in-water work might enable fish to re-enter the work area from downstream, a downstream block net should be placed.

In most instances where gradual dewatering or flow diversion is staged in conjunction with fish capture and removal, it is appropriate to delay installation of the downstream block net(s) until after fish have been given sufficient time to move downstream by their own choosing. If flows are reduced gradually over the course of several hours, or the length of an entire workday, some (perhaps many) fish will make volitional movements downstream beyond the area to be isolated. Gradual dewatering can be an effective

means by which to reduce the risk of fish stress or injury. Gradual dewatering and the encouragement of volitional movement are particularly important where the area to be isolated is large and may hold many fish. However, where the area to be isolated includes a culvert(s), deep pools, undercut banks, or other cover attractive to fish, some (perhaps many) fish will not choose to move downstream regardless of how gradually flows are reduced. The directing biologist should use his/her best professional judgment in deciding what sequence of activities is likely to minimize fish stress or injury (including stranding).

Where the area to be isolated is small, depths are shallow, and conditions are conducive to fish capture, it may be possible to remove all fish life prior to dewatering, or to implement plans for dewatering staged with fish capture over a relatively short timeframe (e.g., 1-2 hours). Where the area to be isolated is large, depths are not shallow, where flow volumes or velocities are high, and/or conditions are not conducive to easy fish capture, dewatering or flow diversion should be staged in conjunction with fish capture and removal over a longer timeframe (e.g., 3-6 hours). The largest areas and/or most difficult site conditions may warrant or require that plans for dewatering and fish capture proceed over the length of an entire workday, or multiple workdays. Where this is the case, fish should be given sufficient time and a means to move downstream by their own choosing so as to reduce the total number of fish exposed to sources of stress and injury (including fish handling).

The directing biologist shall select block nets that are appropriate for the site and fish species present. Type of material, length, and depth may vary based on site conditions. It may be necessary and appropriate to contact other WSDOT Regions or offices with access to nets (or other materials) suitable for placement under unique or unusual circumstances. Typically block nets will be composed of 9.5 millimeter stretched nylon mesh and should be installed at an angle to the direction of flow (i.e., not directly perpendicular to flow) so as to reduce the risk of impinging fish. Anchor bags filled (or half-filled) with clean, washed gravel are preferred over sandbags, especially for nets and anchors that will or may remain in-place for a long duration (i.e., more than two weeks). Any use or movement of native substrates or other materials found on-site should be incidental and shall not appreciably affect channel bed or bank conditions.

Block nets shall remain in place until work affecting fish habitat in that reach of stream is complete and conditions are suitable for the reintroduction of fish[2]. Block nets require frequent inspection and debris removal. A qualified biologist, or other field staff trained in safe fish handling, shall be assigned the responsibility of inspecting the nets and safely capturing and relocating any impinged fish. The frequency of these inspections shall be determined on a case-by-case basis. However, block nets shall, at a minimum, be

[2] If plans for work area isolation and fish capture and removal include the installation of temporary cofferdams, and once the directing biologist has confirmed fish life have been successfully excluded from the entire area enclosed by the cofferdam(s), it may be appropriate to remove block nets and allow fish to re-enter the previously isolated work area; this approach is particularly relevant and appropriate where many weeks or months of construction are planned for completion within temporary cofferdams (i.e., isolated from flowing waters).

inspected for impinged fish (especially juvenile fish) at least three times daily or when requested by the Engineer. On working days, these inspections shall be performed at the start, middle and end of the work day. On non-working days, these activities shall be performed between 6:00 am and 8:00 am, between 11:00 am and 1:00 pm and between 4:00 pm and 6:00 pm. They may need to be checked more frequently for the first 24 hours after a significant rainfall (or change in flow volume or velocity). In the event fish are found impinged on the net(s), or if weather or flow conditions change significantly, the directing biologist shall reconsider and adjust the frequency of net inspections so as to minimize the risk of impinging and injuring fish.

