December 4th 2007

Shitike Creek Restoration Project

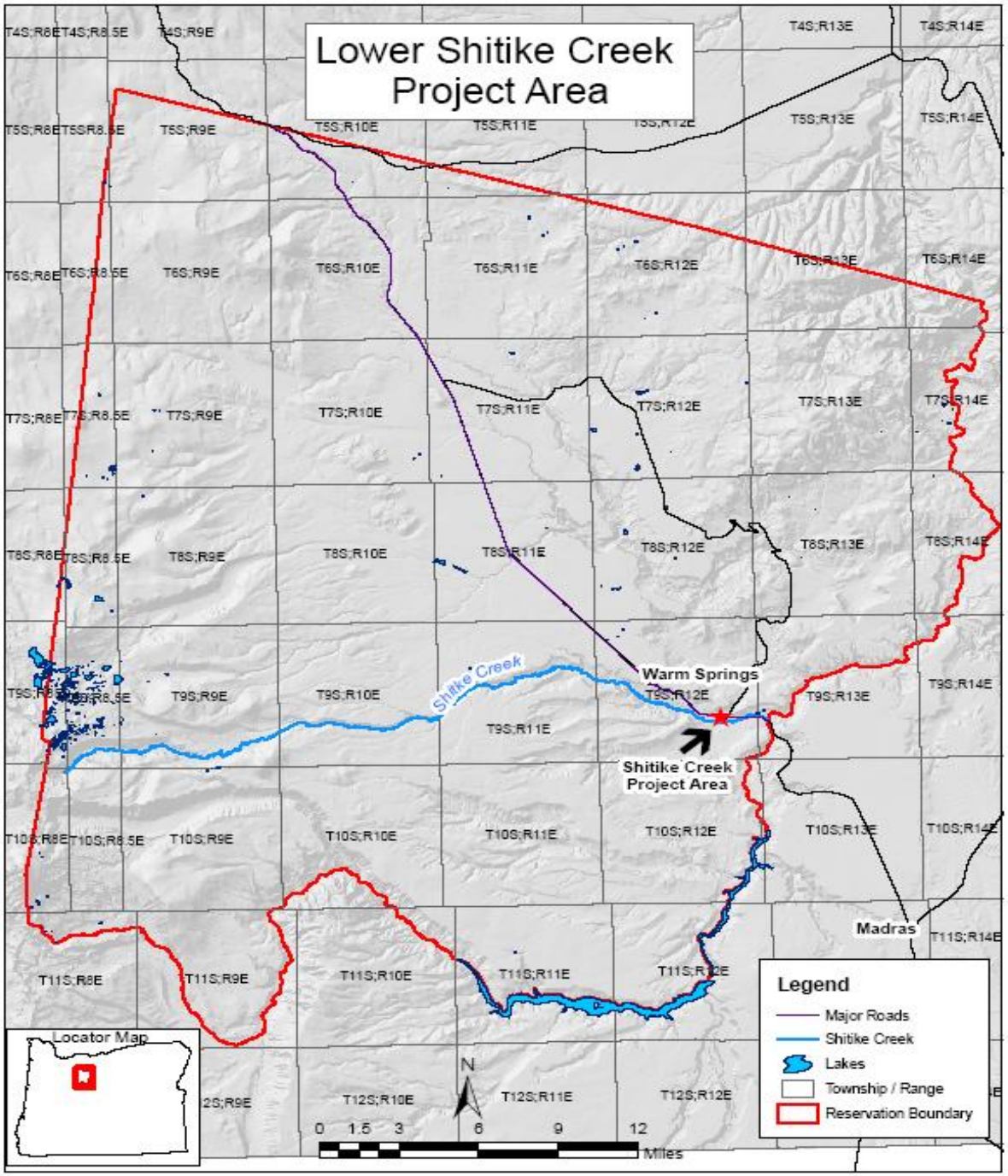
Scott Turo

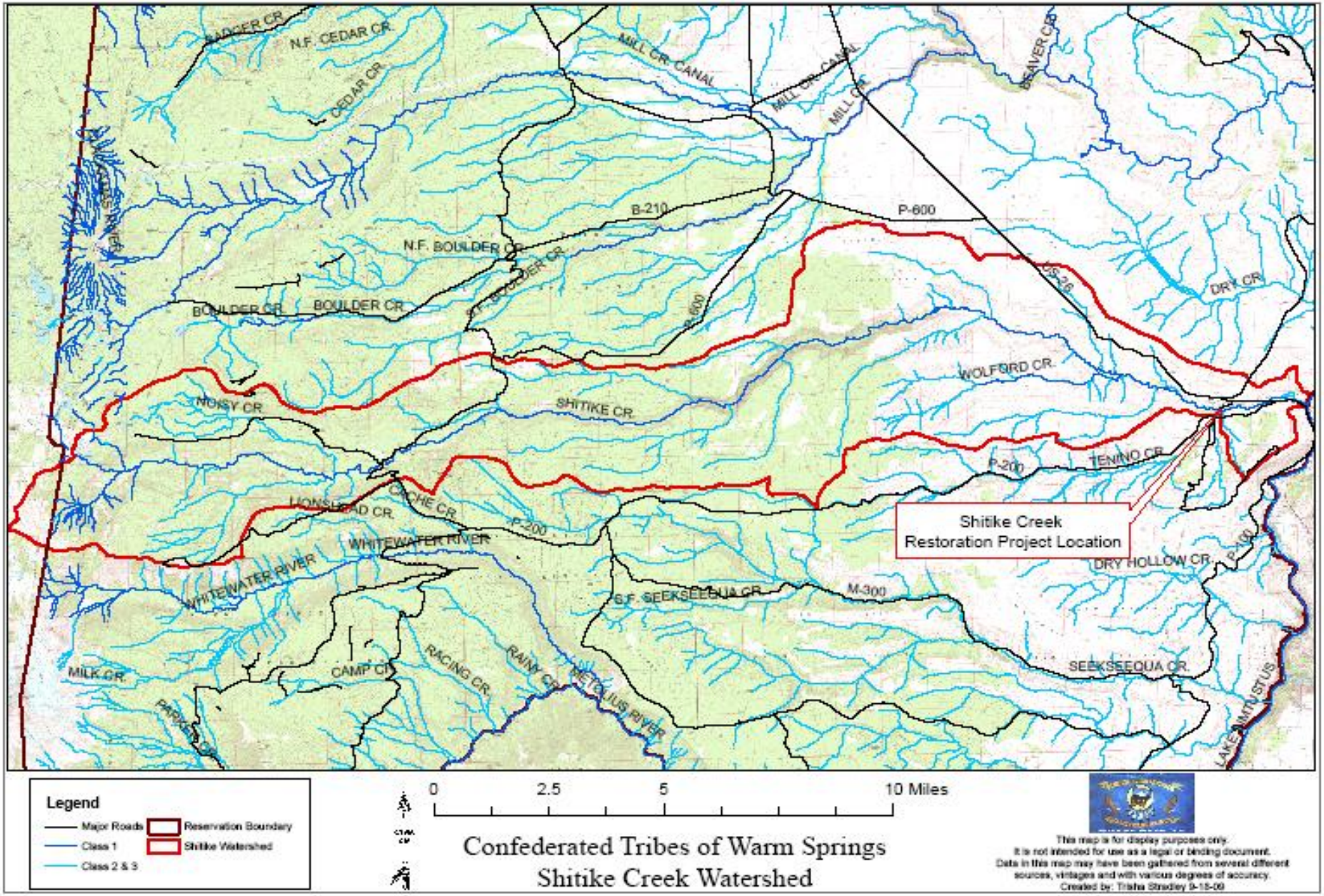
Habitat Program Manager

The Confederated Tribes of the Warm Springs Reservation of Oregon

Branch of Natural Resources


March 16th 2010


Lower Shitike Creek
Project Area
Shitike Creek
Warm Springs
Shitike Creek
Project Area
Madras
Locator Map
N
0 1.5 3 6 9 12
Miles
Legend
Major Roads
Shitike Creek
Lakes
Township / Range
Reservation Boundary


