Bull Trout transport and monitoring in the Rimrock Recreation Area

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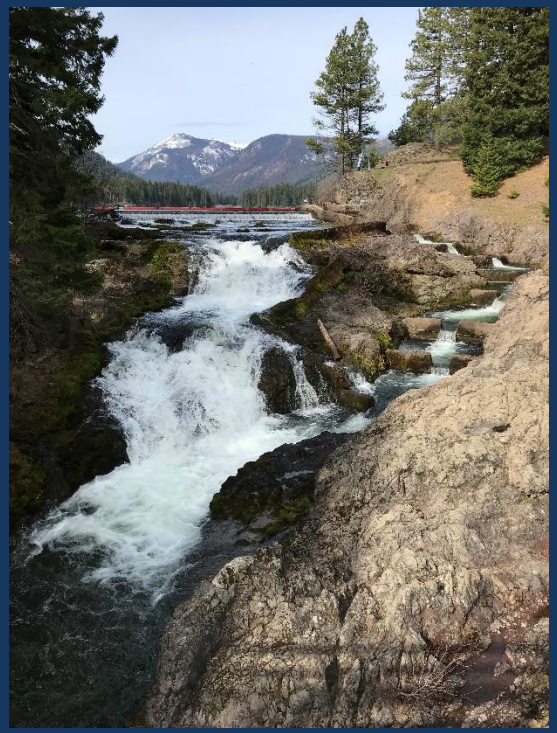
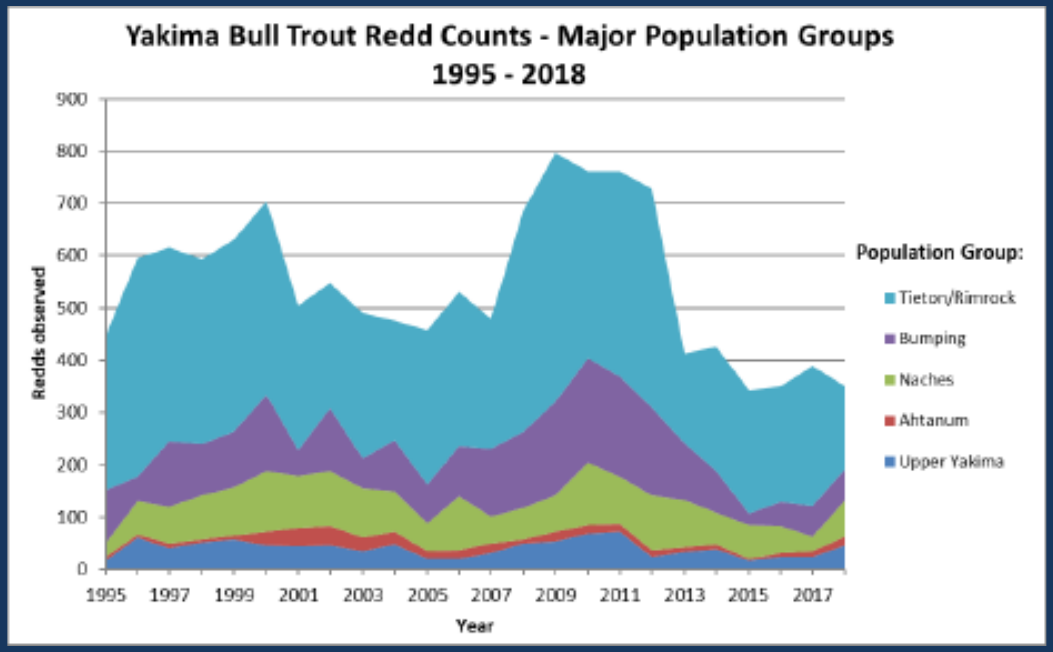


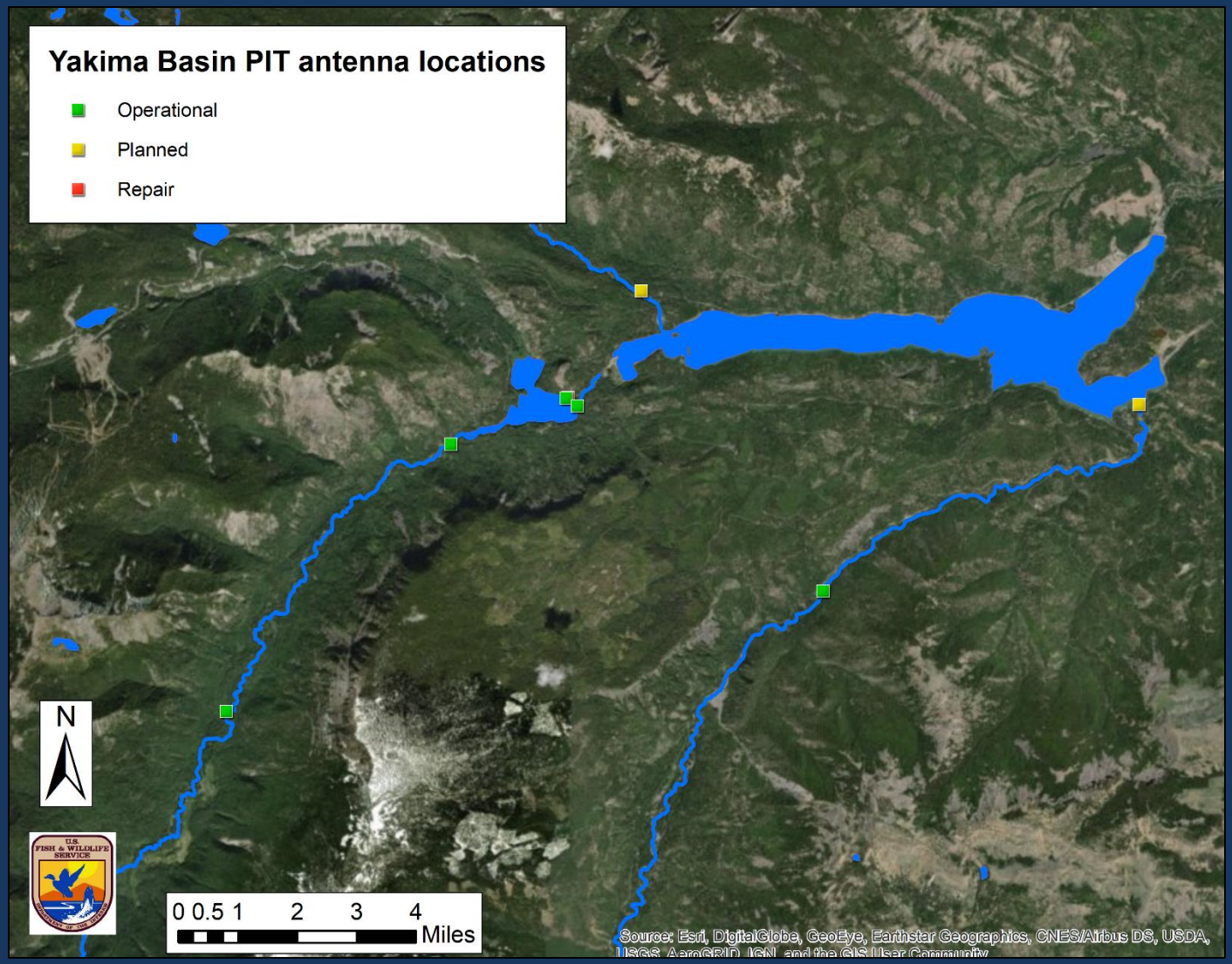
U.S. Department of the Interior
U.S. Fish and Wildlife Service

Yakima Basin Bull Trout
(*Salvelinus confluentus*)

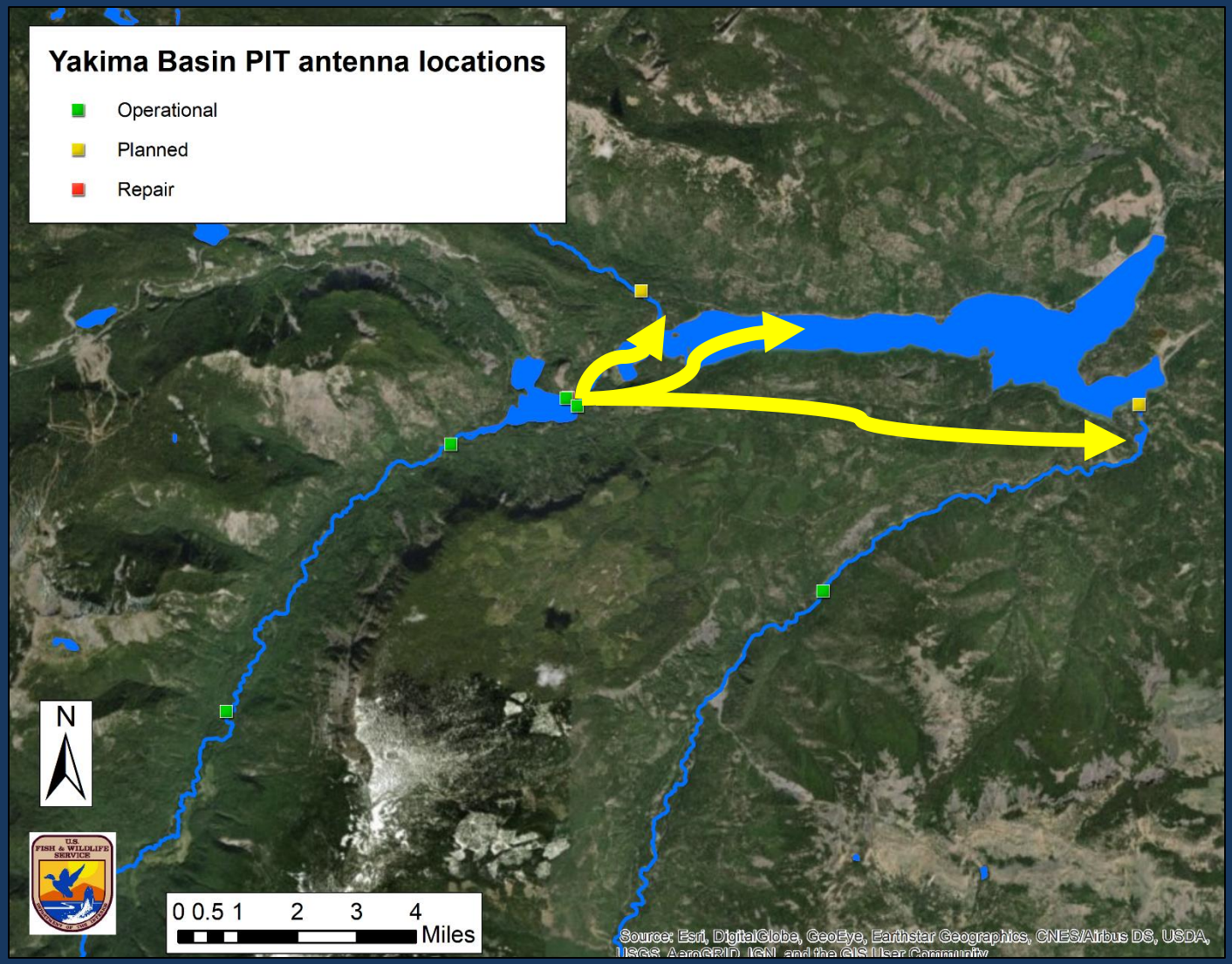
- Mid-Columbia Recovery Unit
  - Upper Mid-Columbia
    - Yakima Basin Core Area
      - 15 populations (adfluvial, fluvial, resident)
      - Rimrock supports the 'Bull Trout Stronghold'
        - South Fork Tieton
        - North Fork Tieton
        - Indian Creek
      - South Fork potential source population for translocation