Field staff shall be assigned the responsibility of frequently checking and maintaining the nets for accumulated debris, general stability, and proper function. The frequency of these inspections shall be determined on a case-by-case basis, dependent upon the site, seasonal, and weather conditions. Block nets must be secured along both banks and the channel bottom to prevent failure as a result of debris accumulation, high flows, and/or flanking. Some locations may require additional block net support (e.g., galvanized hardware cloth, affixed metal fence posts, etc.).

## Fish Capture and Removal

If dewatering and/or flow diversion is deemed necessary, this work (including related fish capture and removal operations) shall comply with any provisions contained in the Hydraulic Project Approval (HPA), or applicable General HPA, issued by the WDFW. If the FWS and/or NMFS have provided relevant Terms and Conditions from a Biological Opinion addressing the work (or action), this work shall also comply with those Terms and Conditions.

If pumps are used to temporarily bypass water or to dewater residual pools or cofferdams, pump intakes shall be screened to prevent aquatic life from entering the intake. Fish screens or guards shall comply with Washington State law (RCW 77.57.010 and 77.57.070), with guidelines prescribed by the NMFS[3], and any more stringent requirements contained in the HPA or General HPA issued by the WDFW. If pumps are to be used on a more permanent basis, as the primary or secondary method for diverting flow around the isolated work area, plans for dewatering shall address contingencies (i.e., extremes of flow or weather). These plans shall include ready access to a larger or additional "back-up" pump with appropriately screened intake. If the directing biologist has confirmed that all fish life has been successfully excluded from the area, there is no risk of entraining fish, and adequate plans are in-place to address contingencies (including a routine schedule for inspection), then pumps may be operated without a screened intake.

[3] National Marine Fisheries Service. 2011. Anadromous Salmonid Passage Facility Design. Chapter 11: Fish Screen and Bypass Facilities. NMFS Northwest Region, July 2011, 140 p..

Fish Capture and Removal Methods:

Methods for safe capture and removal of fish from the isolated work area are described below. These methods are given in order of preference. At most locations, a combination of methods will be necessary. In order to avoid and minimize the risk of injury to fish, attempts to seine and/or net fish should always precede the use of electrofishing equipment. Visual observation techniques (e.g. snorkeling, surveying with polarized glasses or Plexiglas bottomed buckets, etc.) may be used to assess the effectiveness of these methods, to identify locations where fish are concentrating, or otherwise adjust methods for greater effectiveness.

If the planned fish capture and removal methods have not been addressed through consultation (or programmatic consultation), if seining and netting are impracticable (i.e., electrofishing is deemed the only viable means of fish capture), and fish listed under the ESA may be present, the directing biologist shall provide notice to the FWS and/or NMFS (as appropriate). This notice shall be provided in advance of the operations, and shall include an explanation of the unique site conditions or circumstances. Work conducted under a declared emergency (or emergency conditions) shall follow established ESA notification protocols.

Where fish listed under the ESA will or may be present, the directing biologist shall insure that fish capture and removal operations adhere to the following minimum performance measures or expectations:

1) Only dip nets and seines composed of soft (non-abrasive) material shall be used.

2) The operations shall not resort to the use of electrofishing equipment unless other less injurious methods have removed most or all of the adult and sub-adult fish (i.e., fish in excess of 300 millimeters); the operations shall conduct a minimum of three complete passes without capture using seines and/or nets.

3) The operations shall confirm success of fish capture and removal before completely dewatering or commencing with other work within the isolated work area; the operations shall conduct a minimum of two complete passes without capture using electrofishing equipment.

4) Fish listed under the ESA shall not be held in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator.

5) A plan for achieving efficient return to appropriate habitat will be developed before the capture and removal process.

6) Every attempt will be made to release ESA-listed specimens first.

• **Seining** shall be the preferred method for fish capture. Other methods shall be used when seining is not possible, or when/after attempts at seining have proven ineffective. Seines, once pursed, should remain partially in the water while fish are removed with dip nets. Seines with a "bag" minimize handling stress and are preferred. Seines with a bag are also preferred where obstructions make access to the water (or deployment/retrieval of the seine) difficult.

