

Wild Fish Conservancy
N O R T H W E S T

**20-1192 - DESCHUTES TRIBUTARY
RESTORATION PLANNING**



Preliminary Design and Design Report

July 2022

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Introduction

This project provides preliminary designs for the protection and restoration of a unique Deschutes River spring-fed wetland and stream complex. The project site is the 22-acre Meyer family property. Over the past 1.5 years Wild Fish Conservancy and Thurston Conservation District, the project team, assessed existing conditions, identified restoration alternatives, and worked with the Meyer family to prioritize fish habitat protection and restoration actions that improve instream and riparian habitat quality while enabling the Meyers to continue farming their land (pasturing 8 cows, 2 horses). The prioritized actions include removing three derelict culverts that currently block the movement of fish and sediment, installing large woody debris, removing invasive plants, revegetating impacted riparian and wetland habitats, installing livestock exclusion fencing, and implementing a farm best management plan that includes rotational grazing, off-channel watering, and a winter stock confinement area.

Project Site

Meyer Creek joins the mainstem Deschutes River from the north (right-bank) at river mile 38.5, 20140 SE O'Toole Rd. (Figure 1). The Deschutes R. Coho Salmon Biological Recovery Plan (2015) identifies river miles 31-41 as the most utilized coho spawning areas in the watershed. The mainstem Deschutes River within this reach has limited suitable rearing habitat and elevated summer water temperatures. Recommended restoration actions include reducing fine sediments, increasing the availability of complex habitats and reducing high water temps. Meyers Creek is a spring-influenced wetland channel complex that has the potential to provide cold-water refugia and rearing habitat for coho and other native temperature-sensitive fishes.

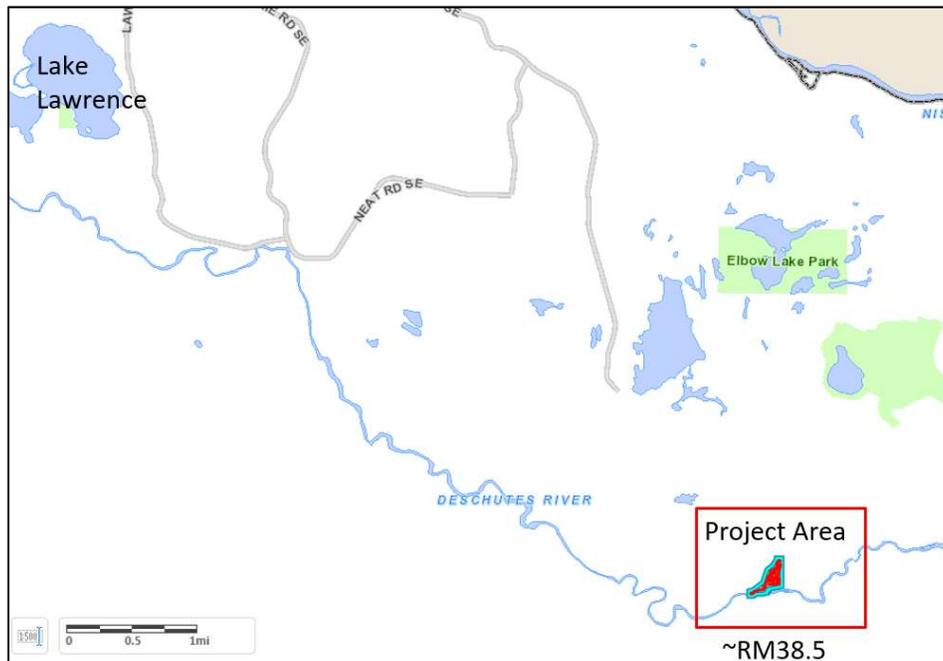


Figure 1. Project area within the Deschutes River.