BADGER CR
N.F. CEDAR CR
CEDAR CR
MILL CR. CANAL
MILL CR. CANAL
MILL CR.
BEAVER CR
CROOKED RIVER
B-210
P-600
N.F. BOULDER CR
BOULDER CR
BOULDER CR
S.F. BOULDER CR
P-600
DS-26
DRY CR
WOLFORD CR.
NOISY CR
SHITIKE CR.
TENINO CR.
P-200
HORSEHEAD CR.
CACHE CR.
P-200
WHITEWATER RIVER
WHITEWATER RIVER
Shitike Creek
Restoration Project Location
DRY HOLLOW CR.
P-300
M-300
S.F. SEEKSEEQUA CR.
SEEKSEEQUA CR.
MILK CR.
CAMP CR.
RACING CR.
RAINY CR.
METOLIUS RIVER
PARY CR.
LAKE CR.
MTN STUS
Legend
Major Roads
Class 1
Class 2 & 3
Reservation Boundary
Shitike Watershed
0
2.5
5
10 Miles
Confederated Tribes of Warm Springs
Shitike Creek Watershed
This map is for display purposes only.
It is not intended for use as a legal or binding document.
Data in this map may have been gathered from several different
sources, vintages and with various degrees of accuracy.
Created by: Trisha Stradley 9-15-09


BRANCH OF LAND OPERATIONS - B. I. A.
374-G5-54

Project Objectives

- **1. Protect critical infrastructure.**
  - Reduce the potential of Shitike Creek breaching the berm and entering the retired wastewater ponds.
  - Protect the wastewater ponds currently in use downstream.
- **2. Reduce risk of flooding.**
  - Design a channel that allows Shitike Creek more access to the floodplain and reduces stream energy.
  - Increase flood protection downstream of the project.
- **3. Enhance fish habitat.**
  - Incorporate appropriate fish habitat into the project for summer steelhead, pacific lamprey, bull trout, spring and fall Chinook, redband trout, and other native fish species.

Strategy to Achieve Project Objectives

- To achieve these goals the Fish Habitat Program worked with the Natural Resources Conservation Service (NRCS) to design and implement a project that moved Shitike Creek from the Community Center Bridge downstream to the wastewater lagoons to a new alignment or path.

- This alignment is very similar to one which the Creek followed in 1938 through the 1950s.

CHANNEL HISTORY

SHITIKE CREEK STREAMBANK RESTORATION

WARM SPRINGS INDIAN RESERVATION
JEFFERSON COUNTY, OREGON

PLAN VIEW

0 500
Scale in meters

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

Designed: KLY
Drawn: KLY
Checked:
Approved:
Date: 12/2006

File Name: shitike_crk_121406
Drawing No.
Sheet of

C:\Users\Projects\Deschutes Basin\Jefferson County\shitike_creek\shitike_crk_121406.dwg, 12/19/2006 8:04:04 AM

Shitike Creek Stream Channel
Historic-1938 and Current-2007

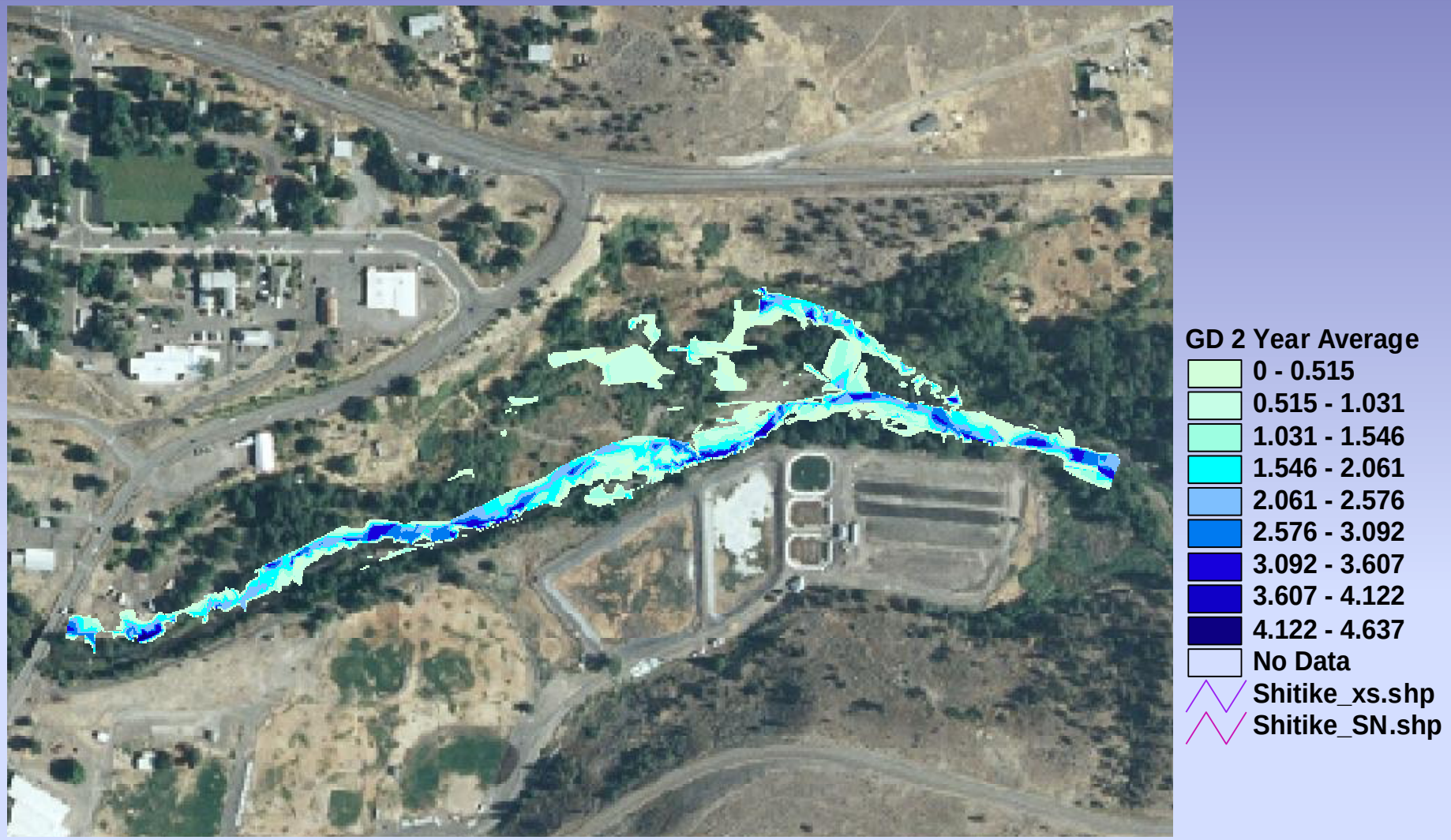
The Confederated Tribes of Warm Springs
Branch of Natural Resources