In general, seining will be more effective if fish, especially juvenile fish, are moved (or "flushed") out from under cover. Methods which may increase effectiveness and/or efficiency include conducting seining operations at dawn or dusk (i.e., during low-light conditions), in conjunction with snorkeling, and/or flushing of the cover. In flowing waters and especially where flow volume or velocity is high or moderately-high, seines that employ a heavy lead line and variable mesh size are preferred. Small mesh sizes are more effective across the full range of fish size (and age class), but also increase resistance and can make deployment/retrieval more difficult in flowing waters. Seines which use a small mesh size in the bag (or body), and a larger, less resistant mesh size in the wings may under some conditions be most effective and efficient.

• **Baited Minnow Traps** are typically used before and in conjunction with seining. Traps may be left in the isolated work area overnight. Traps shall be inspected at least four times daily to remove captured fish and thereby minimize predation within the trap. Traps should be checked more frequently if temperatures are in excess of 15 degrees C (59 F).

Predation within the trap may be an unacceptable risk when minnow traps are left in-place overnight; large sculpin and other predators that feed on juvenile fish are typically much more active at night. The directing biologist shall consider the need and plan for work outside daylight hours (i.e., inspection and removal) before leaving minnow traps in-place overnight.

• **Dip Nets** shall be used in conjunction with seining. This method is particularly effective when employed during gradual dewatering or flow diversion. To be most effective and to minimize stress and risk of injury to fish (including stranding), the directing biologist shall coordinate fish capture operations with plans for dewatering or flow diversion. Plans for dewatering and/or flow diversion should proceed at a measured pace (within constraints), to encourage the volitional downstream movement of fish, and reduce the risk of stranding. Plans for dewatering and/or flow diversion shall not proceed unless there are sufficient staff and materials on-site to capture and safely remove fish in a timely manner. Generally, this will require a minimum of two persons (three if electrofishing), but the directing biologist may find that some sites (especially large or complicated sites) warrant or require a more intensive effort (i.e., additional staffing).

Once netted, fish shall remain partially in water until transferred to a bucket, cooler, or holding tank. Dip nets which retain a volume of water ("sanctuary nets") are preferred. However, sanctuary nets may be ineffective where flow volume or velocity is high or moderately-high (i.e., increase resistance lessens ability to net or capture fish). In

addition, where water depths are very shallow and/or fish are concentrated in very small receding pools or coarse substrate, "aquarium" nets may be a better, more effective choice. Use of dip nets in conjunction with snorkeling, flushing of the cover, or around the hours of dawn or dusk (i.e., during low light conditions), can be effective for capturing fish sheltered below cover.

• **Connecting Rod Snakes** may be used to flush fish out of stream crossing structures (i.e., culverts). Connecting rod snakes are composed of wood sections approximately three feet in length. Like other cover attractive to fish, culverts (especially long culverts), can present a challenge to fish capture and removal operations. The directing biologist should plan a strategy for focusing and concentrating fish in areas where they can be easily seined and netted, and should take active steps to prevent fish from evading capture. When first implementing plans for work area isolation, fish capture and removal, and dewatering, it may be appropriate to place block nets immediately upstream and/or downstream of culverts so as to minimize the number of fish that might seek cover within the culvert(s). Once most or all of the fish have been removed from other parts of the work area, the block net placed downstream of the culvert(s) should be removed to encourage volitional downstream movement of fish.

• **Electrofishing** shall be performed only when other methods of fish capture and removal have proven impracticable or ineffective at removing all fish. The directing biologist shall ensure that attempts to seine and/or net fish always precede the use of electrofishing equipment. Larger fish (i.e., adult and sub-adult fish with comparatively longer spine lengths) are more susceptible to electrofishing injury than smaller fish. To minimize the risk of injury (and the number of fish potentially injured), the directing biologist shall confirm that other methods have been effective in removing most or all of the adult and sub-adult fish before resorting to the use of electrofishing equipment; see the related performance measure appearing on page 6. As a general rule or performance measure, electrofishing should not be conducted under conditions that offer poor visibility (i.e., visibility of less than 0.5 meter).