Existing Conditions

Meyer Creek flows south through a wide valley in a complex of spring fed wetlands, and beaver ponds (Figure 2). During the last century, the stream has been impacted by agricultural practices within the valley. Impacts include ditching and straightening portions of the stream channel; grazing livestock in and adjacent to the stream, beaver ponds, wetlands, and riparian areas; and the presence of three derelict culverts. Portions of the lower reaches of the site are infested with invasive flag iris and Himalayan blackberries.

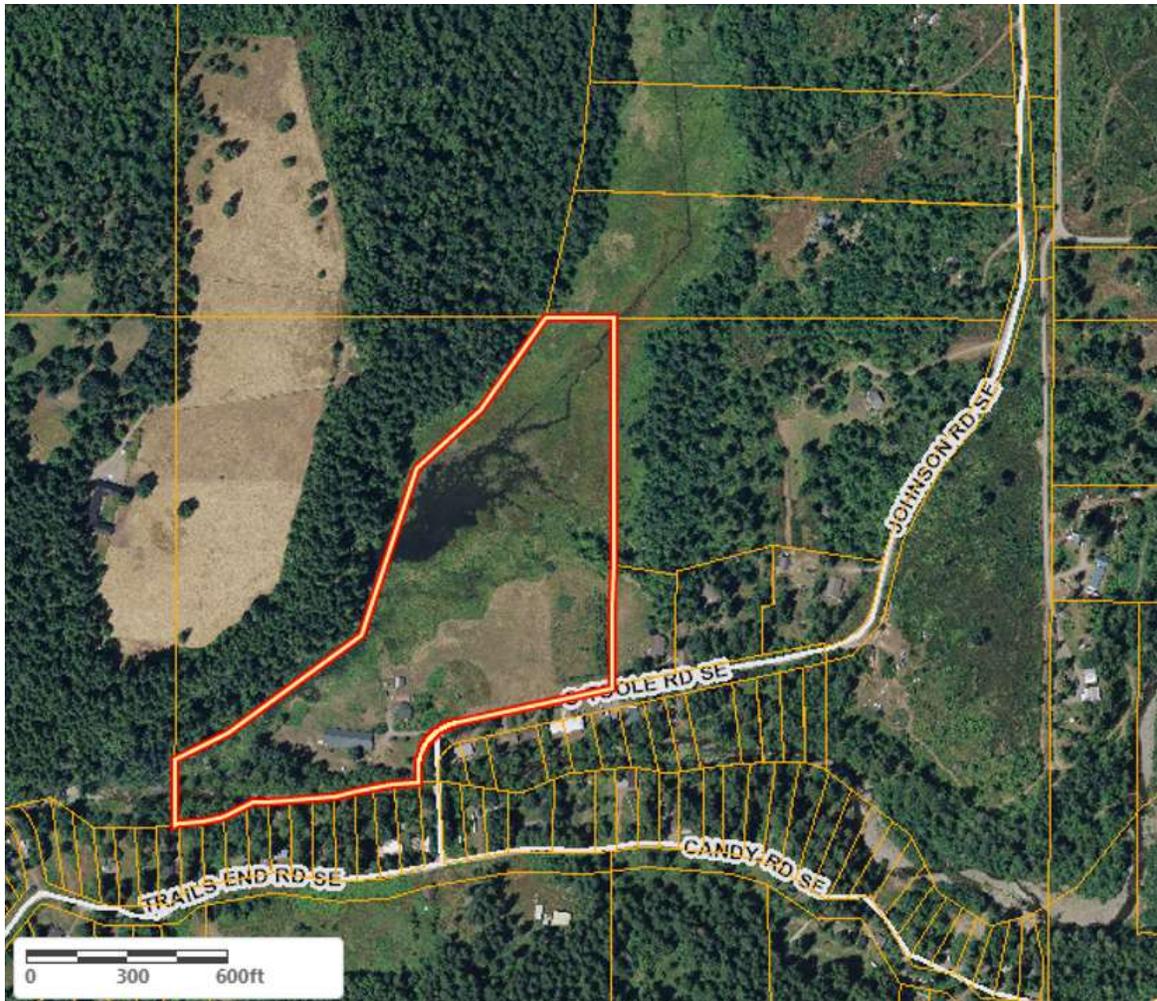


Figure 2. 22-acre project area at the downstream end of the Meyer tributary.