DRAFT

1:14,000

0 500 1,000 2,000 Feet

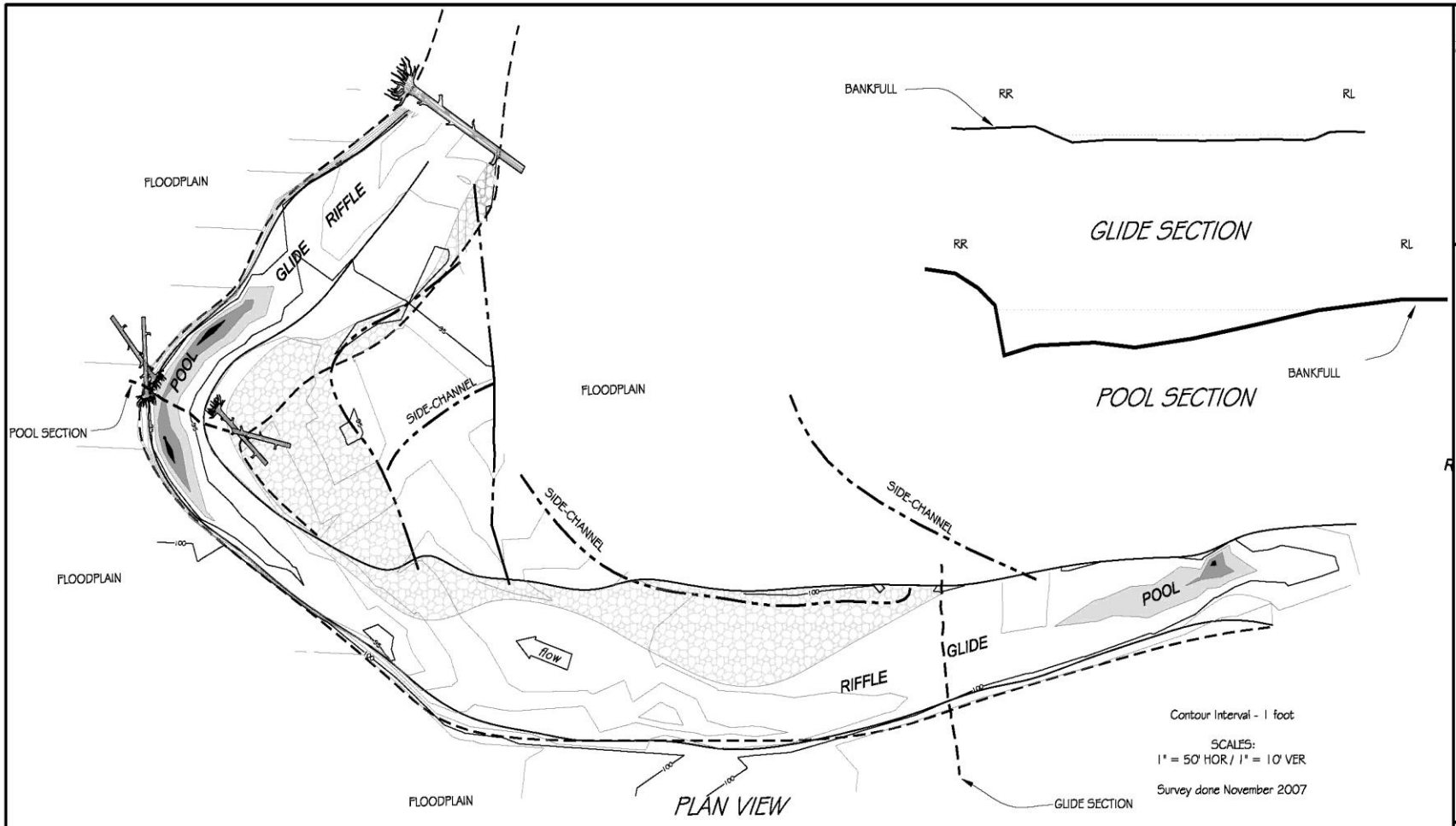
Printing Date: February 20, 2008
CTWS GIS Center-MS