The following performance measures shall apply to the use of electrofishing equipment as a means of fish capture and removal:

1. If the planned fish capture and removal operations have not been addressed through consultation (or programmatic consultation), and fish listed under the ESA may be present, WSDOT shall provide notice to the FWS and/or NMFS prior to the initiation of electrofishing attempts. Upon request, the WSDOT shall permit the FWS, NMFS, and/or their designated representative to observe fish capture and removal operations. Work conducted under a declared emergency (or emergency conditions) shall follow established ESA notification protocols.

2. Electrofishing shall only be conducted when a biologist with at least 100 hours of electrofishing experience is on-site to conduct or direct all related activities. The directing biologist shall be familiar with the principles of electrofishing, including the effects of voltage, pulse width and pulse rate on fish, and associated risk of injury or

mortality. The directing biologist shall have knowledge regarding galvanotaxis, narcosis and tetany, their relationships to injury/mortality rates, and shall have the ability to recognize these responses when exhibited by fish.

3. The directing biologist shall ensure that electrofishing attempts use the minimum voltage, pulse width, and rate settings necessary to create the desired response (galvonotaxis). Water conductivity shall be measured in the field prior to each electrofishing attempt to determine appropriate settings. Electrofishing methods and equipment shall comply with guidelines outlined by the NMFS[4].

4. The initial and maximum settings identified below shall serve as guidelines when electrofishing in waters that may support ESA-listed fish. Only DC or pulsed DC current shall be used. [Note: some newer, late-model electrofishing equipment includes a "set-up" or initialization function; the directing biologist shall have the discretion to use this function as a means to identify proper initial settings.]

**Guidelines for initial and maximum settings for backpack electrofishing**.[5]

| | **Initial Settings** | **Conductivity (µS/cm)** | **Maximum Settings** |
|---|---|---|---|
| **Voltage** | 100 V | ≤ 300 | 800 V |
| | | >300 | 400 V |
| **Pulse Width** | 500µs | | 5 ms |
| **Pulse Rate** | 15 Hz | | 60 Hz (In general, exceeding 40 Hz will injure more fish) |

Each attempt shall begin with low settings for pulse width and pulse rate. If fish present in the area being electrofished do not exhibit a response, the settings shall be gradually increased until the appropriate response is achieved (galvanotaxis). The lowest effective settings for pulse width, pulse rate and voltage shall be used to minimize risks to both personnel and fish. Safe implementation is a high priority. The directing biologist shall ensure the safety of all individuals assisting with electrofishing attempts; this includes planning for and providing all necessary safety equipment and materials (e.g., insulated waders and gloves, first aid/CPR kit, a current safety plan with emergency contacts and phone numbers, etc.). Only individuals that are trained and familiar with the use of electrofishing equipment should provide direct assistance during electrofishing attempts.

5. Electrofishing shall not be conducted where spawning adults or redds with incubating eggs may be exposed to the electrical current. As a general rule or performance measure, waters that support anadromous salmon should not be electrofished from October 15

[4] National Marine Fisheries Service. 2000. Guidelines for electrofishing waters containing salmonids listed under the Endangered Species Act

[5] Adapted from NMFS Backpack Electrofishing Guidelines, June 2000, and WDFW Electrofishing Guidelines for Stream Typing, May 2001

through May 15, and resident waters from November 1 through May 15. If located within waters that may support bull trout, especially waters located within a local bull trout population (i.e., that support spawning and rearing), seasonal limitations on the use of electrofishing equipment may be more restrictive; if you have questions, contact the FWS. If any, more restrictive work windows have been identified through consultation, those windows shall apply. The directing biologist shall ensure that electrofishing attempts are made only during appropriate times of year, and not where spawning adults or redds with incubating eggs may be exposed to the electrical current.

6. An individual shall be stationed at the downstream block net(s) during electrofishing attempts to recover stunned fish in the event they are flushed downstream and/or impinged against the block net(s).

7. The operator shall use caution so as to prevent fish from coming into direct contact with the anode. Under most conditions, the zone of potential fish injury extends approximately 0.5 meter from the anode. Netting shall not be attached to the anode, as this practice presents an increased risk of direct contact and injury. Extra care shall be taken near in-water structures or undercut banks, in shallow waters, or where fish densities are high. Under these conditions fish are more likely to come into close or direct contact with the anode and/or voltage gradients may be intensified. Voltage and other settings shall be readjusted to accommodate changing conditions in the field, including channel depth. When electrofishing areas near undercut banks, overhanging vegetation, large cobble or boulders, or where structures provide cover, fish that avoid capture may be exposed to the electrical current repeatedly. Repeated or prolonged exposures to the electrical current present a higher risk of injury, and therefore galvanotaxis should be used to draw fish out of cover.