Fish Passage

Three derelict 4.0 foot diameter concrete culverts currently impede fish access from the mainstem Deschutes River to Meyer Creek and compromise the downstream delivery of sediment, wood, and water (Figures 3 and 4). The culverts are no longer in use by the landowner.

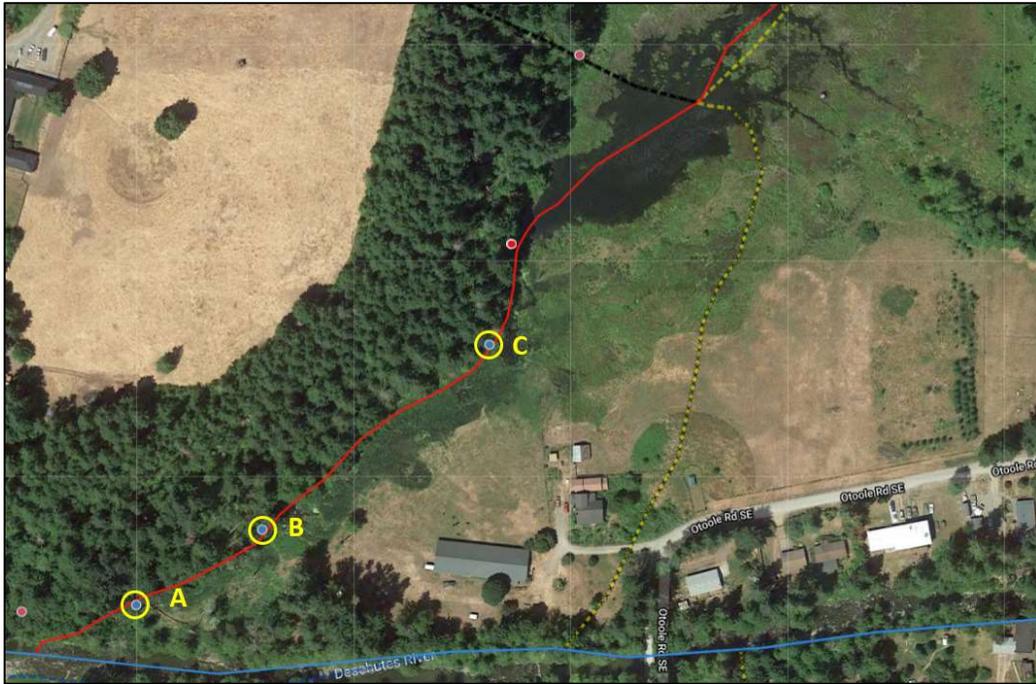


Figure 3. Locations of three derelict concrete culverts.



Figure 4. Downstream-most (Site A) of three derelict concrete culverts.

Water Temperature

The project team installed five Hobo © temperature data loggers to record water temperatures during summer 2021 (Figure 5). Wild Fish Conservancy installed the loggers on May 10, 2021 and removed them on October 19, 2021. Raw hourly temperature data for all the sites are available upon request.



Figure 5. Locations of five Hobo © water temperature loggers which were in place between May 10 and October 19, 2021.

The temperature data collected during summer 2021 captured the late June heat dome, demonstrating the relatively cool and constant water temperatures (10 degrees C) delivered by the spring channel (temp logger 803) relative to the mainstem Deschutes River, which peaked at 24 degrees C during that extreme event (Figure 6).