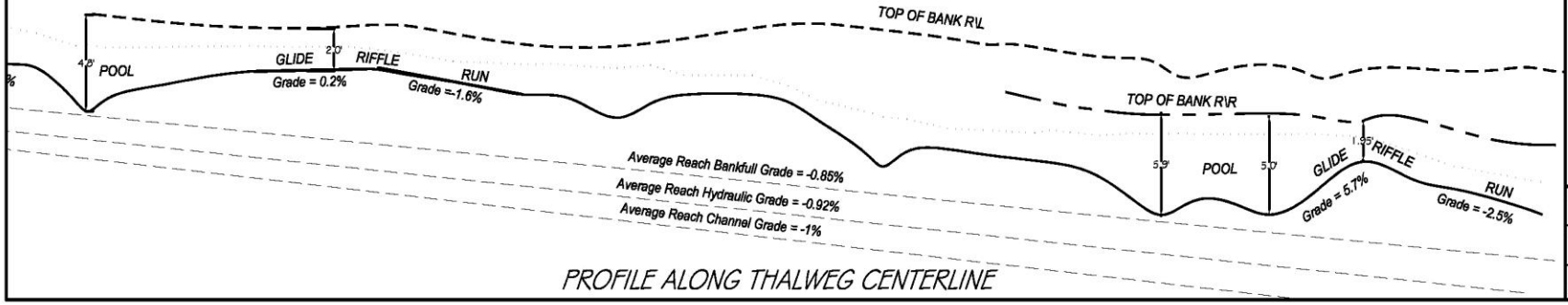


Depth on the floodplain (ft) 2 year event

Velocity (ft) 2 year event


Reference site 3 miles upstream





PROFILE ALONG THALWEG CENTERLINE

PLAN AND PROFILE

SHITIKE CREEK BIOLOGIC REFERENCE REACH

MINIMUM JOB CLASS : STANDARD PRACTICE CODE

DESCHUTES BASIN JEFFERSON COUNTY, OREGON

Date 11/2007

Designed S.WELCH

Drawn S.WELCH

Checked

Approved

Title State Conservation Engineer

NRCS

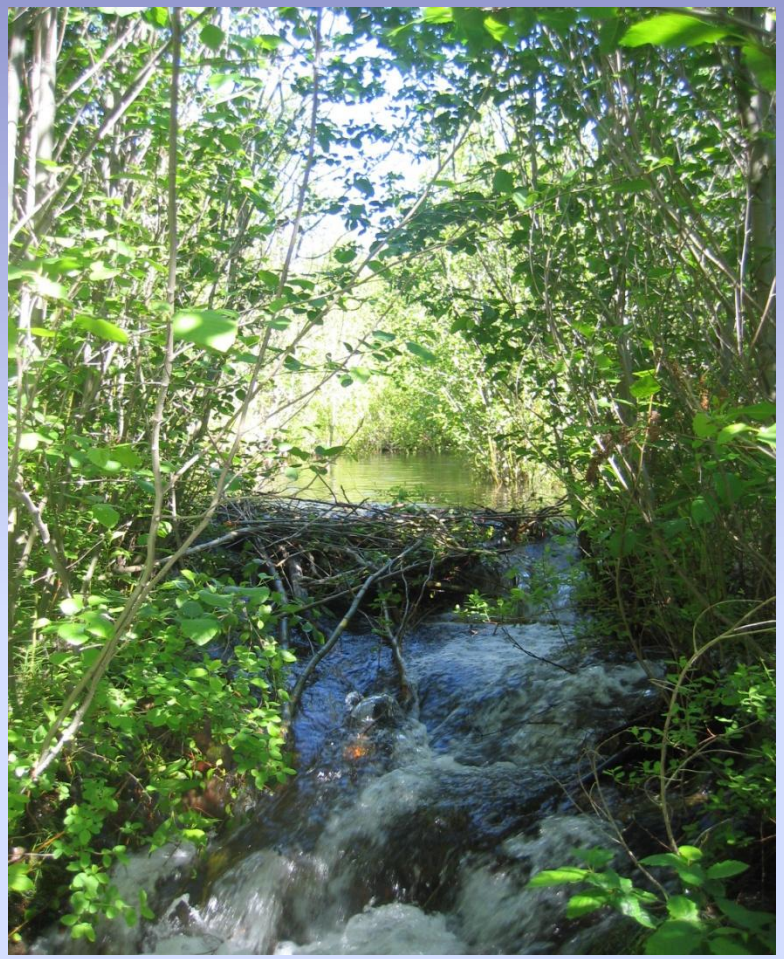
Natural Resources Conservation Service

United States Department of Agriculture

File Name justice.dwg

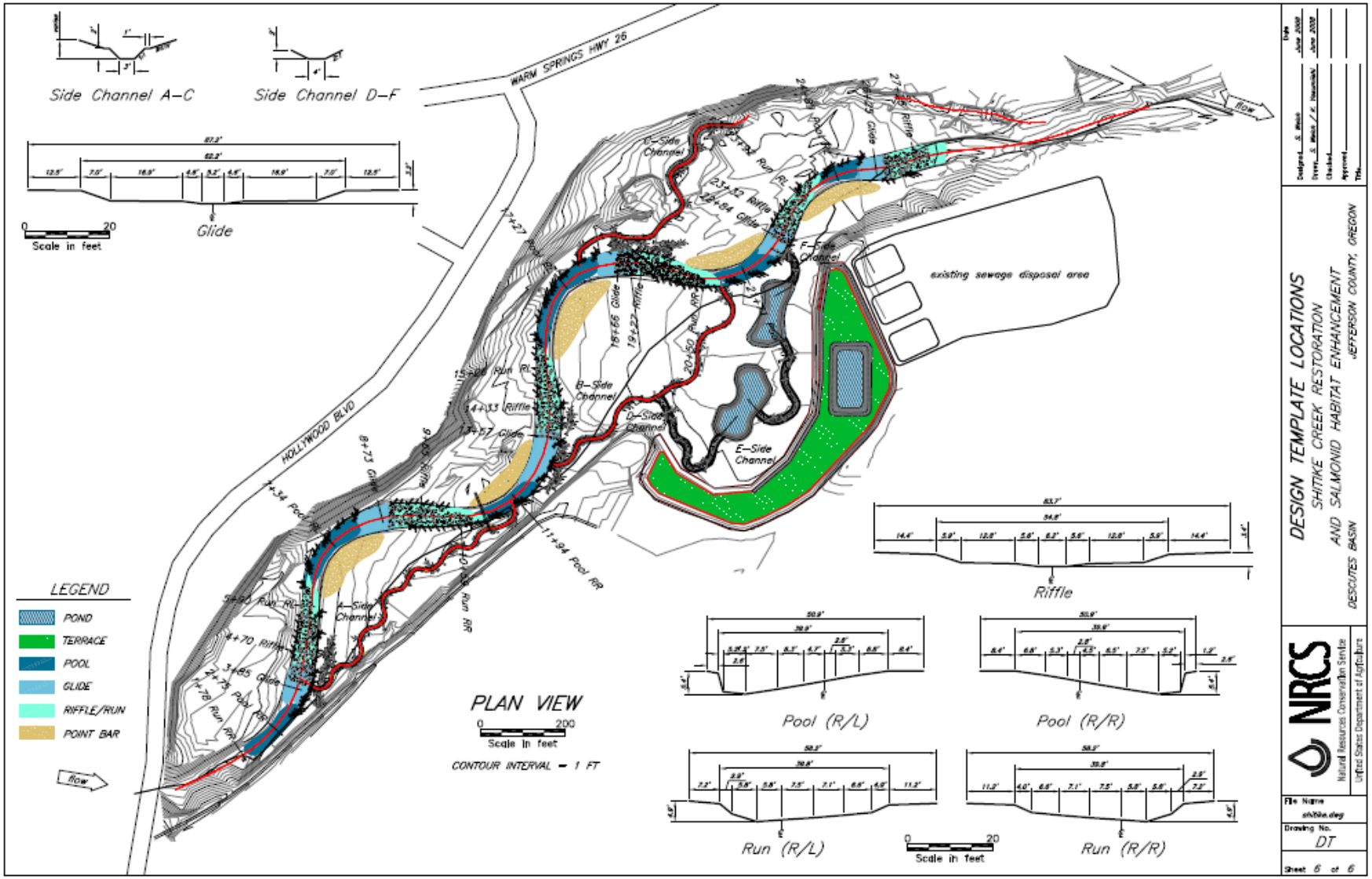
Drawing No.

Sheet 3 of 6



Biological reference reach side channel


December 4th 2007

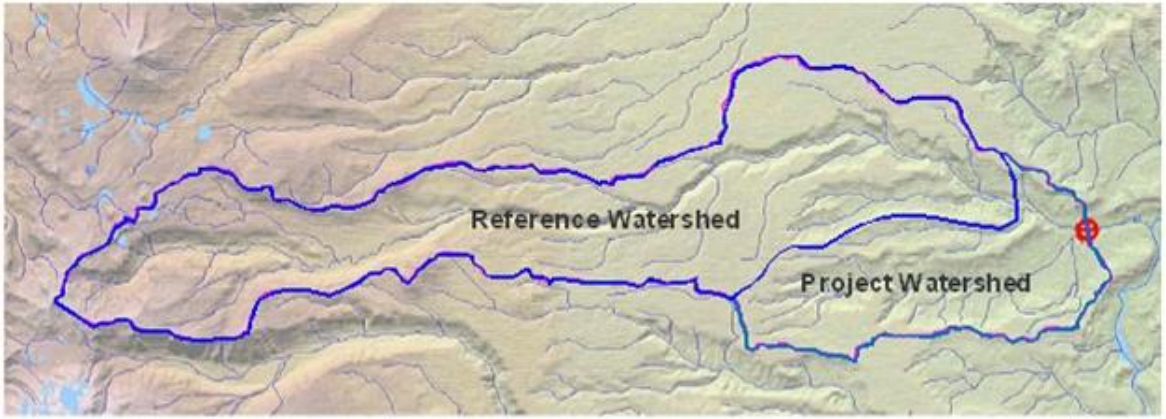

Side Channel A–C
Side Channel D–F
Glide
Scale in feet
WARM SPRINGS HWY 26
HOLLYWOOD BLVD
A–Side Channel
B–Side Channel
C–Side Channel
D–Side Channel
E–Side Channel
F–Side Channel
existing sewage disposal area
flow
LEGEND
POND
TERRACE
POOL
GLIDE
RIFFLE/RUN
POINT BAR
PLAN VIEW
Scale in feet
CONTOUR INTERVAL = 1 FT
Riffle
Pool (R/L)
Pool (R/R)
Run (R/L)
Run (R/R)
DESIGN TEMPLATE LOCATIONS
SHITIKE CREEK RESTORATION
AND SALMONID HABITAT ENHANCEMENT
JEFFERSON COUNTY, OREGON
DESCHUTES BASIN
NRCS
Natural Resources Conservation Service
United States Department of Agriculture
File Name
shtike.dwg
Drawing No.
DT
Sheet 6 of 6

OWRD FFA				OWRD PRED EQ				USGS NFF	
RI	Q	lower	upper	RI	Q	lower	upper	RI	Q
2	677	494	880	2	1150	455	2920	2	524
5	1310	966	1910	5	1890	858	4170	5	934
10	1850	1350	3020	10	2460	1130	5320	10	1280
25	2660	1910	5090	25	3240	1460	7190	25	1830
50	3350	2400	7240	50	3860	1670	8920	50	2310
100	4150	2950	10000	100	4530	1870	11000	100	2860

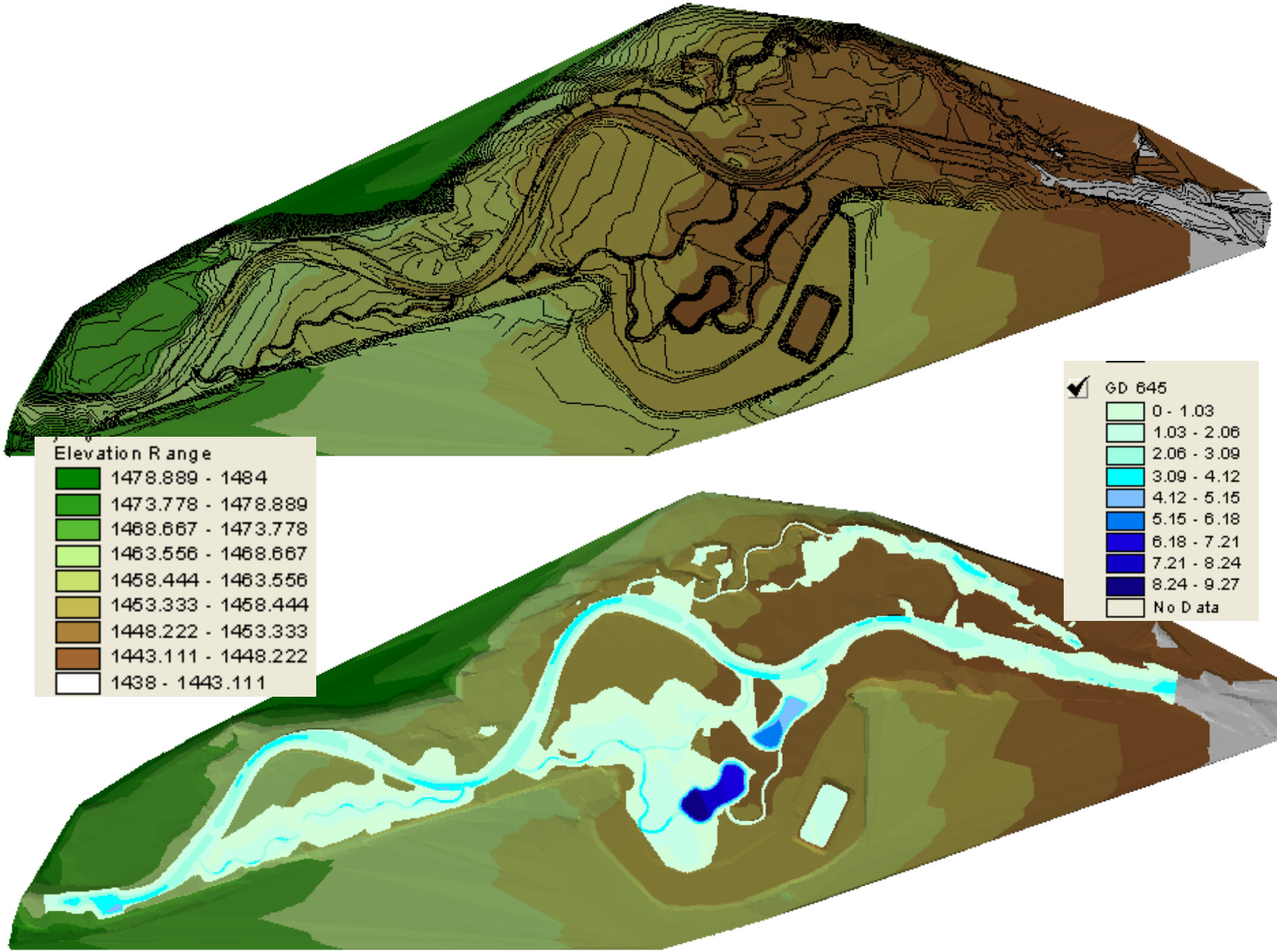
Table 3: Comparison of OWRD methods and USGS NFF. OWRD results are bounded by the 95% confidence intervals.