8. Electrofishing shall be conducted in a manner that minimizes harm to fish. Once an appropriate fish response (galvanotaxis) is achieved, the isolated work area shall be worked systematically. The number of passes shall be kept to a minimum, but is dependent upon the numbers of fish and site characteristics and shall be at the discretion of the directing biologist. Electrofishing shall not be conducted unless there are sufficient staff and materials on-site, to both minimize the number of passes required and to locate, net, recover, and release fish in a timely manner. Generally, this will require a minimum of three persons, but the directing biologist may find that some sites (especially large or complicated sites) warrant or require a more intensive effort (i.e., additional staffing). Care shall be taken to remove fish from the electrical field immediately and to avoid exposing the same fish repeatedly. Fish shall not be held in dip nets while electrofishing is in progress (i.e., while continuing to capture additional fish). [Note: where flow velocity or turbulence is high or moderately-high (e.g., within riffles) it may be difficult to see and net fish; these fish may evade capture (resulting in repeated exposure), or may become impinged on the downstream block net(s); a “frame” net, or small portable block net approximately 3 feet in width, can be effective under these conditions when held downstream in close proximity to the anode.]

9. The condition of captured fish shall be carefully observed and documented. Dark bands on the body and/or extended recovery times are signs of stress or injury. When such signs are noted, settings for the electrofishing unit may require readjustment. The directing biologist should also review and consider changes to the manner in which the electrofishing attempt is proceeding. If adjustments to the electrofishing attempt do not lessen the frequency (or severity) of observed stress, the directing biologist shall have the authority to postpone fish capture and removal operations[6]. Each fish shall be capable of remaining upright and actively swimming prior to release, and will be completely revived in holding tanks as necessary (*See* Fish Handling, Holding and Release).

10. Electrofishing shall not be conducted when turbidity reduces visibility to less than 0.5 meter, when water conductivity exceeds 350 μS/cm, or when water temperature is above 18°C (64 F) or below 4°C (39 F).

Fish Handling, Holding and Release:

• Fish handling shall be kept to the minimum necessary to remove fish from the isolated work area. Fish capture and removal operations shall be planned and conducted so as to minimize the amount and duration of handling. The operations shall maintain captured fish in water to the maximum extent possible during seining/netting, handling, and transfer for release.

• The directing biologist shall document and maintain accurate records of the operations, including: fish species, number, age/size class estimate, condition at release, and release location. Fish shall not be sampled or anesthetized, unless for valid purposes consistent with the WSDOT's Section 10 scientific collection permits.

• Individuals handling fish shall ensure that their hands are free of harmful and/or deleterious products, including but not limited to sunscreen, lotion, and insect repellent.

- The operations shall ensure that water quality conditions are adequate in the buckets, coolers, or holding tanks used to hold and transfer captured fish. The operations shall use aerators to provide for clean, cold, well-oxygenated water, and/or shall stage capture, temporary holding, and release to minimize the risks associated with prolonged holding. The directing biologist shall ensure that conditions in the holding containers are monitored frequently and operations adjusted appropriately to minimize fish stress. If fish listed under the ESA will or may be held for more than a few minutes prior to release, the directing biologist should consider using dark-colored, lidded containers only. Fish listed under the ESA shall not be held in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator; small

[6] If the FWS and/or NMFS have provided an Incidental Take Statement from a Biological Opinion addressing the work (or action), the directing biologist shall ensure limits on take have not been exceeded; if the limits on take are exceeded, or if take is approaching these limits, the directing biologist shall postpone fish capture and removal operations and immediately notify the federal agency (or agencies) with jurisdiction.

coolers meeting this description are preferred over buckets. Fish will be held for the shortest time necessary for recovery and release.