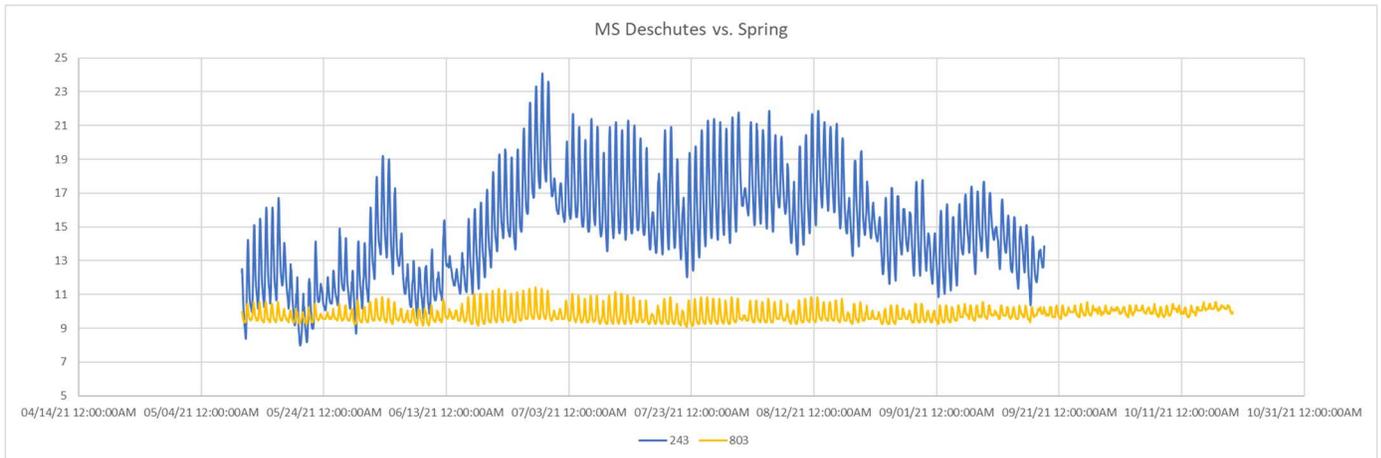


Figure 6. Mainstem Deschutes River (Site 243, in blue) water temperatures relative to the Meyer spring (Site 803) during the June 2021 heat dome.

The team also created a GIS using mainstem Deschutes forward-looking infrared (FLIR) water temperature data collected by the WA Dept. of Ecology during the development of the Deschutes River 2015 TMDLs (Figure 7). The data illustrate the elevated mainstem water temperatures in the vicinity of Meyer Creek, affirming the importance of this cold-water low gradient rearing habitat.



Figure 7. Mainstem Deschutes FLIR data from the Department of Ecology’s Deschutes TMDL effort. Reaches of higher water temperature are shown in red.

Fish Use

On May 10, 2021 WFC performed a fish species composition and distribution survey of surveyor-accessible habitats within the project reach. Five sample reaches were surveyed systematically in an upstream direction (Figure 8).