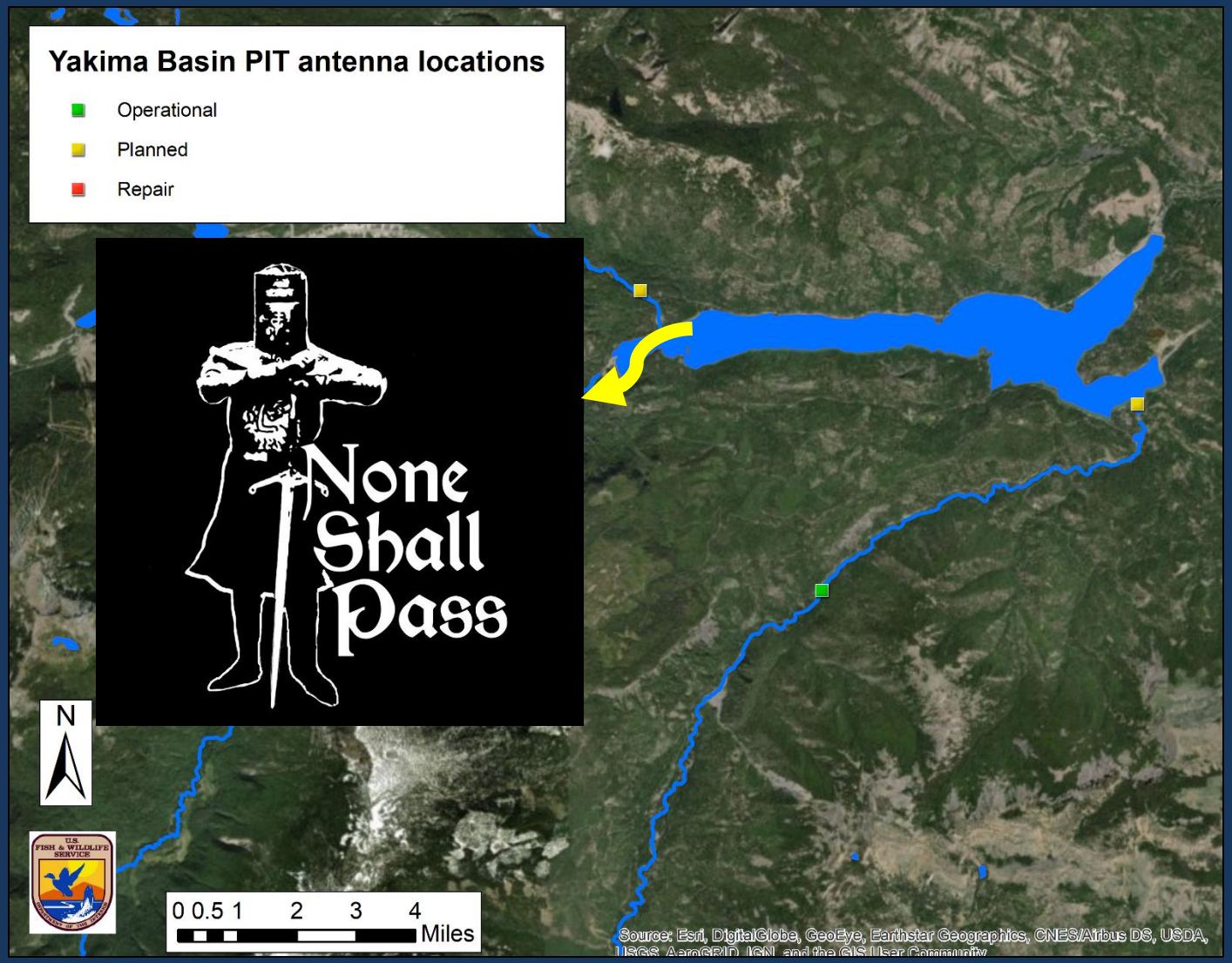
Rimrock Recreation Area



Rimrock Recreation Area



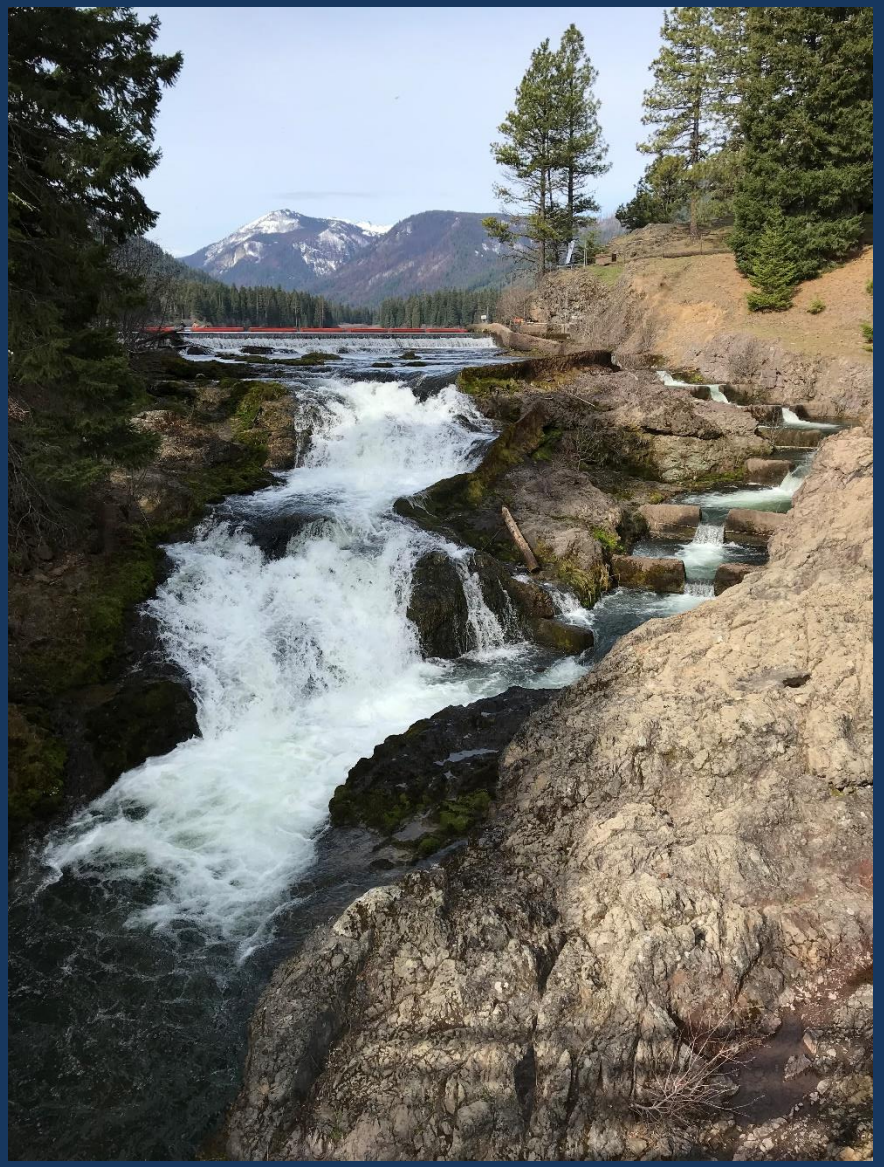
Rimrock Recreation Area



Clear Creek Dam Fish Descender

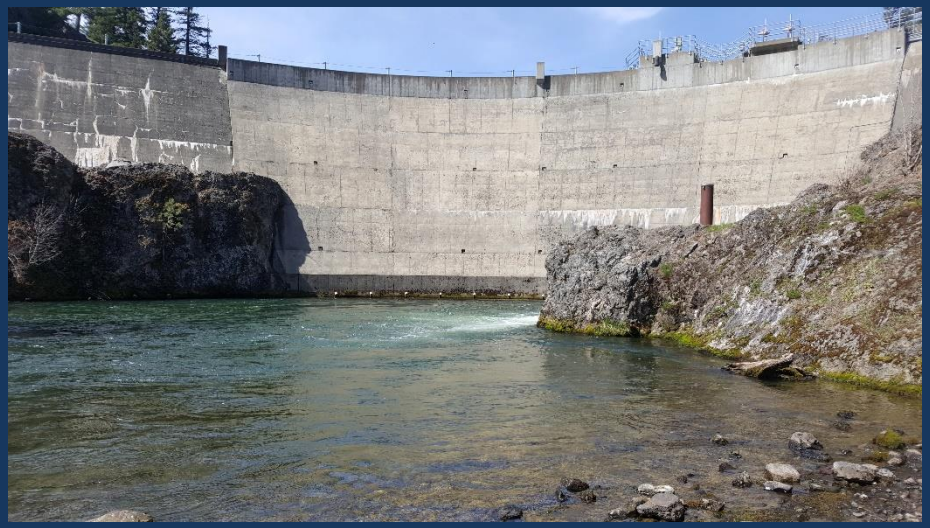
- **Dysfunctional fish ladder**
  - **Fish only move down it**
  - **Read all about it:**