• The operations shall provide a healthy environment for captured fish, including low densities in holding containers to avoid effects of overcrowding. Large fish shall be kept separate from smaller fish to avoid predation. The operations shall use water-to-water transfers whenever possible.

• The release site(s) shall be determined by the directing biologist. The directing biologist should consider both site characteristics (e.g., flow, temperature, available refuge and cover, etc.) and the types of fish captured (e.g., out-migrating smolt, kelt, prespawn migrating adult, etc.) when selecting a release site(s). More than one site may be designated to provide for varying needs, and to separate prey-sized fish from larger fish. The directing biologist shall consider habitat connectivity and fish habitat requirements, seasonal flow and temperature conditions, and the duration and extent of planned in-water work when selecting a fish release site(s). If conditions upstream of the isolated work area will or may become unfavorable during construction, then fish should not be released to an upstream location. However, the directing biologist shall also consider whether planned in-water work presents a significant risk of downstream turbidity and sedimentation; fish released to a downstream location may be exposed to these conditions. Site conditions may warrant releasing fish both upstream and downstream, or relocating fish at a greater distance (e.g., thousands of feet or miles), so as to ensure fish are not concentrated in areas where their habitat needs cannot be met. For a fuller discussion of this topic see page 2.

• The directing biologist shall ensure that each fish is capable of remaining upright and has the ability to actively swim upon release.

• Any ESA-listed fish incidentally killed as a result of fish capture and removal operations shall be preserved and delivered to the appropriate authority upon request (see Documentation).

• If the limits on take of ESA-listed species are exceeded (harm or harassment), or if incidental take is approaching and may exceed specified limits, the directing biologist shall postpone fish capture and removal operations and immediately notify the federal agency (or agencies) with jurisdiction. If dewatering or flow diversion is incomplete and still in-progress, WSDOT shall take remedial actions directed at maintaining sufficient quantity and quality of flow and lessening sources of fish stress and/or injury. If conditions contributing to fish stress and/or injury may worsen before the federal agency with jurisdiction can be contacted, WSDOT should attempt to move fish to a suitable location near the capture site while keeping fish in water and reducing stress as much as possible.

## Reintroduction of Flow and Fish to the Isolated Work Area

If conducting work in isolation from flowing waters has required placement of a block net(s), fish capture and removal, and temporary dewatering, the directing biologist shall ensure that the block net(s) remain in place until work is complete and conditions are suitable for the reintroduction of fish. Flows shall be gradually reintroduced to the isolated work area, so as to prevent channel bed or bank instability, excessive scour, or turbidity and sedimentation. The directing biologist shall inspect the work area and downstream reach to ensure no fish are stranded or in distress during reintroduction of flows. If conditions causing or contributing to fish stress and/or injury are observed, WSDOT shall take remedial actions directed at lessening these sources of stress. This may include a more gradual reintroduction of flow, so as to reduce resulting turbidity and sedimentation.

All temporary structures and materials (e.g., block nets, posts, and anchors; bypass flume or culvert; sandbag, sheet pile or similar cofferdam; etc) shall be removed at the completion of work. The directing biologist shall document in qualitative terms the final condition of the isolated work area (including temporary bypass). The directing biologist shall identify and document any obvious signs of channel bed or bank instability resulting from the work, and shall report these conditions to the appropriate Maintenance, Construction, and/or Environmental staff for remedy. WSDOT shall document any additional actions taken to correct channel instability, and the final condition of the isolated work area (including temporary bypass).

To avoid and minimize the risk of introducing or spreading nuisance or invasive species, aquatic parasites, or disease, the directing biologist shall ensure that all equipment and materials are cleaned and dried to protocol before transporting them for use at another site or waterbody. Once equipment is fully dried, it should stay dry for at least 48 hours before using in Washington waters. Biologists should avoid the use of felt-soled shoes since they are difficult to decontaminate.

## Documentation

- All work area isolation, and fish capture and handling shall be documented in a log book with the following information: project location, date, methods, personnel, water temperature, conductivity, visibility, electrofishing equipment settings, and other comments.

- All fish captured or handled shall be documented: species, number of each species, age/size class estimate, condition at release, and location of release.