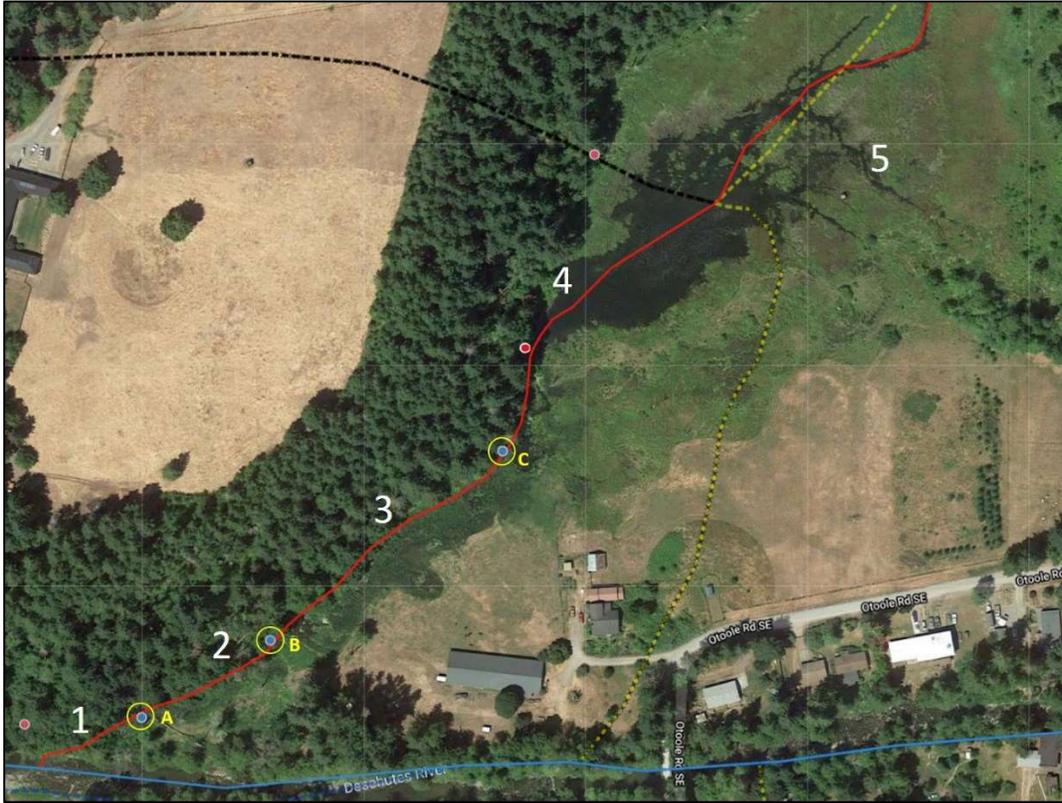


Figure 8. WFC sampled fish in five sub-reaches within the project reach.

WFC conducted single-pass electrofishing where possible, however portions of the backwatered and ponded reaches were too deep, and the substrate was too soft, to safely electrofish. In reaches 2 and 4, minnow traps (1 and 4, respectively) were baited with bloodworms and left for six hours during the sampling day. Three sculpin were captured in one trap within reach 2, no other fish were trapped. Several 7-10-inch cutthroat trout were observed in the beaver ponds but were not brought to hand. A school of ~10 young-of-year coho were observed in the mainstem Deschutes just upstream from the confluence. Juvenile coho were also observed in Reach 1 downstream from the barrier culvert “A,” but not upstream (Table 1, Figure 9).

Table 1. Native coho, cutthroat, sculpin, dace, and crayfish were captured during the May 10, 2021 survey.

	coho	cutthroat	sculpin	crayfish	dace	notes
Reach 1	4	3	3	3	1	Mouth to culvert #1
Reach 2	0	3	16	1	0	Culvert #1 to culvert #2
Reach 3	0	0	25	1	0	Culvert #2 to culvert #3
Reach 4	0	0	0	0	1	Culvert #2 to US-most dam
Reach 5	0	1	24	1	0	Spring Cr. - near duck blind, ~250 feet upstream.