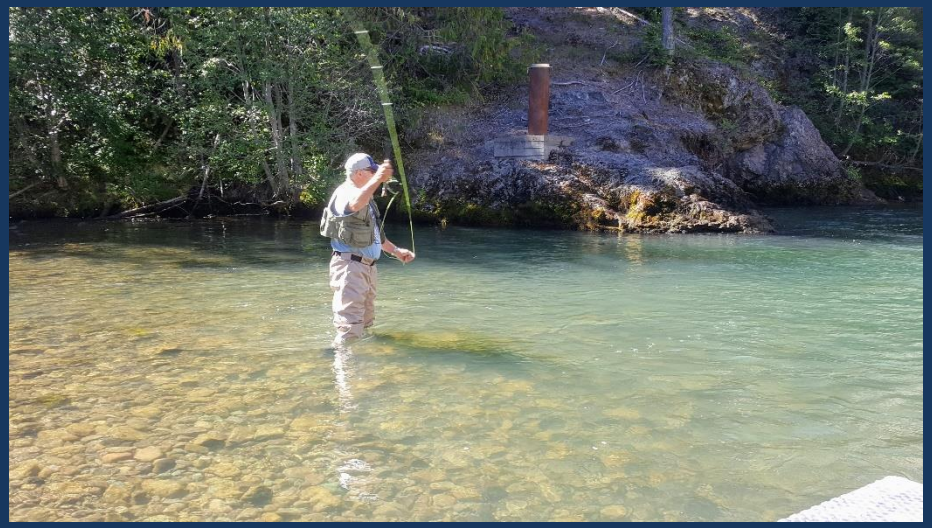
Thomas and Monk 2016



Bang head against wall here

- **Use recreational angling gear and tangle nets to capture**



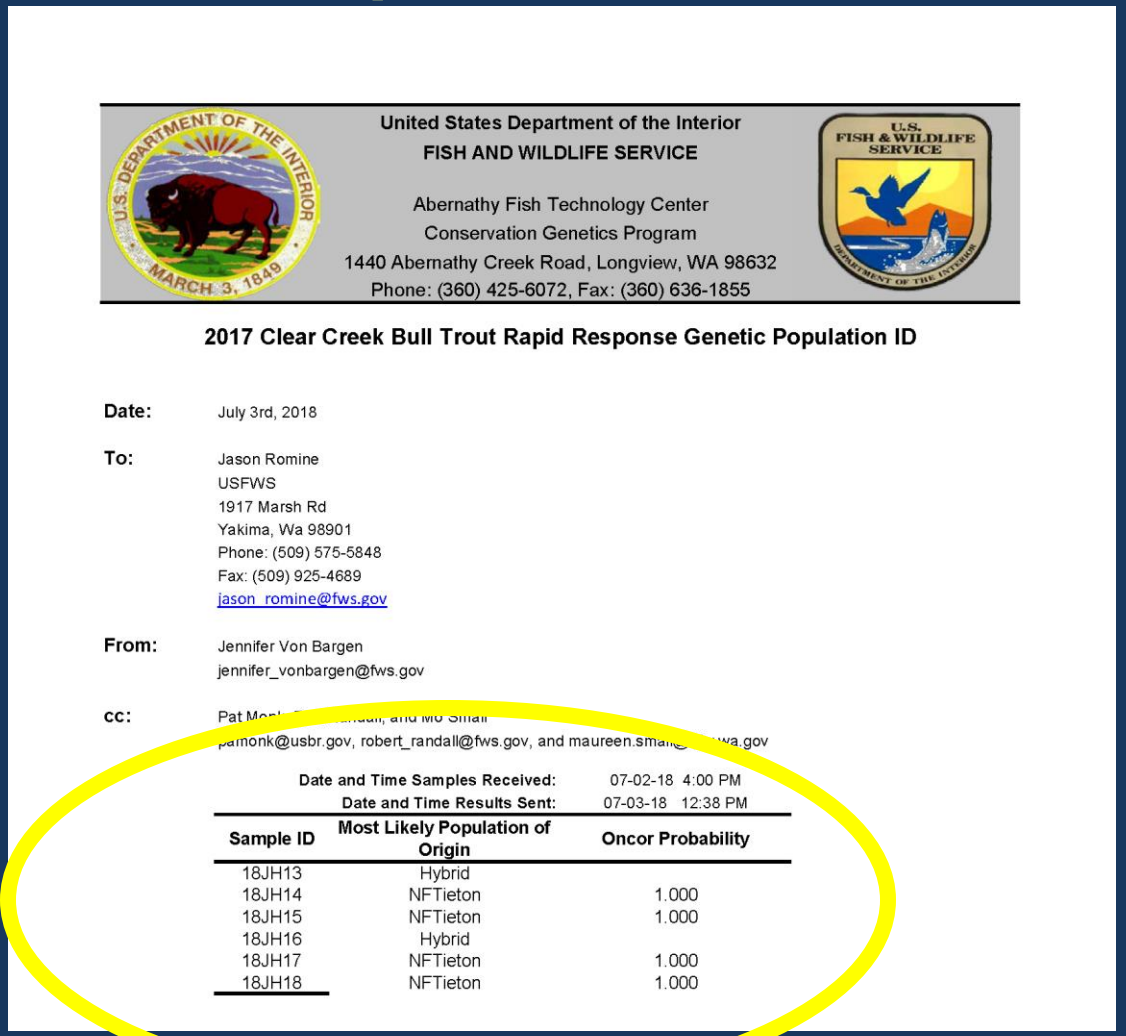


Fish Transport

- **Work up**
  - **Measure, tag (HDX), fin clip**
  - **Recovery tubes (monitored)**
  - **Place fish back in holding pen**

Fish Transport

- **Wait for results**
  - **North Fork Fish get in the taxi**
  - **South Fork and Indian Creek fish, no ticket to ride**
  - **Hybrids euthanized**



United States Department of the Interior
FISH AND WILDLIFE SERVICE

Abernathy Fish Technology Center
Conservation Genetics Program
1440 Abernathy Creek Road, Longview, WA 98632
Phone: (360) 425-6072, Fax: (360) 636-1855

2017 Clear Creek Bull Trout Rapid Response Genetic Population ID

Date: July 3rd, 2018

To: Jason Romine
USFWS
1917 Marsh Rd
Yakima, Wa 98901
Phone: (509) 575-5848
Fax: (509) 925-4689
jason_romine@fws.gov

From: Jennifer Von Bargen
jennifer_vonbargen@fws.gov

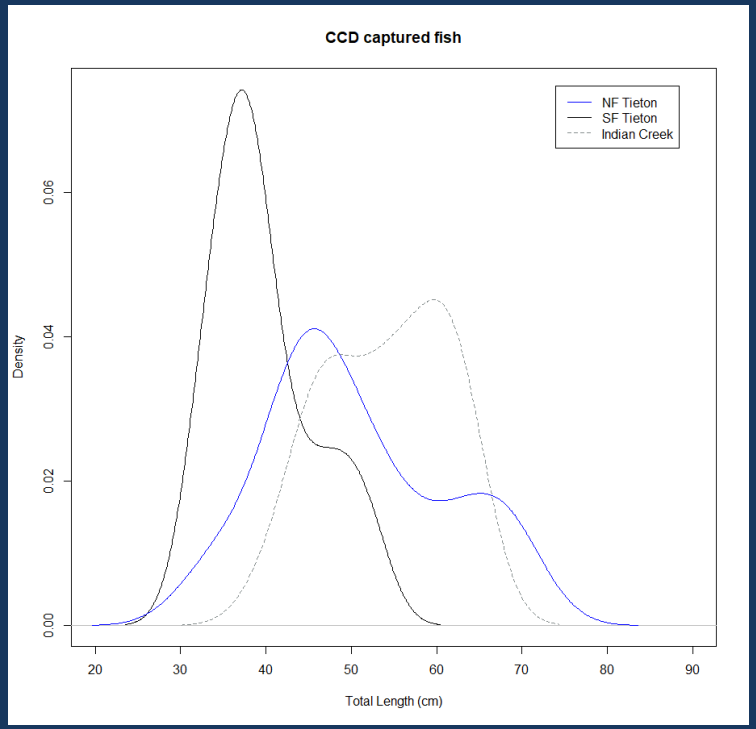
cc: Pat Mon[illegible], and Mo Small
pamonk@usbr.gov, robert_randall@fws.gov, and maureen.small@[illegible].gov

Date and Time Samples Received: 07-02-18 4:00 PM
Date and Time Results Sent: 07-03-18 12:38 PM

Sample ID	Most Likely Population of Origin	Oncor Probability
18JH13	Hybrid	
18JH14	NFTieton	1.000
18JH15	NFTieton	1.000
18JH16	Hybrid	
18JH17	NFTieton	1.000
18JH18	NFTieton	1.000

Clear Creek Dam captured fish

Origin	Average TL (cm)	sd	min	max	n
Indian Creek	54.11	7.15	41	64	19
NF Tieton	50.60	10.41	32	71	56
SF Tieton	39.77	6.03	32	52	13
Unknown	56.21	6.68	44	68	21



Trap and haul 2018

Genetic Origin	Event	Transported	n
Hybrid	MARK	No	3
Hybrid	RECAP	No	1

Trap and haul 2018

Genetic Origin	Event	Transported	n
Hybrid	MARK	No	3
Hybrid	RECAP	No	1
Indian Creek	**MARK**	**No**	**1**
Indian Creek	**RECAP**	**No**	**1**

Trap and haul 2018

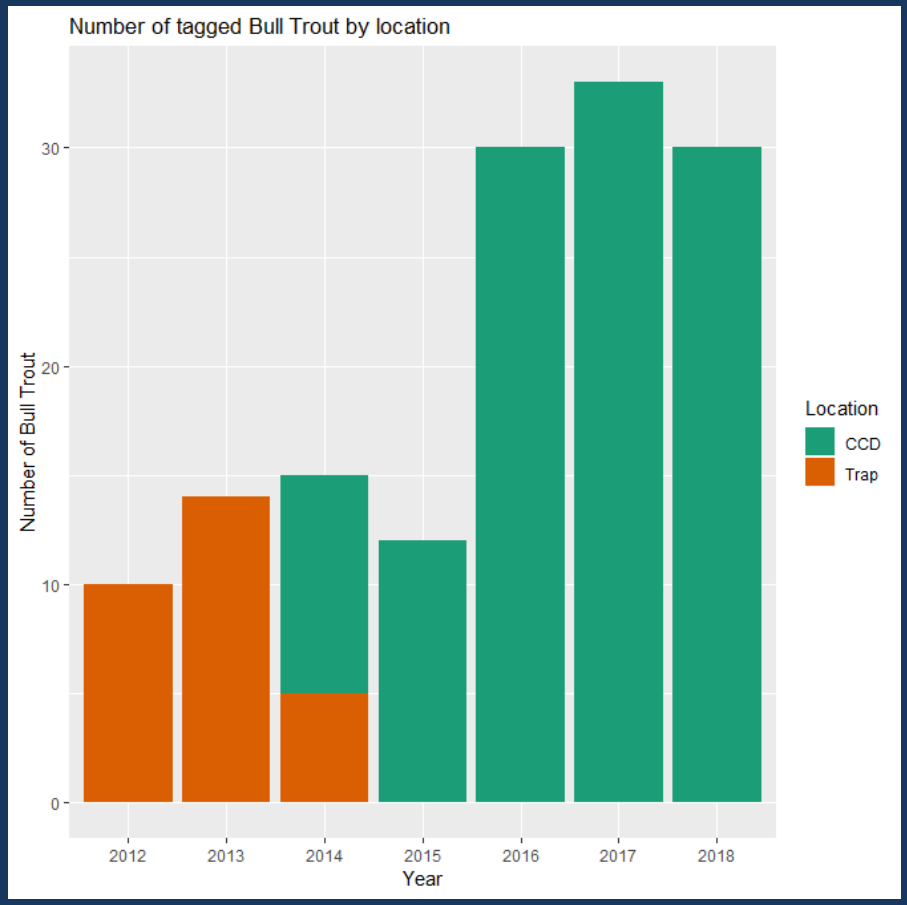
Genetic Origin	Event	Transported	n
Hybrid	MARK	No	3
Hybrid	RECAP	No	1
Indian Creek	MARK	No	1
Indian Creek	RECAP	No	1
South Fork Tieton	**MARK**	**No**	**2**