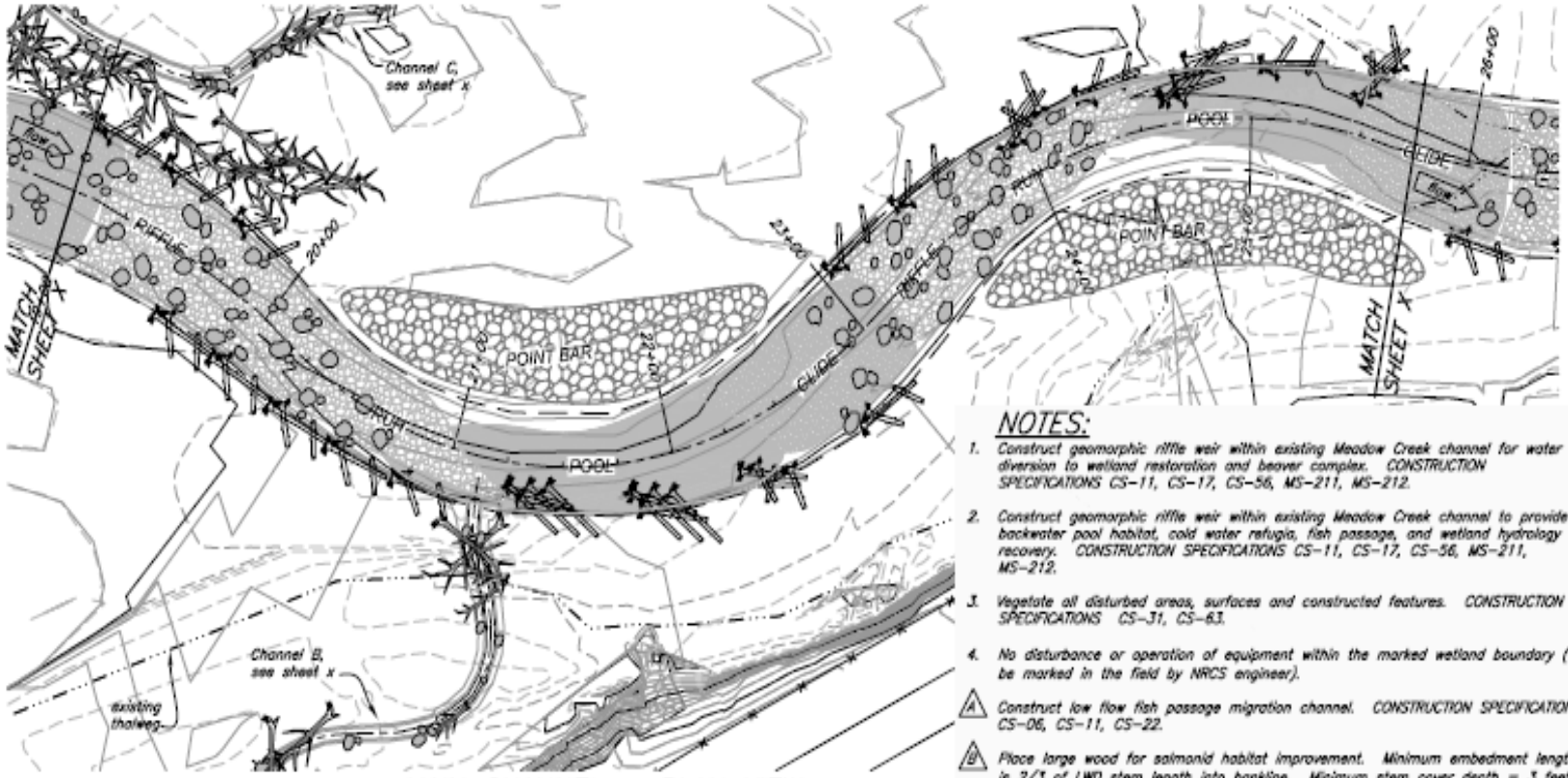
Method	2-Year Discharge
Design FFA	*594 cfs*
USGS NFF	*677 cfs*
OWRD FFA	*524 cfs*
Bankfull Ratio	*655 cfs*
Average of methods	*615 cfs*

Table 43: Comparison of Design FFA, OWRD FFA, USGS NFF and Bankfull Discharge Capacity Hydraulic Analysis.



Reference Watershed area = 75 sq.mi.
Project Watershed area = 103 sq.mi.


Elevation Range
1478.889 - 1484
1473.778 - 1478.889
1468.667 - 1473.778
1463.556 - 1468.667
1458.444 - 1463.556
1453.333 - 1458.444
1448.222 - 1453.333
1443.111 - 1448.222
1438 - 1443.111
GD 645
0 - 1.03
1.03 - 2.06
2.06 - 3.09
3.09 - 4.12
4.12 - 5.15
5.15 - 6.18
6.18 - 7.21
7.21 - 8.24
8.24 - 9.27
No Data



MAIN CHANNEL – PLAN VIEW

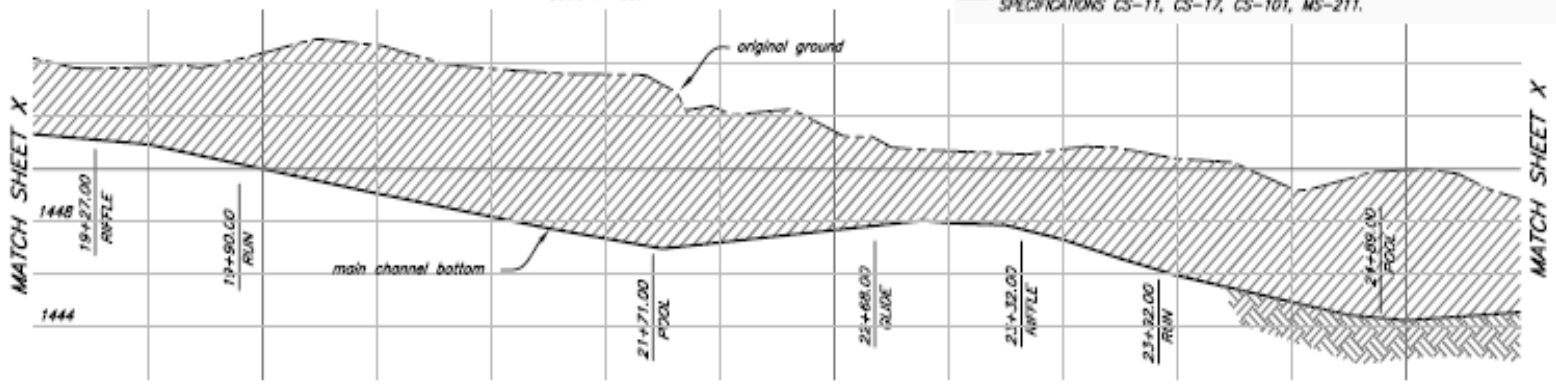
NOTES:

1. Construct geomorphic riffle weir within existing Meadow Creek channel for water diversion to wetland restoration and beaver complex. CONSTRUCTION SPECIFICATIONS CS-11, CS-17, CS-56, MS-211, MS-212.
2. Construct geomorphic riffle weir within existing Meadow Creek channel to provide backwater pool habitat, cold water refugia, fish passage, and wetland hydrology recovery. CONSTRUCTION SPECIFICATIONS CS-11, CS-17, CS-56, MS-211, MS-212.
3. Vegetate all disturbed areas, surfaces and constructed features. CONSTRUCTION SPECIFICATIONS CS-31, CS-63.
4. No disturbance or operation of equipment within the marked wetland boundary (to be marked in the field by NRCS engineer).