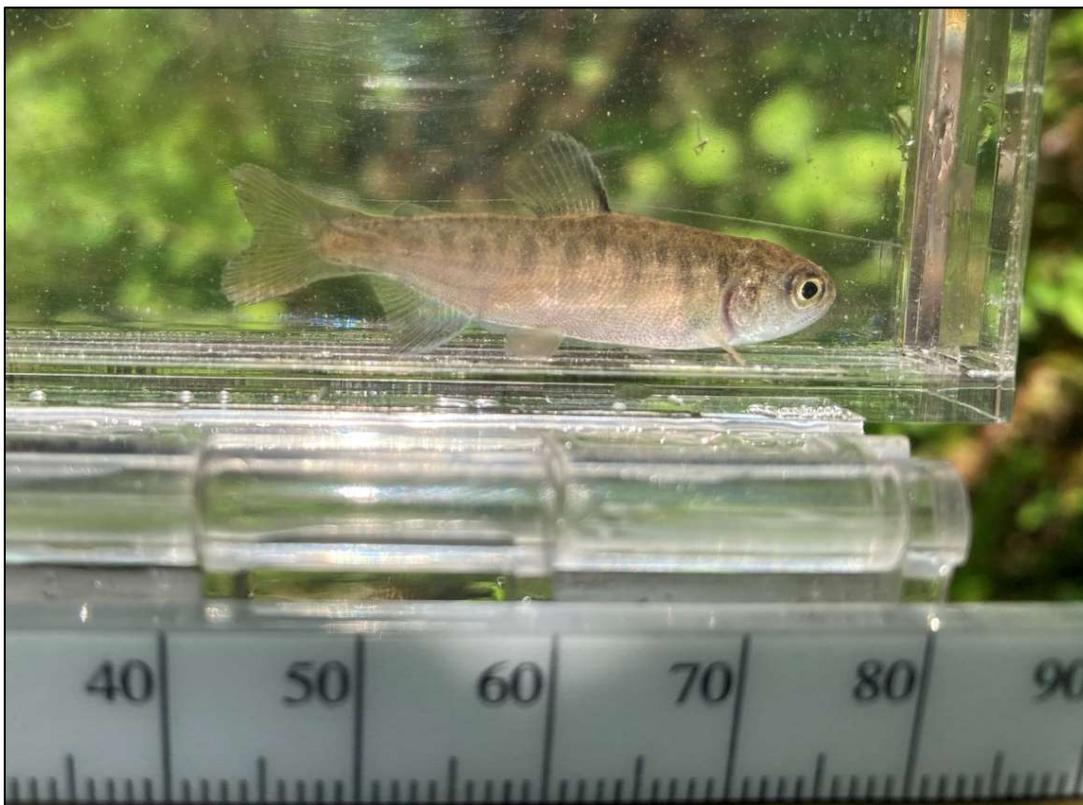


Figure 9. One of four juvenile coho captured in Reach 1 downstream from the barrier culvert “A.”

Topography and Flood extents

Wild Fish Conservancy performed a total station survey of the site to complement existing LiDAR elevation data and collect channel cross sections and long profiles.

To document the channel-adjacent topography and extent of flooding, Wild Fish Conservancy digitized aerial photographs collected using a drone during a flood event on January 22, 2021 (Figure 10).



Figure 10. Wild Fish Conservancy digitized aerial photos from January 9, 2021 to create a shapefile for flood extents that informed the preliminary designs.

Project Design Alternatives

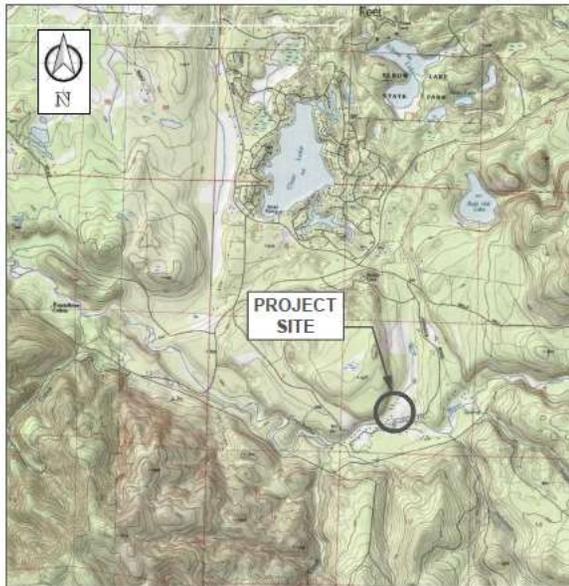
The project team collaboratively developed a suite of habitat protection and restoration options to address the documented habitat impairments and improve the quality and quantity of native fish rearing habitat. These included:

- Removing anthropogenic barriers to fish passage and longitudinal stream processes (delivery of sediment, wood, and water).
- Installing large woody debris in targeted locations within the channel to increase instream habitat complexity, sort sediments, and provide cover.
- Removing invasive flag iris and blackberry.
- Restoring impacted riparian and wetland habitats to protect and improve water quality and quantity.
- Protecting riparian and wetland habitats by installing livestock exclusion fencing.
- Implementing a suite of farm management practices to improve the health of the stream-adjacent pastures.