Trap and haul 2018

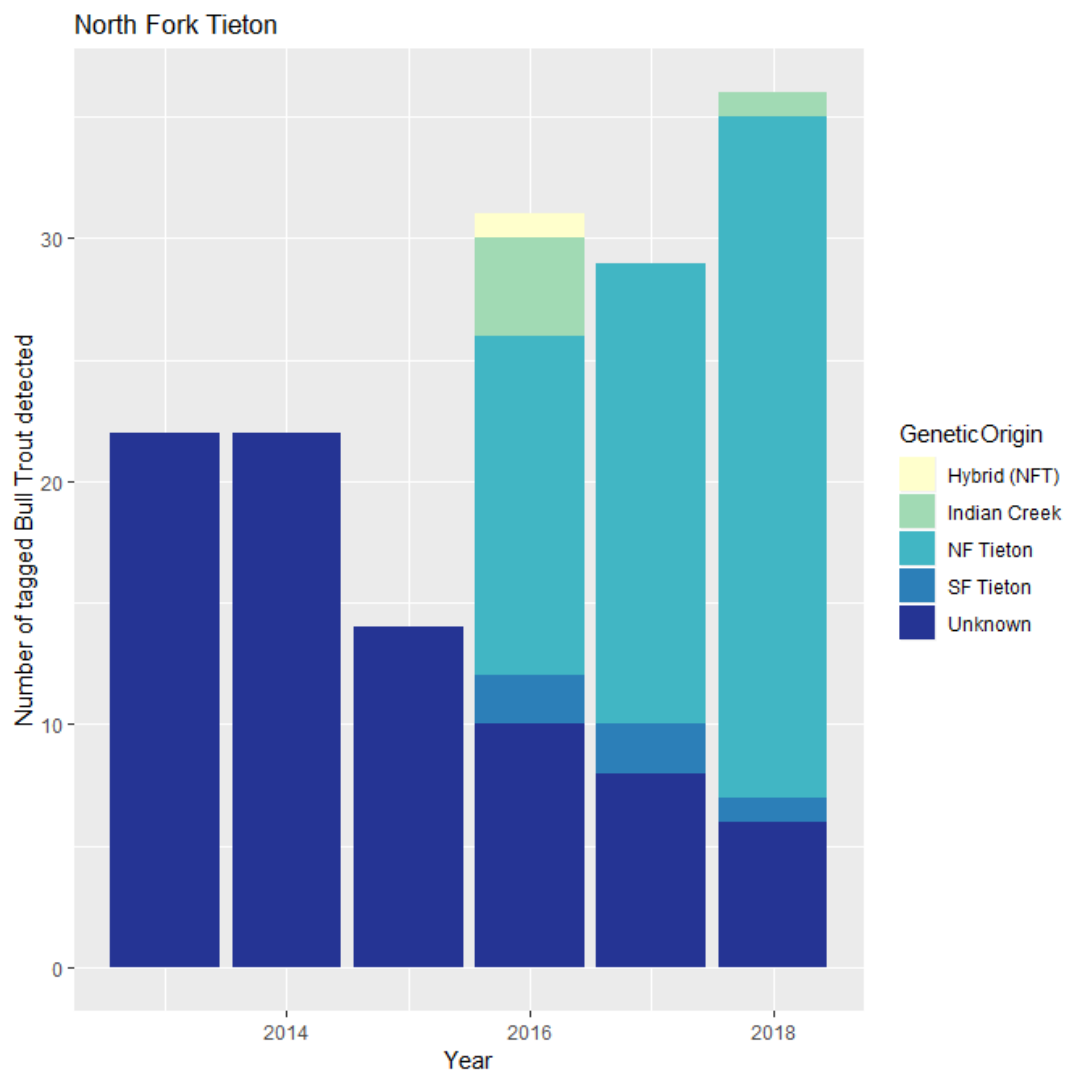
Genetic Origin	Event	Transported	n
Hybrid	MARK	No	3
Hybrid	RECAP	No	1
Indian Creek	MARK	No	1
Indian Creek	RECAP	No	1
South Fork Tieton	MARK	No	2
North Fork Tieton	**MARK**	**No**	**1**
North Fork Tieton	**MARK**	**Yes**	**20**
North Fork Tieton	**RECAP**	**Yes**	**2**

Fish Transport

Origin	Number transported	Detected at Lower NFT
NFT	51	41
SFT	5	3
IC	7	4
Unknown	21	2
Total	**84**	**50**



Detection data at lower NFT



2018 Fish detections at wilderness boundary at upper NFT

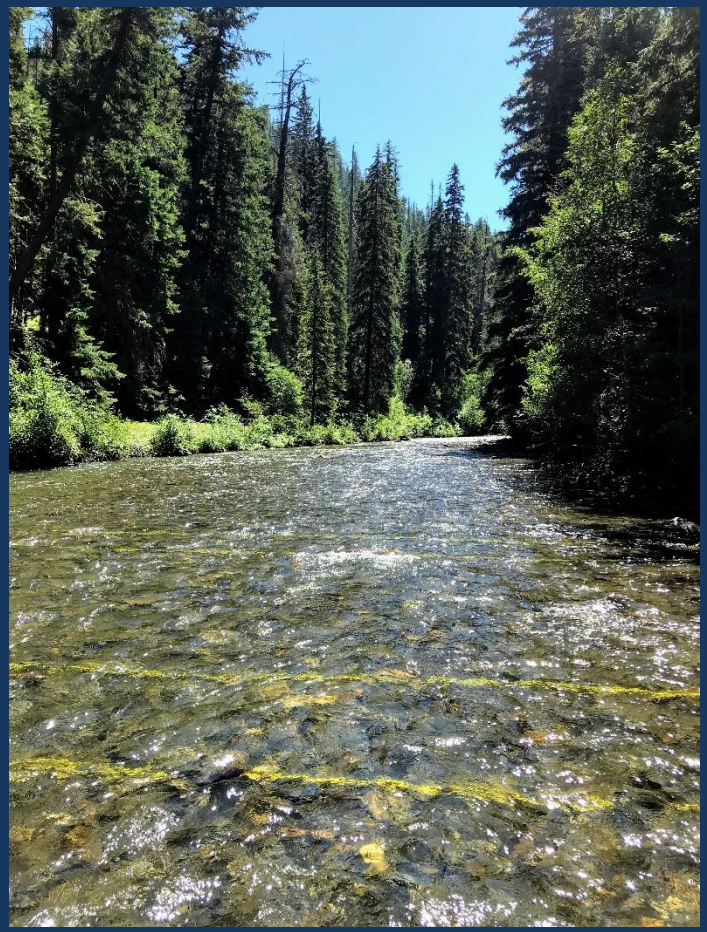
Genetic Origin	n
Indian Creek	1
NF Tieton	27
SF Tieton	1
Unknown	6

Upper NFT by tag year

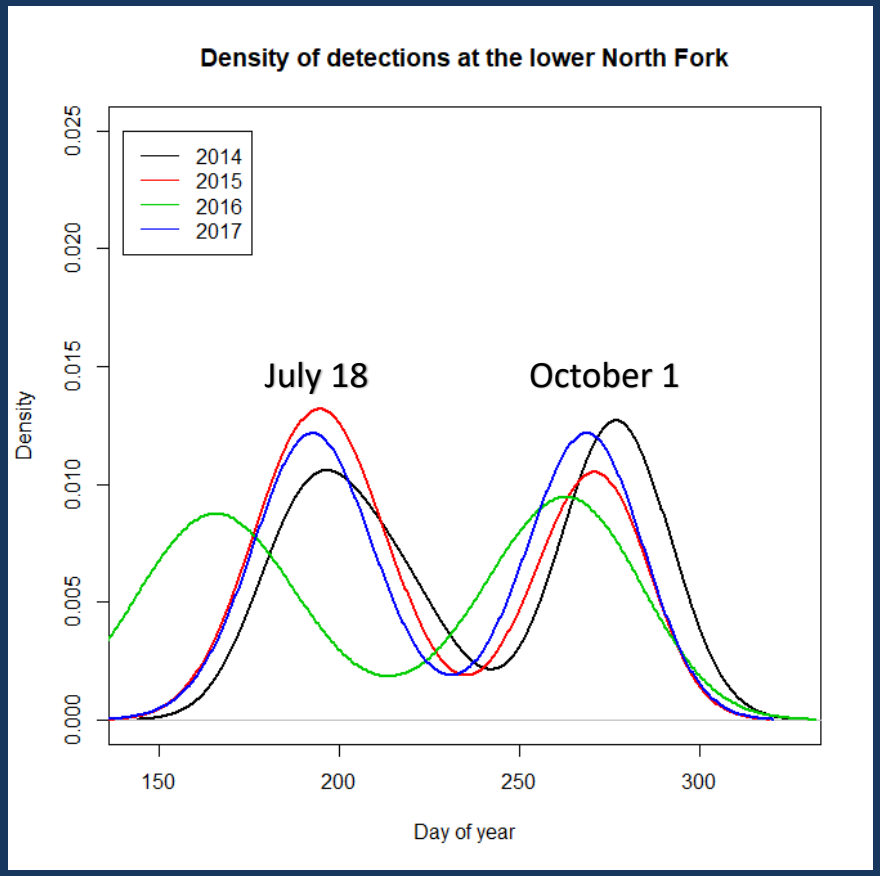
Genetic Origin	Tag Year	n
Unknown	2012	1
Unknown	2013	2
Unknown	2014	3
NF Tieton	2015	1
Indian Creek	2016	1
NF Tieton	2016	7
SF Tieton	2016	1
NF Tieton	2017	6
NF Tieton	2018	13