A. Construct low flow fish passage migration channel. CONSTRUCTION SPECIFICATIONS CS-06, CS-11, CS-22.

B. Place large wood for salmonid habitat improvement. Minimum embedment length is 2/3 of LWD stem length into bankline. Minimum stem cover depth = 3 feet or as directed by NRCS engineer. CONSTRUCTION SPECIFICATIONS CS-11, CS-17, CS-101, MS-211.

C. Place large wood at constructed channel inlet and outlet inverts. CONSTRUCTION SPECIFICATIONS CS-11, CS-17, CS-101, MS-211.



MAIN CHANNEL – PROFILE

SCALES: 1"=50' H / 1"=5' V

PLAN/PROFILE – MAIN CHANNEL

SHITIKE CREEK RESTORATION
AND SALMONID HABITAT ENHANCEMENT
JEFFERSON COUNTY, OREGON
DESCHUTES BASIN

NRCS Natural Resources Conservation Service
United States Department of Agriculture

File Name: shtlike.dwg
Drawing No.: MC4
Sheet 1 of 2

Channel Dimensions

Lower Shitike Creek

Bankfull Q: 640 cfs

Drainage area ~104 sq miles

	Existing Condition	Proposed Design
Stream Type	B4c	C4
Channel Slope	0.01 ft/ft	.0075 ft/ft
Stream Length	2500 ft	3300 ft
Side Channel Length	0 ft	2800 ft
Sinuosity	1.04	1.23
Bankfull Width	82 ft	60 ft
Mean Depth	1.4	1.9
Cross Sectional Area	117	113
Width/Depth Ratio	58	30
Radius of Curvature	0 ft	200 ft
Flood Prone Width	130 ft	320 ft
Entrenchment Ratio	~1	5.8
Meander Beltwidth	90 ft	348 ft
Meander Width Ratio	~1	5.6
Meander Length	0 ft	350 ft
No. of Pool Complexes	0	6
Riffle Bed Material D84	100 mm	120 mm
Entrainable Particle Size	180 mm	100 mm

Summary

- **3,300 feet of meander reconstruction along historic meandering channel corridor (optimizing use of old-age existing riparian vegetation)**

- **2,800 feet of side channel construction (juvenile habitat, velocity refugia, additional habitat complexity)**

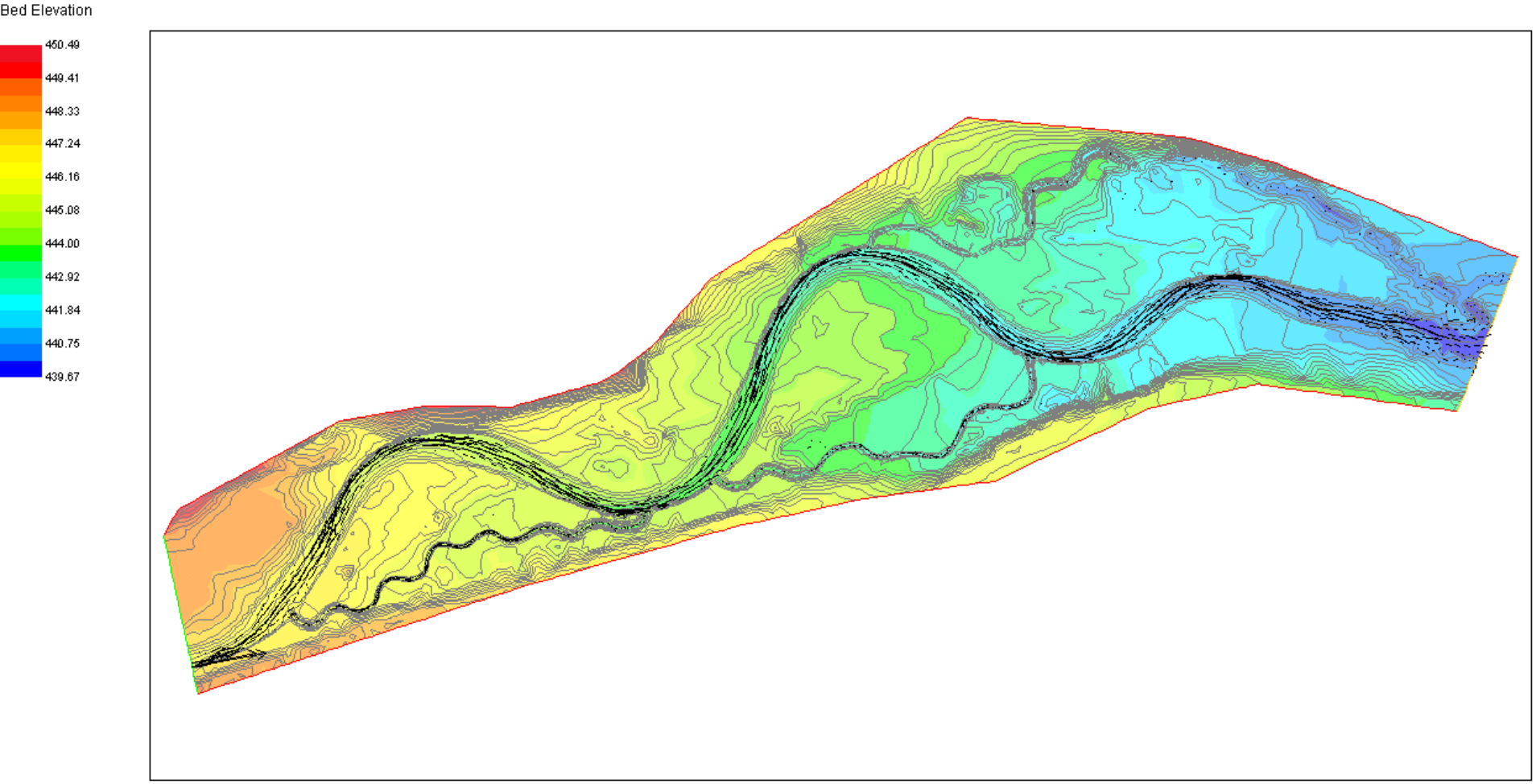
- **6 new pool – glide-riffle-run complexes (spawning habitat, summer pool habitat, and backwater habitats**

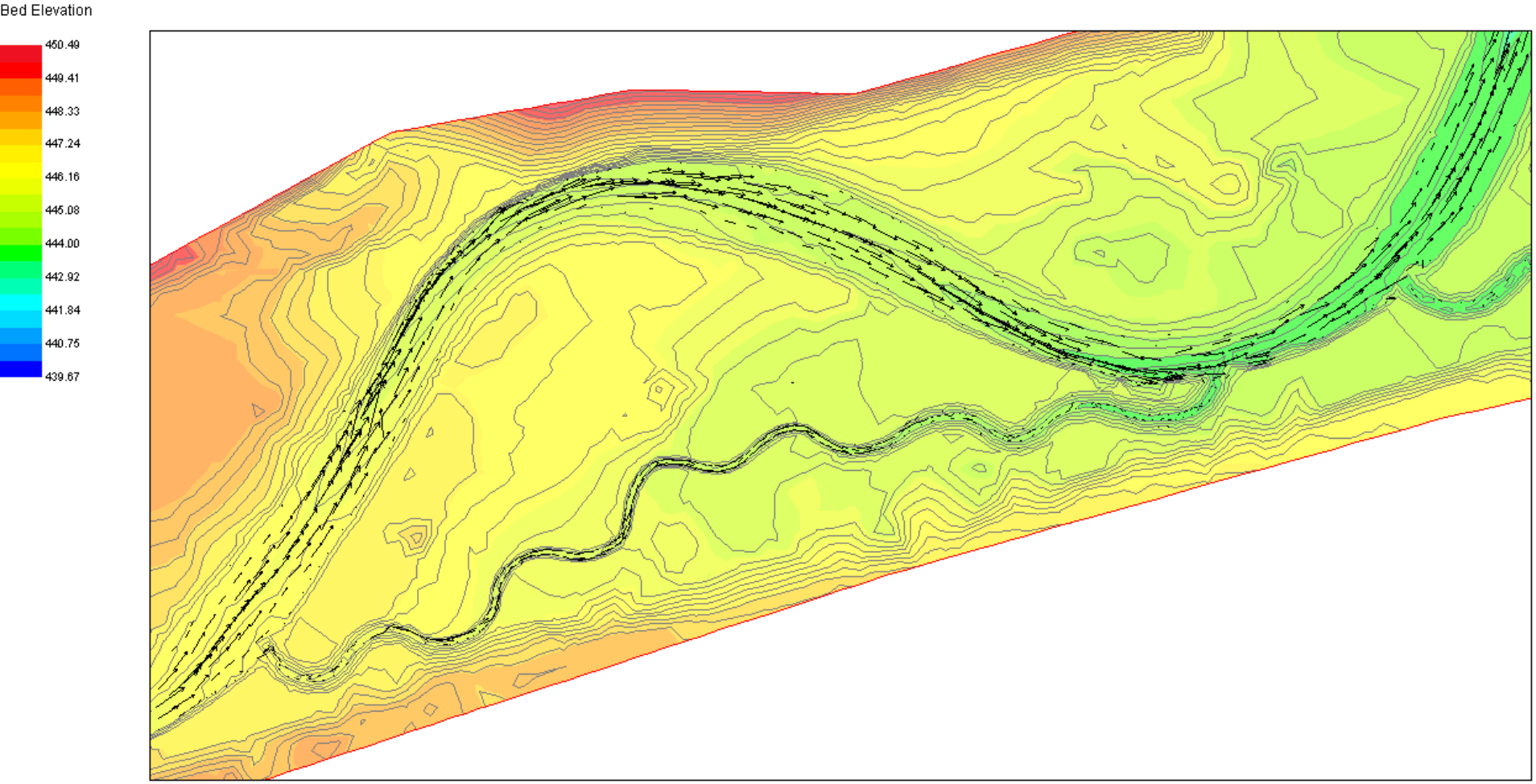
- **Connected flow-through wetland complex creating additional off-channel habitat**