The team presented the restoration alternatives to the Meyer family and worked collaboratively to refine a suite of restoration and protection actions that achieve the project's ecological objectives without compromising, and in some cases improving, the Meyer family's farming operations.

Preliminary Design Drawings

DESCHUTES-MEYER RESTORATION PROJECT PERMIT LEVEL PLANS



VICINITY MAP



SHEET TITLE	NO.
TITLE SHEET	1
GENERAL NOTES	2
EXISTING CONDITIONS WITH 2014 AERIAL PHOTO	3
EXISTING CONDITIONS WITH FLOOD EXTENTS	4
EXISTING CONDITIONS WITH TOPO	5
RESTORATION PLAN	6
CHANNEL CROSS SECTIONS	7

WARNING
 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

Project Contacts
 Project Manager: Jamie Glasgow 206-310-9302
 Project Engineer: Amy Stonkus, P.E. 206-349-3955

PROJECT LOCATION:
 ADDRESS: 20140 SE O. Toole Rd.
 Yelm WA 98258
 PARCEL NO. 23508310200
 LAT: 46.796 N
 LONG: -122.457 W

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DATE: 06/10/2022	 Wild Fish Conservancy 15629 Main Street NE Duwai, WA 98019 Phone: 425-785-1167	TITLE SHEET	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	DATE																			SHEET NO.
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DESIGNED BY: A. STONKUS - P.E.	THURSTON COUNTY, WA																							
CHECKED BY:																								
JOB NO.:																								

SCHEDULE OF QUANTITIES	UNIT	QUANTITY
MOBILIZATION	LS	1
CONSTRUCTION SURVEYING AND STAKING	LS	1
REMOVAL OF DERELICT CULVERTS (3)	LS	1
FILL REMOVAL- EXCAVATION	CY	49
HAIL AND WASTE FILL AT DESIGNATED UPLAND SITE	CY	49
JUTE MAT	SY	300
SEED MX	Lbs	15
20" DBH x 20' LONG LOGS WITH ATTACHED ROOTWADS	Each	6

GENERAL NOTES

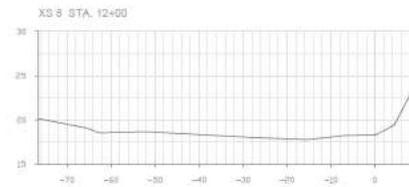
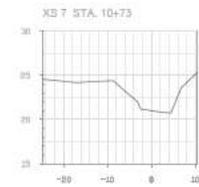
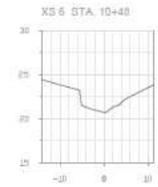
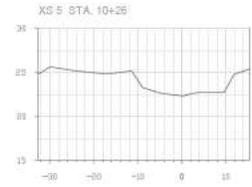
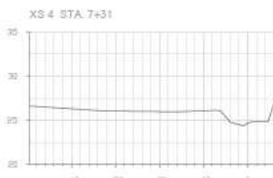
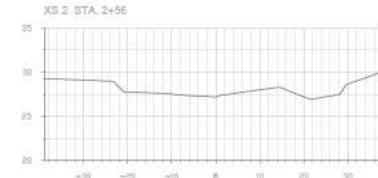
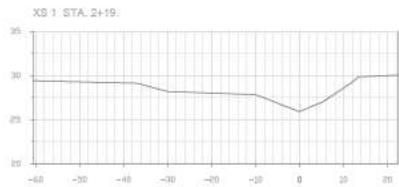
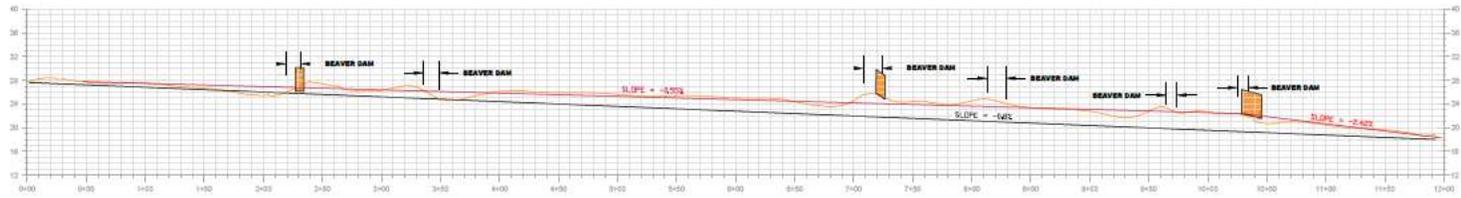
1. CONTOUR CHANNEL BANKS TO MATCH UPSTREAM AND DOWNSTREAM CHANNEL GEOMETRY AT CULVERT REMOVAL SITES.
2. MINIMIZE DISTURBANCE TO ADJACENT VEGETATION.
3. SPOILS TO BE DISPOSED OF AS DIRECTED BY PROJECT ENGINEER. APPROPRIATE EROSION AND SEDIMENTATION CONTROL BMPs WILL BE IN PLACE TO ENSURE NO TURBID WATER ENTERS THE STREAM.
4. REVEGETATE DISTURBED RIPARIAN AND WETLAND AREAS WITH LOCAL NATIVE VEGETATION (BY OTHERS).