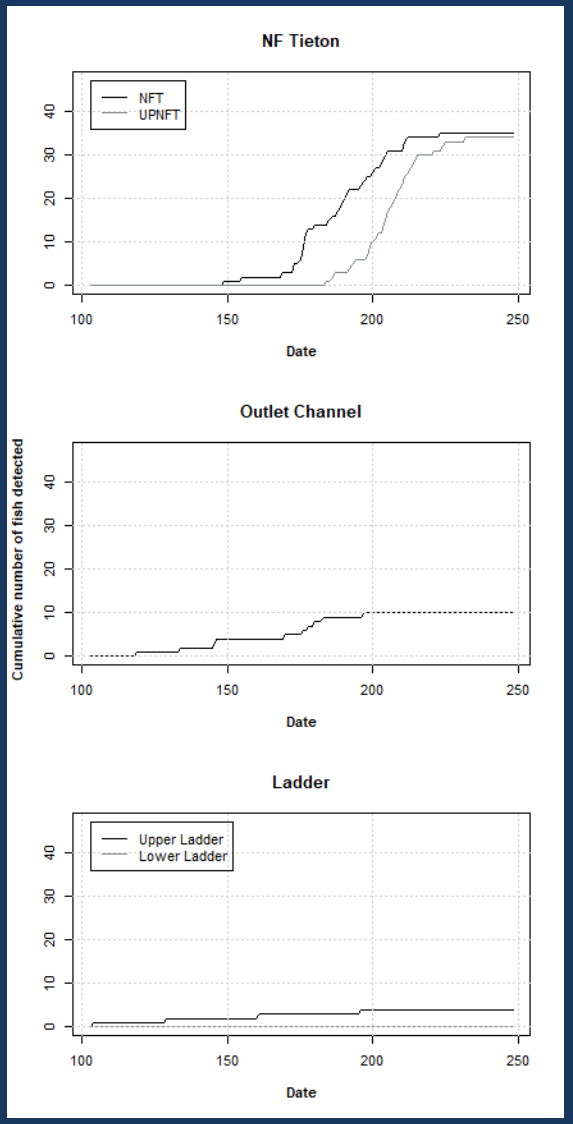
South Fork Bake Oven

- Dual antennas → directionality
- 3 fish detected
  - 2 transported South Fork fish
    - 196
      - 2 runs up the North Fork: 2016,2017
      - Exited Clear Lake late July 2018, arrived at Bake Oven 7 days later
      - Detected in September at the SF reservoir falls antenna
    - 256
      - Transported in 2016
  - 1 transported North Fork Fish
    - Transported in 2016 -> NFT -> Upper Ladder -> Lower Ladder
    - Detected moving upstream then down stream in the SFT