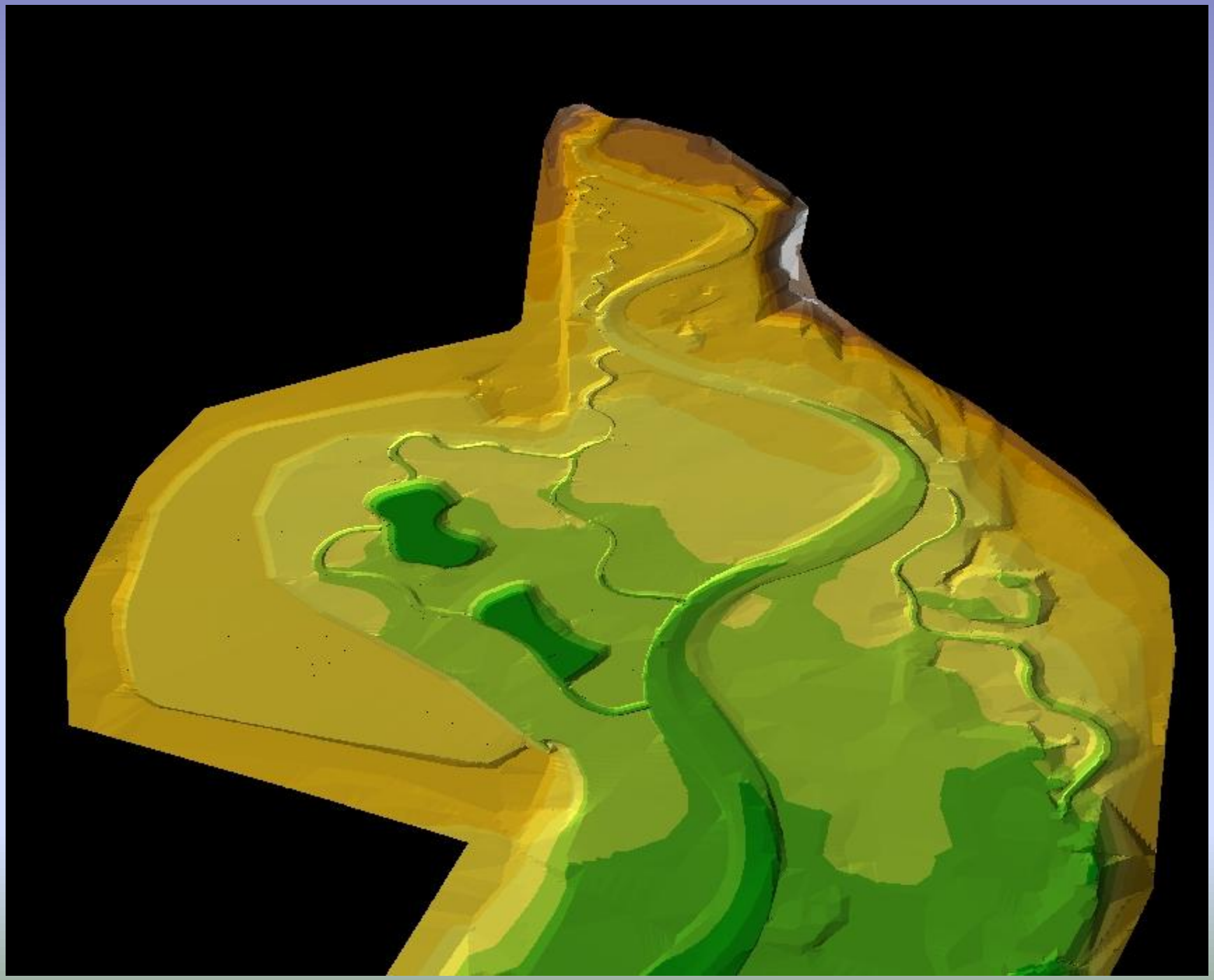
Funding $545,000 project total
$382,529 construction

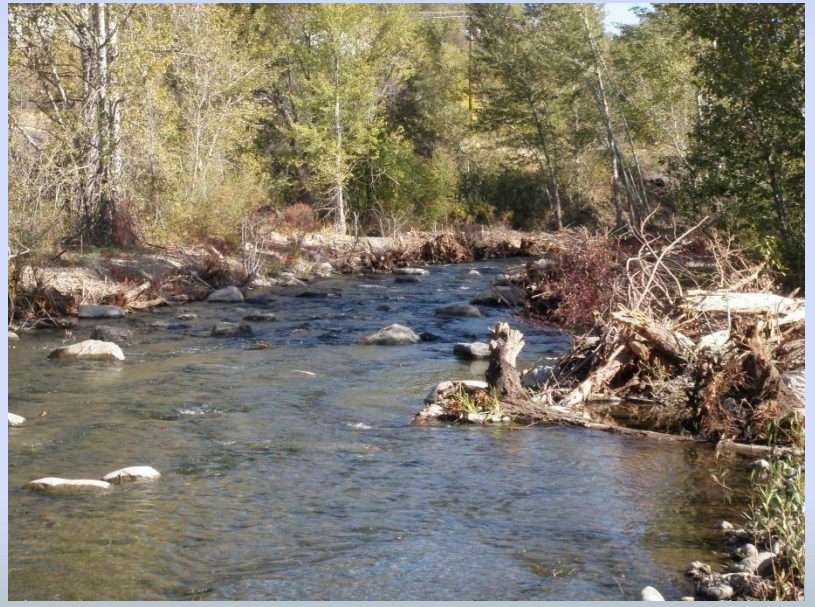
National Resources Conservation Service
Pelton-Round Butte Fund
Oregon Watershed Enhancement Board
Environmental Protection Agency 319 Program

200 trees donated by the CTWSRO
Design completed by NRCS


Bed Elevation
450.49
449.41
448.33
447.24
446.16
445.08
444.00
442.92
441.84
440.75
439.67


Bed Elevation
450.49
449.41
448.33
447.24
446.16
445.08
444.00
442.92
441.84
440.75
439.67