WATER MANAGEMENT NOTES

1. INSTREAM WORK SHALL COINCIDE WITH SUMMER LOW-FLOW CONDITIONS.
2. IN WATER WORK IS ALLOWED PER HPA PROVISIONS.
3. NOTCH BEAVER DAM AT DERELICT CULVERTS TO SLOWLY REDUCE UPSTREAM HEAD. ALLOW UPSTREAM AND DOWNSTREAM WATER SURFACE ELEVATIONS TO EQUILIBRATE BEFORE REMOVING DERELICT CULVERTS.

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DATE: 06/10/2022	 <p>Wild Fish Conservancy 15629 Main Street NE Duwamish, WA 98019 Phone: 425-788-1167</p>	<p>GENERAL NOTES</p> <hr/> <p>DESCHUTES-MEYER RESTORATION PROJECT</p> <hr/> <p>THURSTON COUNTY, WA</p>	REVISIONS	DATE	<p>SHEET NO.</p> <p style="font-size: 2em; text-align: center;">2</p>
DRAWN BY: S. KROPP A. JORGENSON					
DESIGNED BY: A. STOMKUS - P.E.					
CHECKED BY:					
JOB NO.:					



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DATE: 06/10/2022	 Wild Fish Conservancy 15629 Main Street NE Duval, WA 98019 Phone: 425-785-1167	CHANNEL PROFILE AND CROSS SECTIONS		<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> </tbody> </table>	REVISIONS	DATE															SHEET NO. 7
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DESIGNED BY: A. STONKUA - P.E.	THURSTON COUNTY, WA																				
CHECKED BY:																					
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Engineer's Cost Estimate

Deschutes Tributary Implementation, RCO 22-1162

Meyer Farm Restoration Project			
Item	Description		
1	Remove and dispose of 3 culverts and assoc. fill	\$	46,000.00
2	Bioengineering	\$	6,000.00
3	Purchase and install LWD	\$	10,000.00
4	Riparian / Wetland Planting	\$	46,075.00
5	Invasive plant control	\$	20,765.00
6	Riparian exclusion fencing	\$	37,205.00
7	Farm BMP infrastructure to protect stream - cross fencing, water source, winter stock confinement	\$	24,000.00
	Total	\$	190,045.00
	RCO	\$	161,545.00
	Conservation Commission (pending)	\$	28,500.00