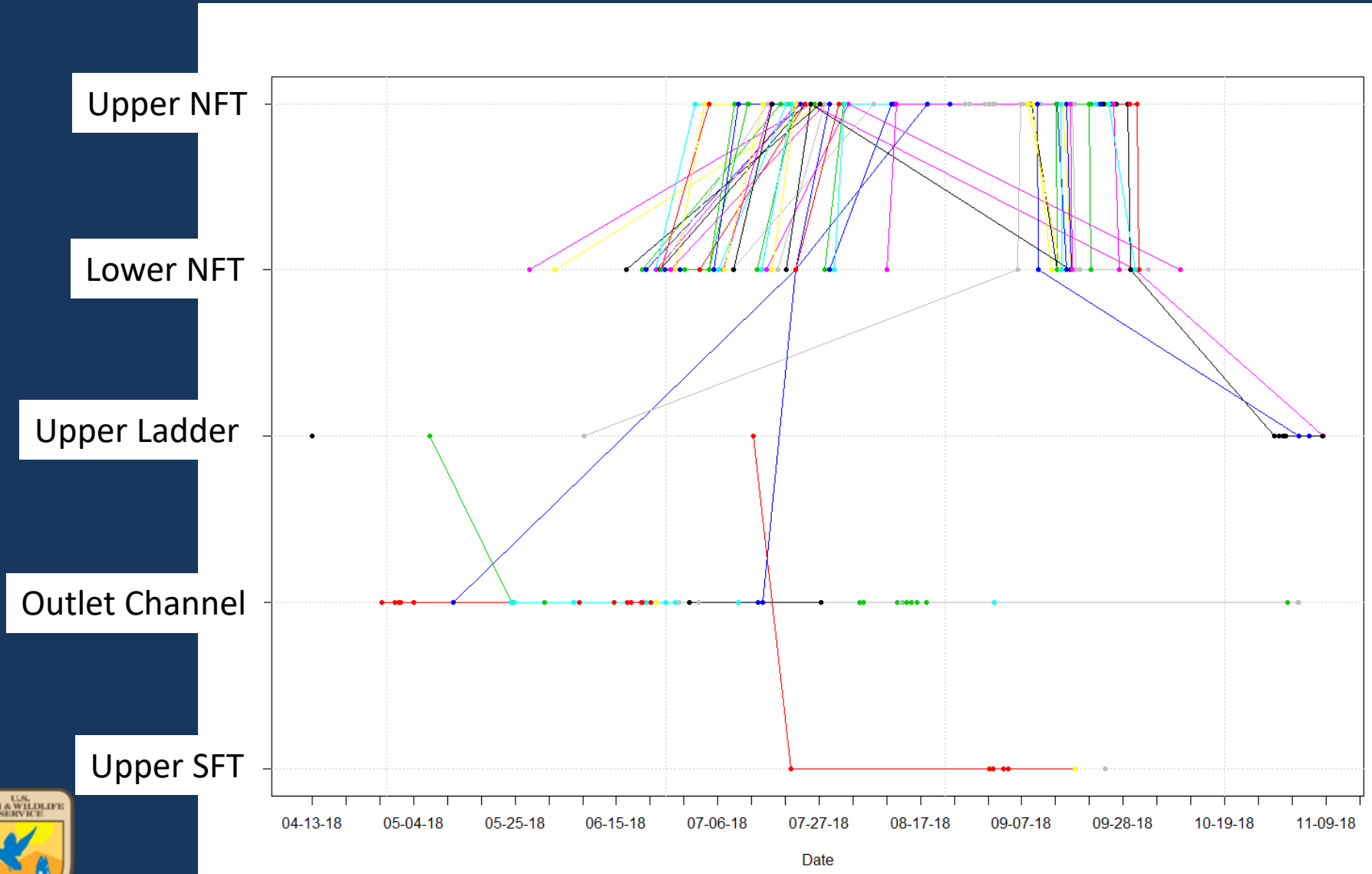


Movement patterns

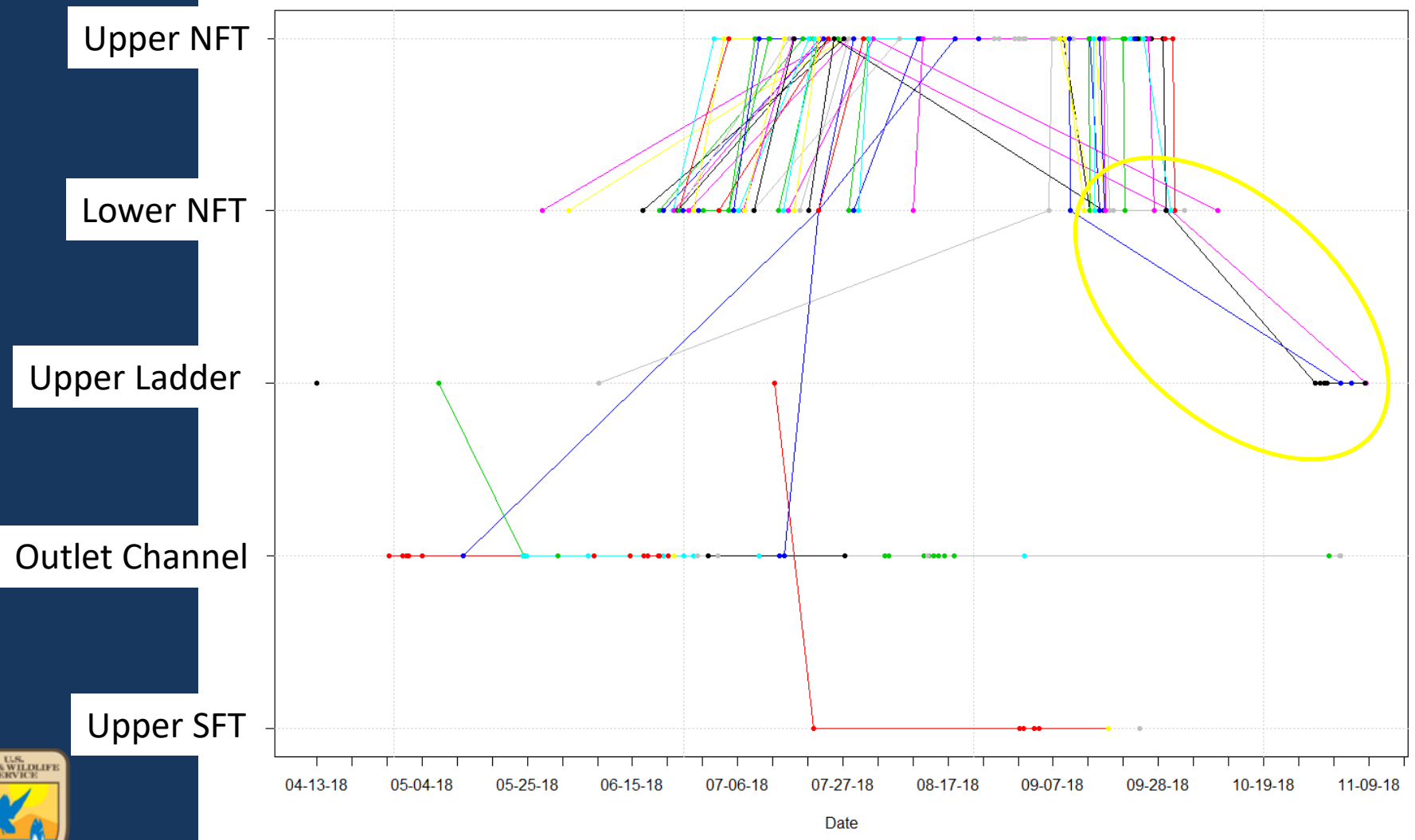




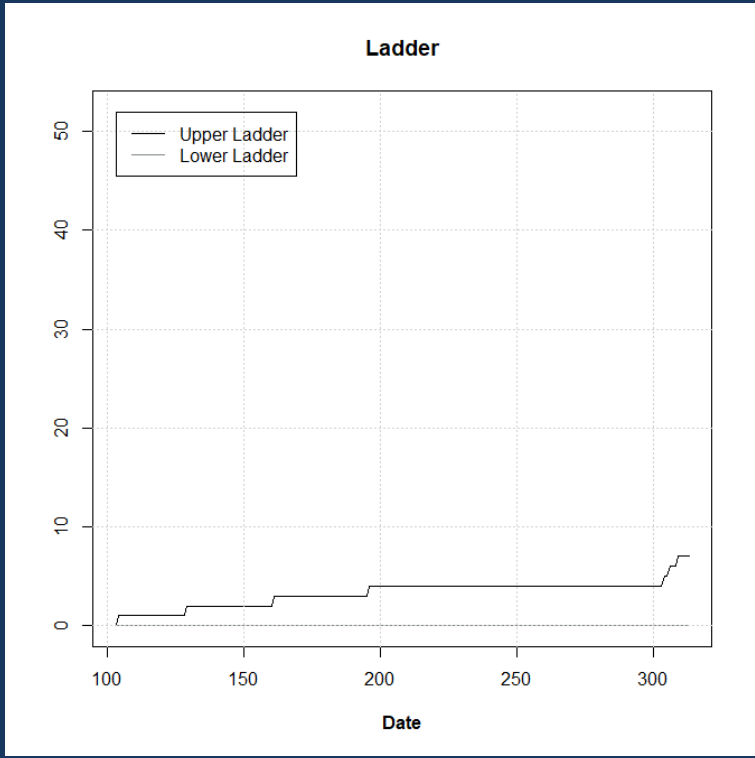
Movement Patterns 2018

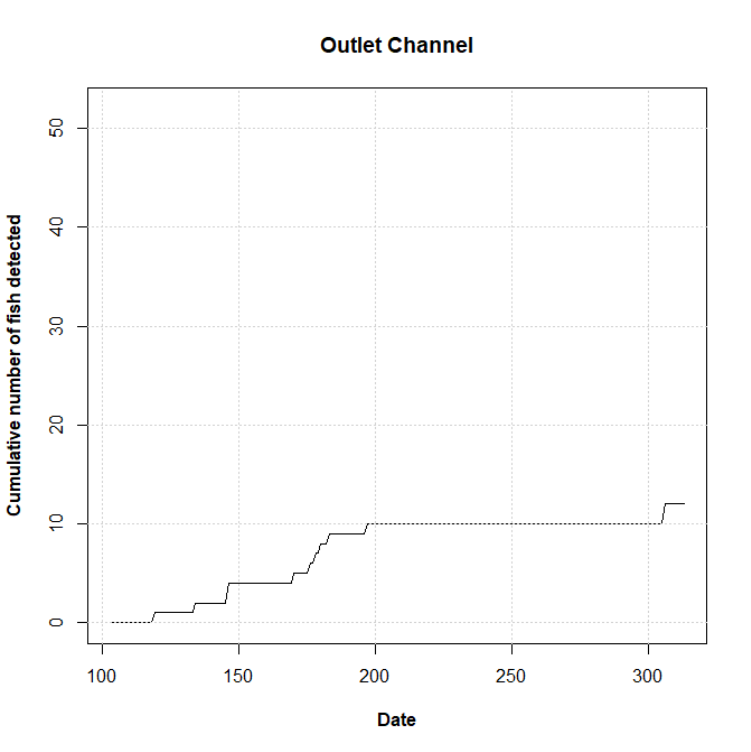


Movement Patterns 2018

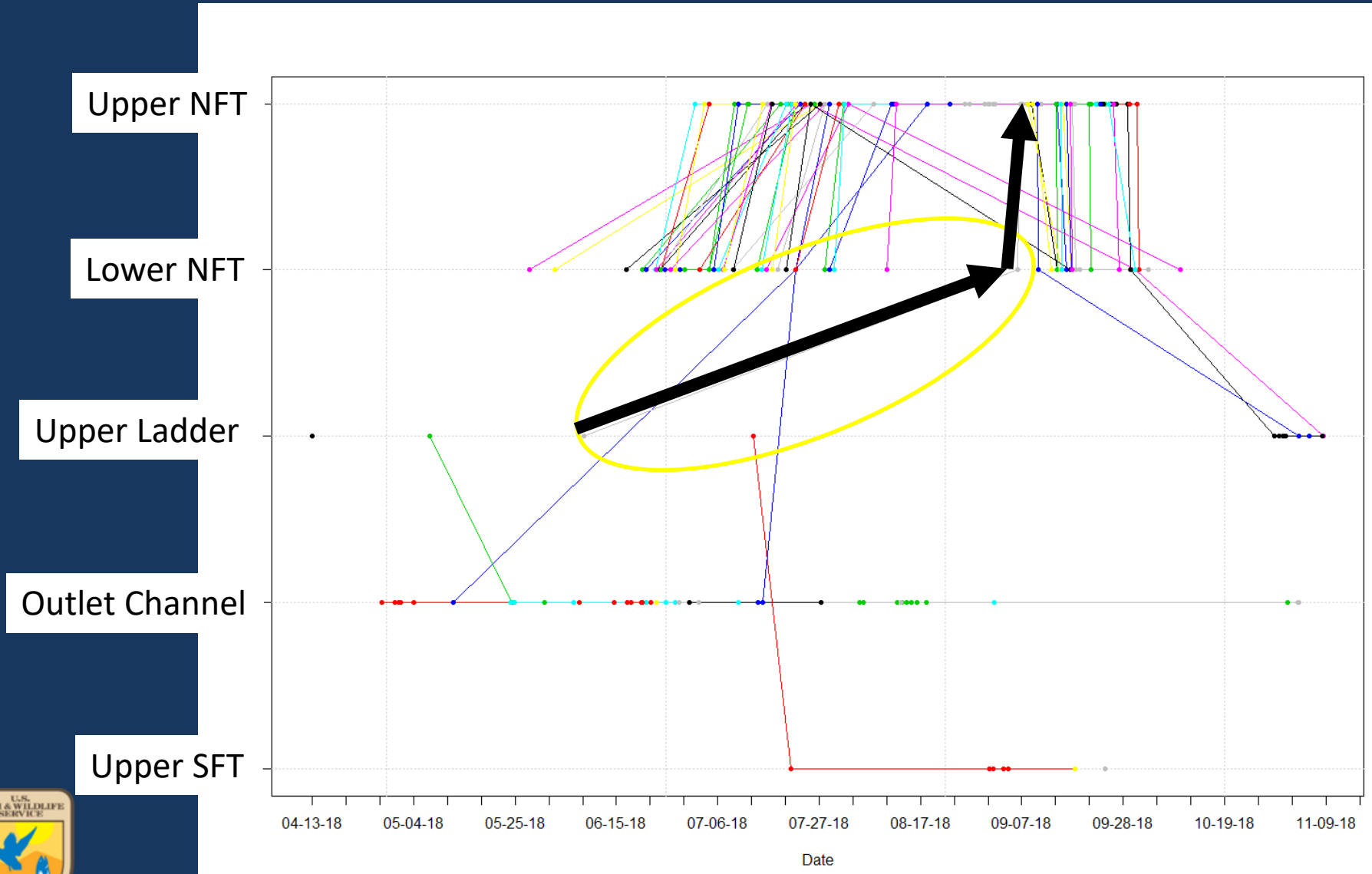


Below Dam


Ladder
Upper Ladder
Lower Ladder
0
10
20
30
40
50
100
150
200
250
300
Date

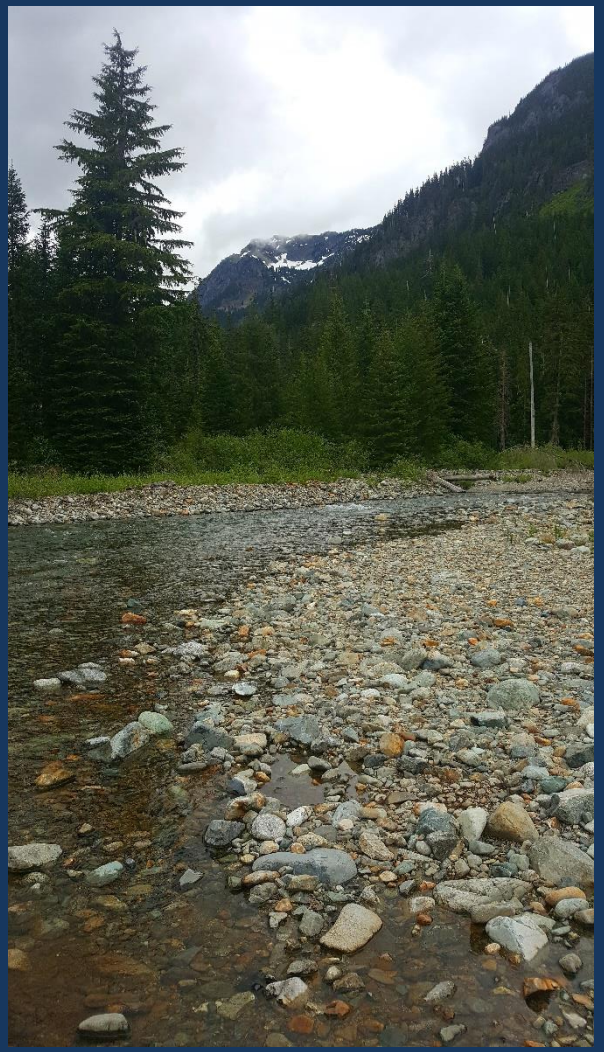

Outlet Channel
Cumulative number of fish detected
0
10
20
30
40
50
100
150
200
250
300
Date

Movement Patterns 2018



2019 and beyond

- 8 fish so far
  - 1 recap + 6 new NFT fish
  - 1 Indian Creek fish
- Effective population size estimates
- Redd survey in the NFT
- Antennas
  - Indian Creek
  - Lower South Fork Tieton
- Trap and haul at other dams + monitoring
  - Kachess
  - Keechelus
  - Bumping