- If at any time, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), the directing biologist, if they are a consultant shall immediate notify WSDOT who shall provide immediate notification to the WDFW consistent with any provisions contained in the HPA (or applicable General HPA). Notification shall consist of a phone call or voice mail message directed to the

Area Habitat Biologist identified on the HPA and/or the Washington Military Department Emergency Management Division at (800) 258-5990, as appropriate.

- Any ESA-listed species incidentally killed as a result of fish capture and removal operations shall be documented with the notification provided to the appropriate authority (FWS and/or NMFS) within two working days. If the directing biologist is a consultant, they shall immediately notify WSDOT, who will notify the Services. The consultant shall not independently contact other agencies. Initial notifications shall consist of a phone call or voice mail message. Initial notifications shall be directed to the following: (FWS) the nearest FWS Law Enforcement Office, and the Washington Fish and Wildlife Office at (360) 753-9440; (NMFS) the NMFS Office of Law Enforcement at (800) 853-1964, and the Washington State Habitat Office at (360) 753-9530. Any dead specimens shall be kept whole and preserved on-ice or frozen until WSDOT receives a response and further directions from the appropriate authority; if WSDOT receives no response within 5 working days, the directing biologist shall have the discretion to dispose of specimens. Initial notifications shall be followed by a second notification in writing. All notifications shall provide at a minimum the following: date, time, WSDOT point-of-contact (the directing biologist and/or supervisor), project name (and FWS and/or NMFS tracking number if available), precise location of any incidentally killed or injured and unrecovered fish, number of specimens and species, and cause of death or unrecoverable injury. If the limits on incidental take are exceeded (harm or harassment), the written notification shall also include an explanation of the circumstances causing or contributing to observed levels of take.

- The final condition of the isolated work area (including temporary bypass) shall be documented in qualitative terms, including any obvious signs of channel bed or bank instability resulting from the work. WSDOT shall document any additional actions taken to correct channel instability, and the final condition of the isolated work area (including temporary bypass).

Appendix A

**Requirements for Designated Lead Fish Moving Biologist (Directing Biologist**)

- Completion of a minimum of a two day electrofishing class.
- Training in fish ecology and identification
- 100 hours of electrofishing experience in the Pacific Northwest, at least 20 hours of which should have been in the last 5 years in the PNW.
- Possession of a current CPR certification
- Possession of a current first aid certification
- Demonstrated understanding of aquatic invasive species and the appropriate decontamination methods necessary to prevent introducing aquatic invasive species into the work area.
- Demonstrated ability to interpret contract plan sheets/specification, contactor schedule and plans prepared by the contractor (e.g. Temporary Steam Diversion Plan and Spill Prevention Control and Countermeasure Plan)
- Ability to move fish per the most current version of the "**WSDOT Fish Exclusion Protocols and Standards"**
- Must develop and deliver on site field training for individuals assisting with fish moving.

**Requirements for Trained Personnel**

- Possess training, knowledge, skills and ability to ensure safe handling of fish and to ensure the safety of staff conducting the operations.
- Have a current first aid certification.
- Training must be conducted on site by the Designated Lead Fish Moving Biologist prior to initiation of the fish moving and must cover the following:
    - Review of site specific pre- activity safety plan
    - A site specific job site analysis and fish exclusion plan.
    - A discussion of roles, responsibilities, permit requirements, and species expected.
    - Review of electrofishing guidelines and equipment manufactures recommendations.
    - Definitions of basic terminology (galvanotaxis, narcosis, and tetany) and an explanation of how electrofishing attracts fish.
    - A demonstration and discussion of the proper use of electrofishing equipment (including an explanation of how gear can injure fish and how to recognize signs of injury) and the role of each crew member.
    - A demonstration of proper fish handling including proper netting, sorting by size, keeping buckets cool, releasing small and large fish

in different pools, not overcrowding buckets, avoiding sunscreens/ insect repellants etc on hands moving fish.

- A review of common mistakes.
- A discussion of the use of personal floatation devices.
- A discussion of aquatic invasive species and the decontamination methods necessary to prevent introducing aquatic invasives into the work area.