DEERE


DEERE
225C


CWS
HD

Monitoring

Summer Rearing

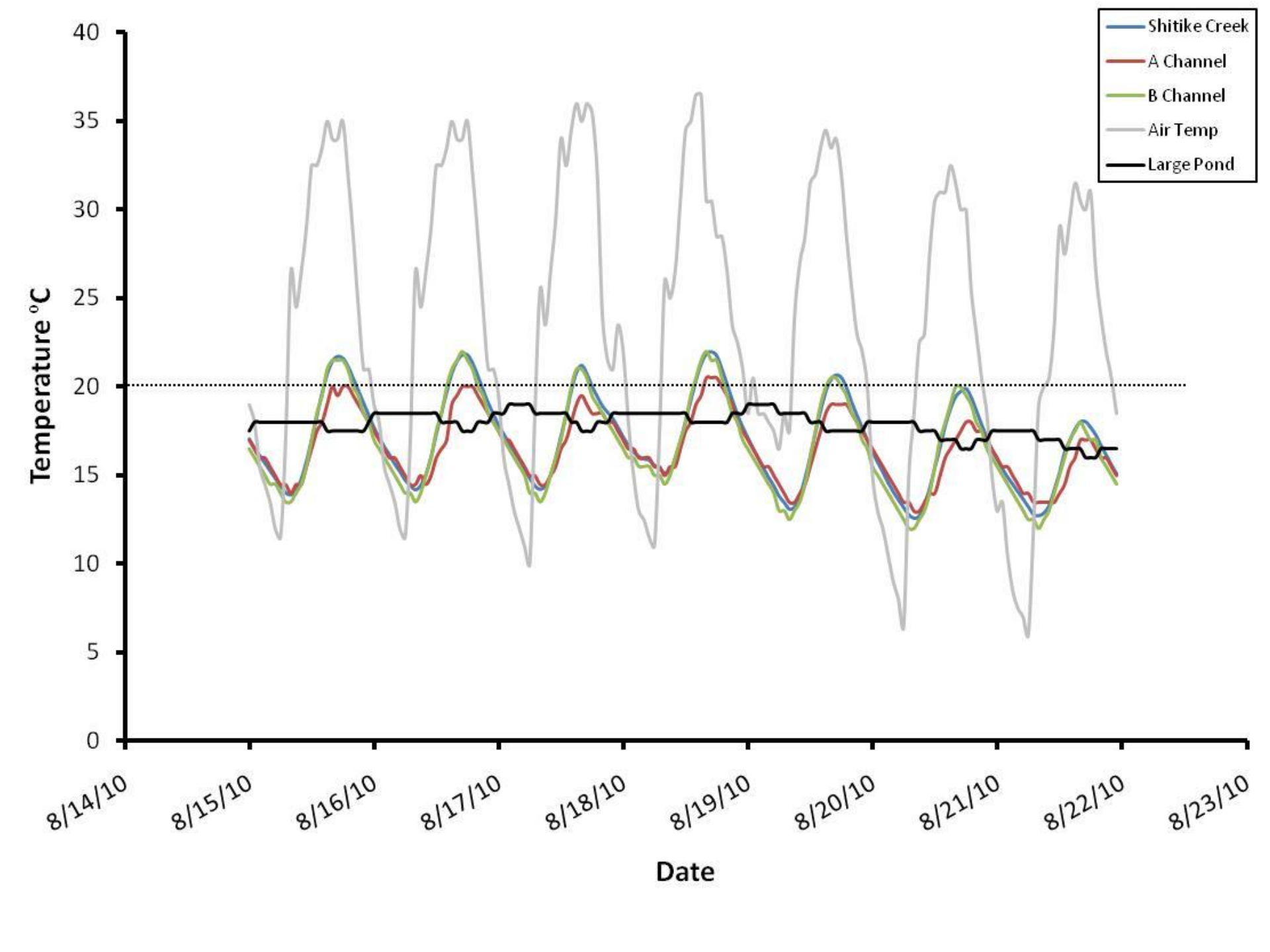
- Pre project
- Very limited

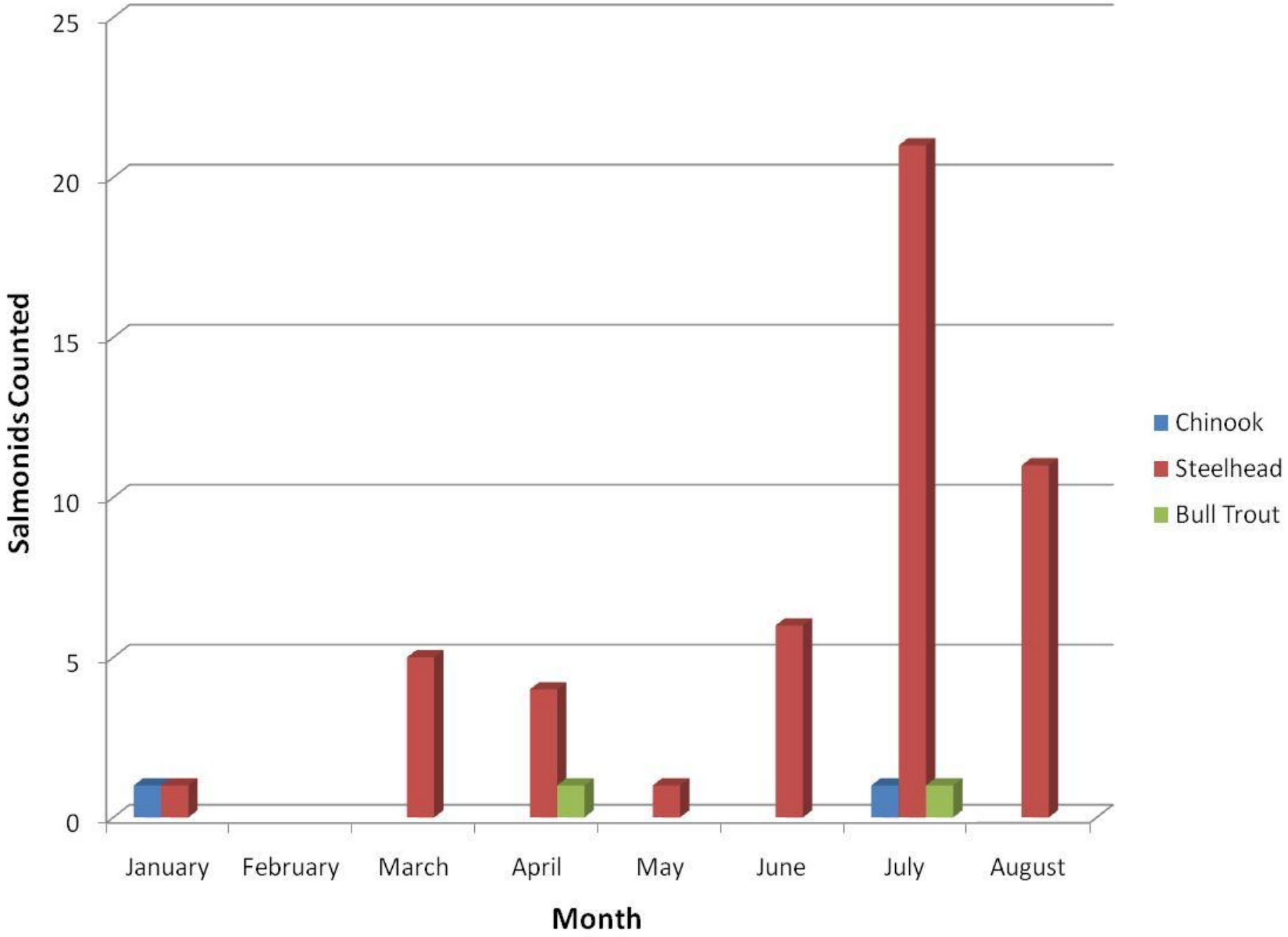
Post Project

- Juvenile STH, Chinook and Coho were observed rearing in pools a riffles
- One sub adult bull trout observed in thermal refugia created at side channel A return to mainstem

Water temps

- Mainstem 14-22C in summer
- Side channel Thermal refugia 9-18C


Shitike Creek
A Channel
B Channel
Air Temp
Large Pond
Temperature °C
40
35
30
25
20
15
10
5
0
8/14/10
8/15/10
8/16/10
8/17/10
8/18/10
8/19/10
8/20/10
8/21/10
8/22/10
8/23/10
Date


25
20
15
10
5
0
Salmonids Counted
January
February
March
April
May
June
July
August
Month
Chinook
Steelhead
Bull Trout

• Things I would add for next project

- Roughness below where side channels cross the filled channel.
- On high banks above bankfull I would create small release channels at bankfull to create additional floodplain connectivity.
- Have a dozens of willow and dog wood waddle ready to go and install at log jam or other critical vegetation sites during construction.
- No right angles of sharp turns in return side channel from ponds. Follow the valley slope.


Questions ?