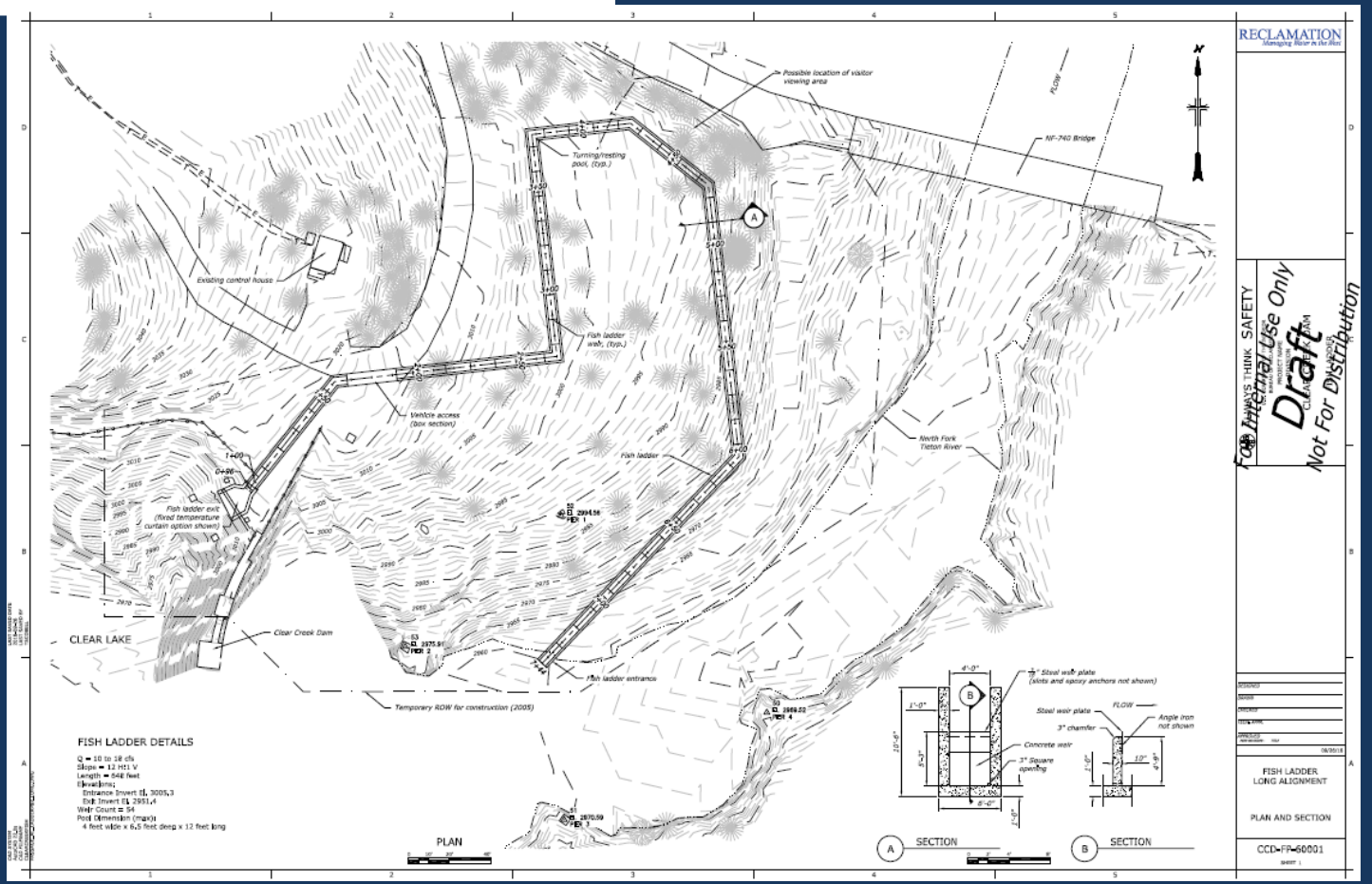


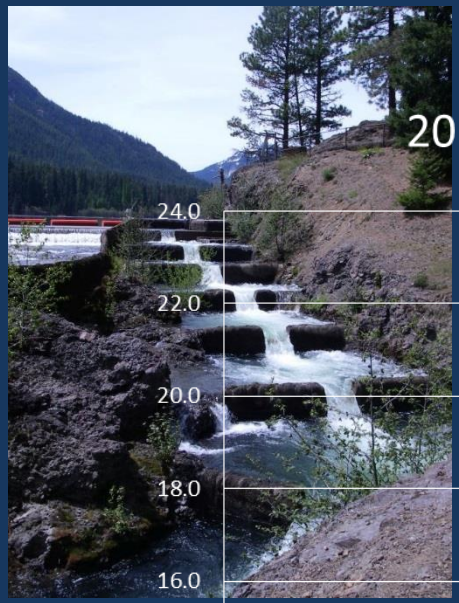
- Technical team of local agencies: WDFW, YN, USFWS, Reclamation
- Reclamation-Denver supplied civil engineer to review and update 2005 design report-completed October 2018
- Technical Team met in fall of 2018 to review appraisal level design
- Preliminary cost estimate $5.5-7.5 million

CLEAR CREEK DAM FISHWAY DESIGN

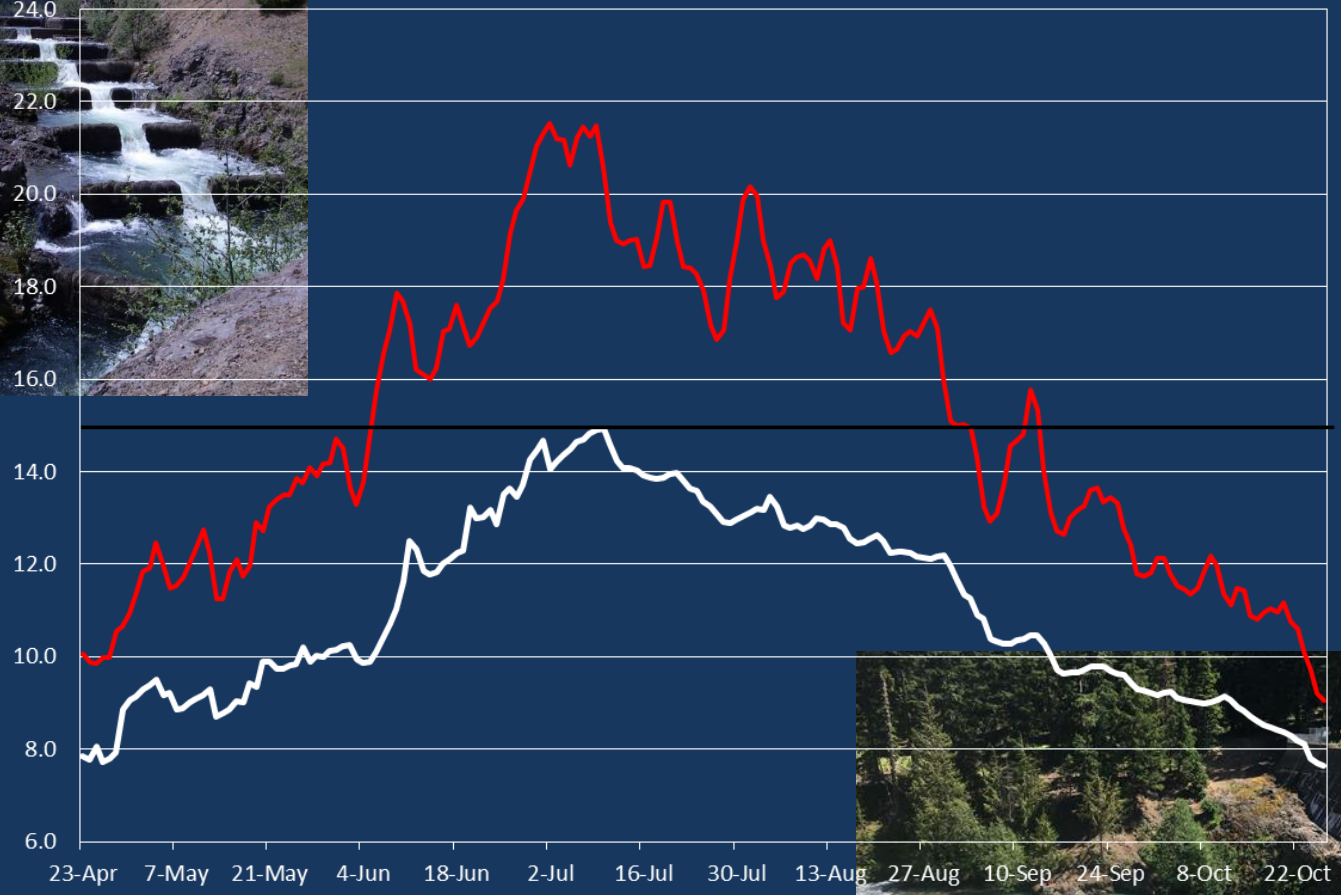
Table 2 – Fish Ladder Passage Criteria

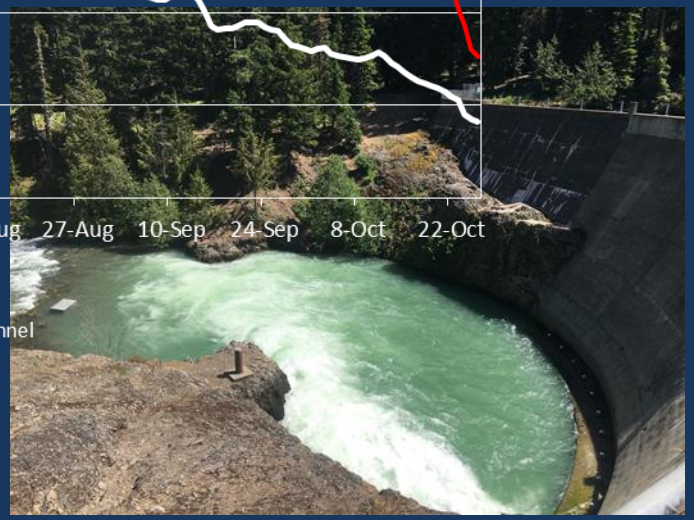
CRITERIA	VALUE
Design Flow Conditions	5% and 95% Exceedance
Pool to Pool Hydraulic Drop	12 inches
Pool Energy Dissipation Factor (EDF)	4 ft-lb/sec/ft^3
Pool Minimum Depth	4 ft
Weir Minimum Depth	6 inches (1-foot preferred)
Maximum Ladder Slope	10%
Minimum Pool Length	10 ft
Design Ladder Flow	10 ft^3/s (min) to 18 ft^3/s (max)
Passage Season	mid-June to mid-October

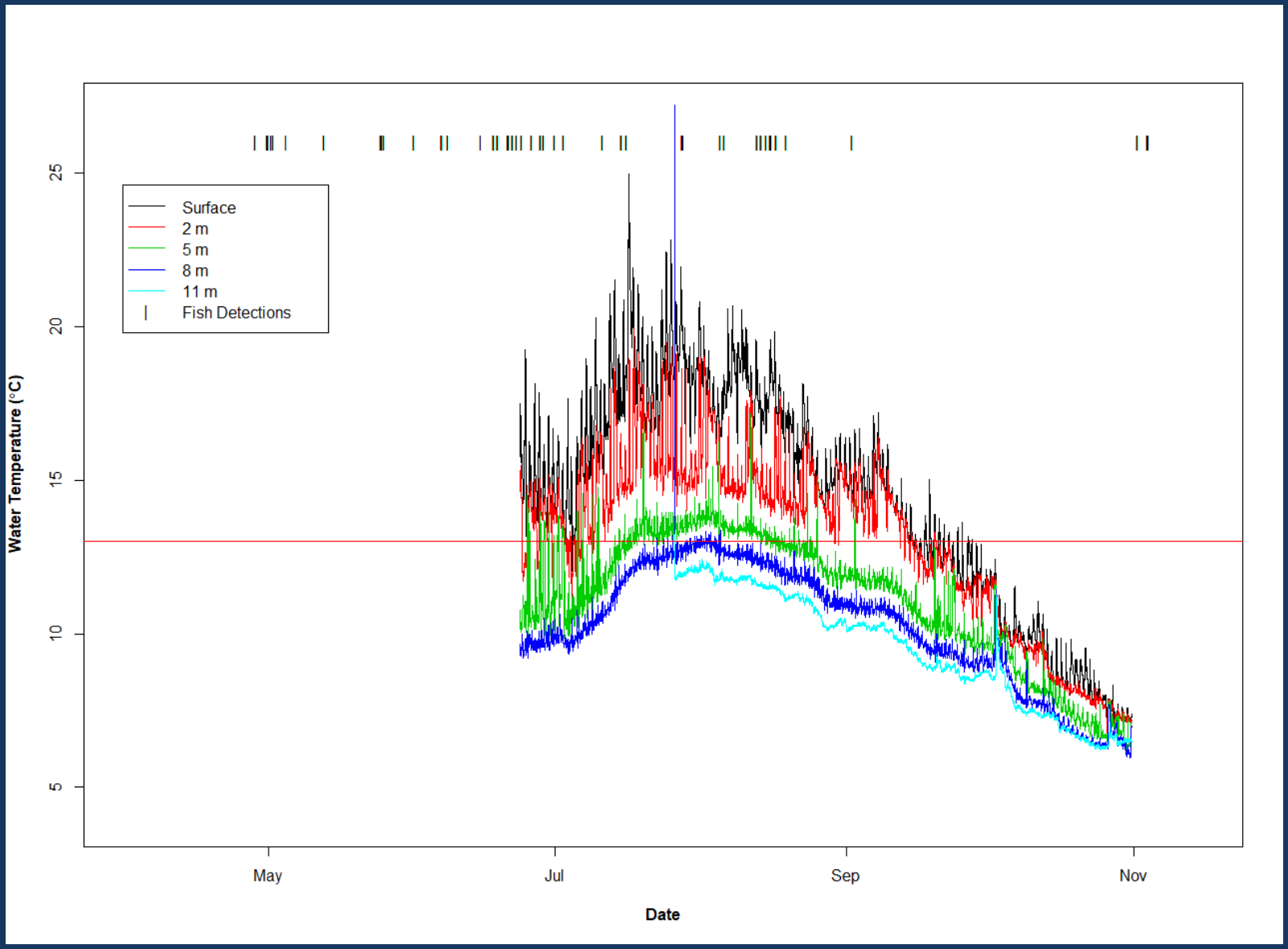


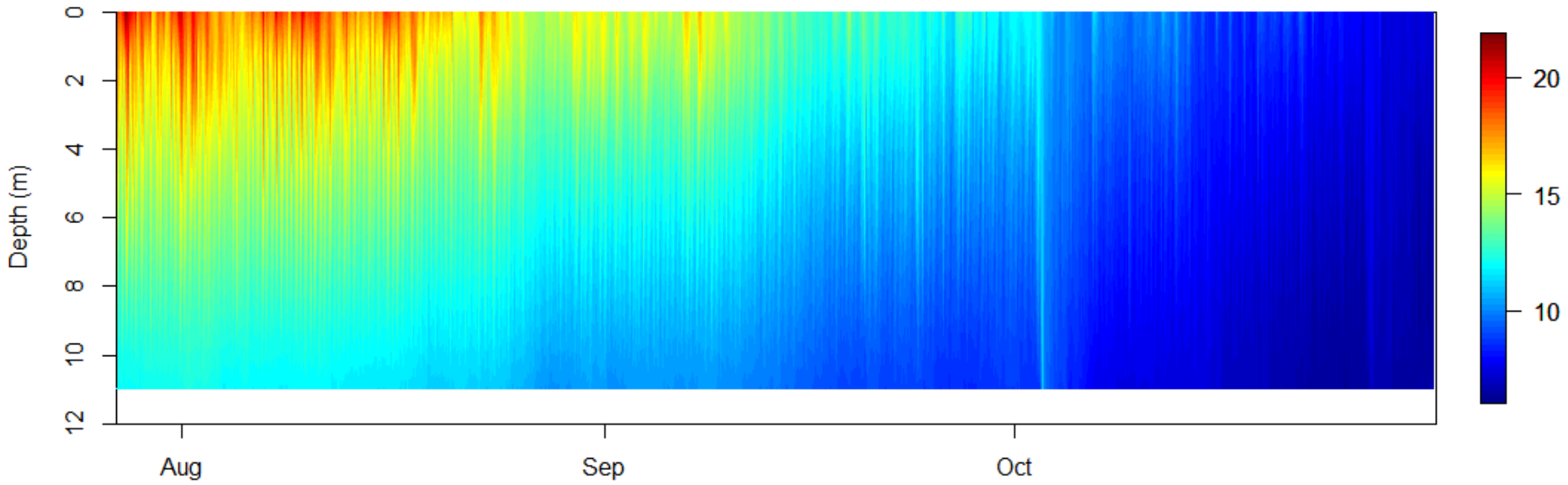


2015 mean daily water temperatures (°C)

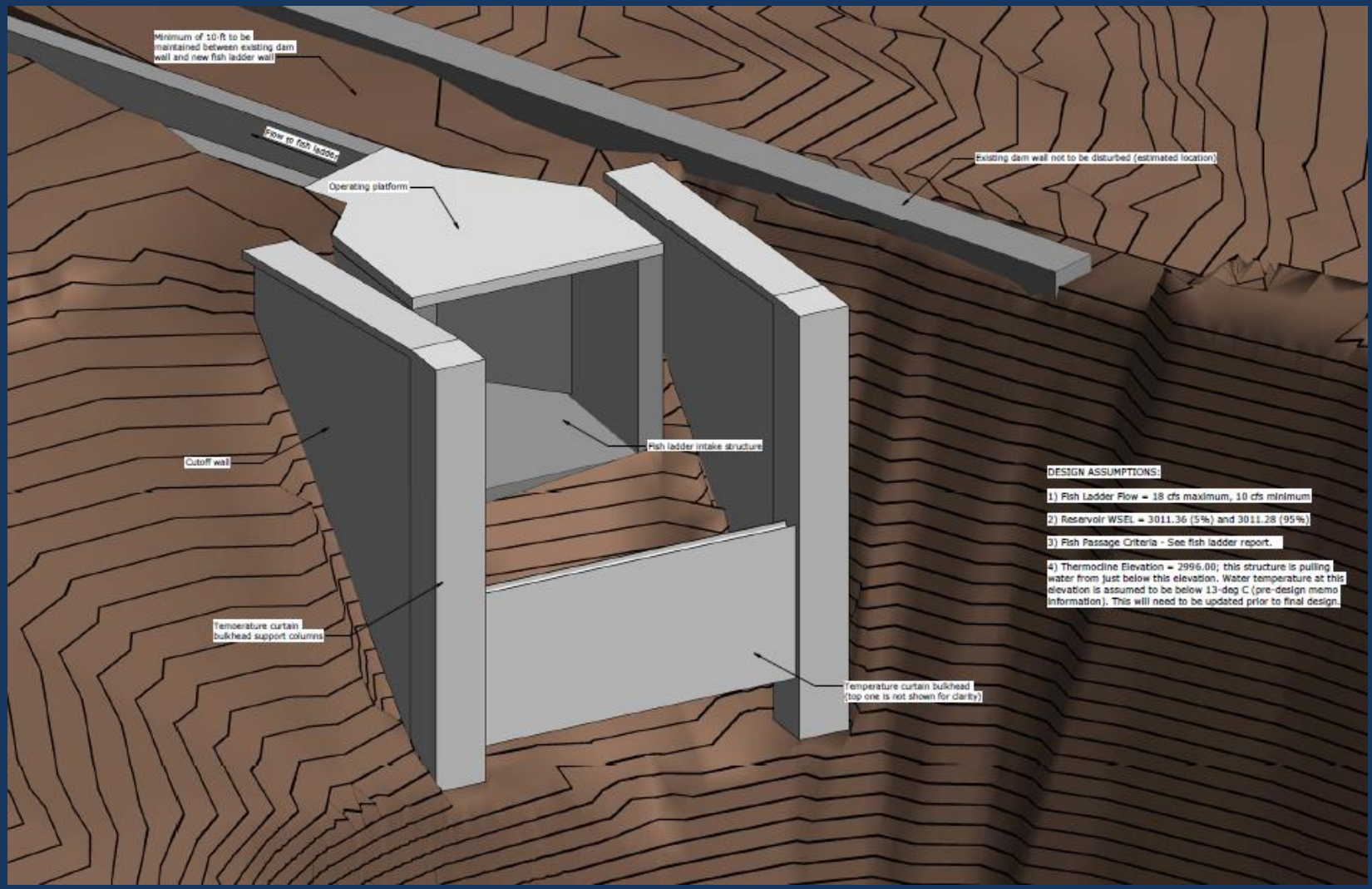





Surface
2 m
5 m
8 m
11 m
Fish Detections
Water Temperature (°C)
5
10
15
20
25
May
Jul
Sep
Nov
Date


Depth (m)
0
2
4
6
8
10
12
Aug
Sep
Oct
20
15
10

Cool Water Intake Structure—needs to be deeper



Thank you, questions?

This work is funded by BOR