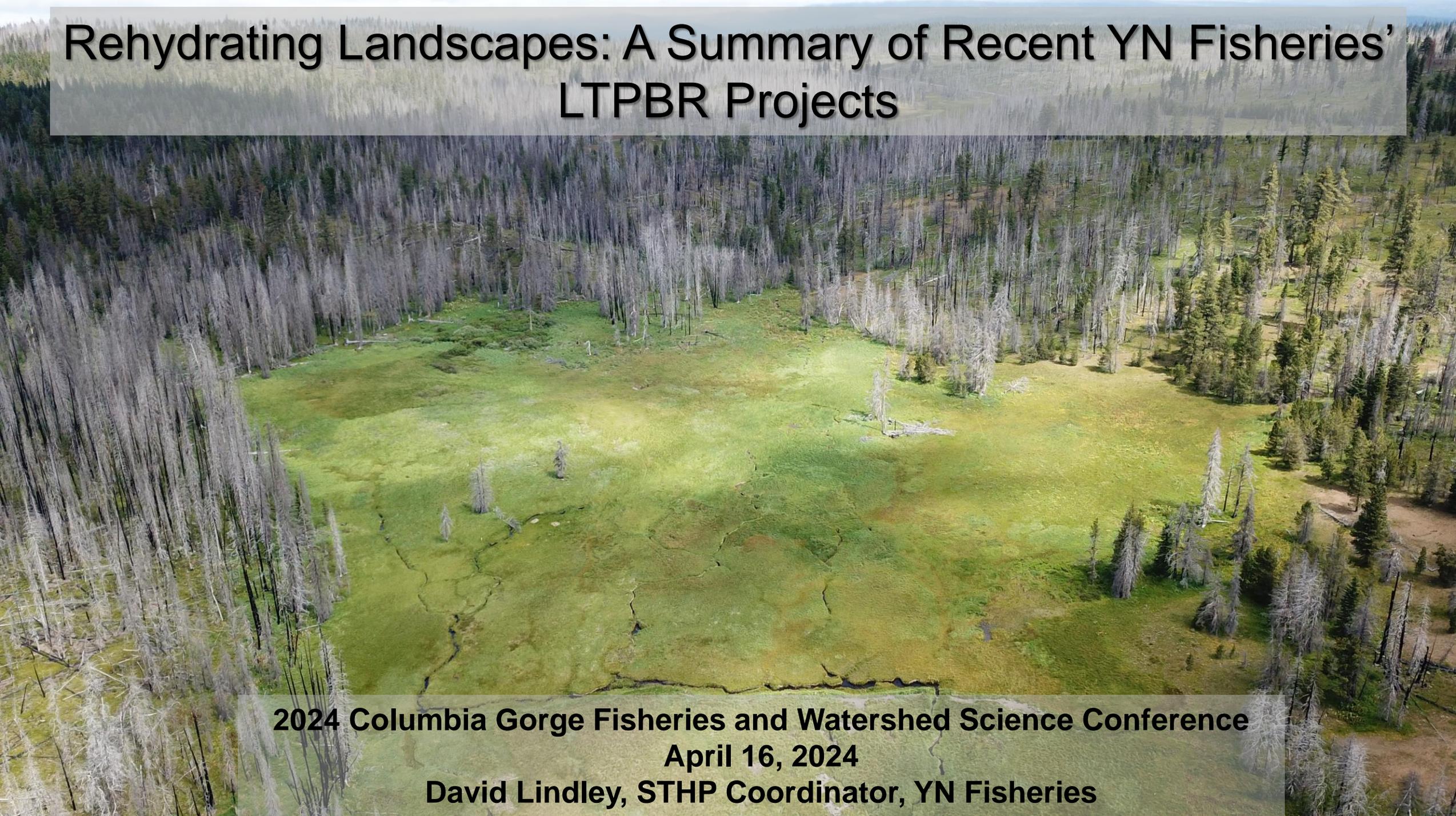
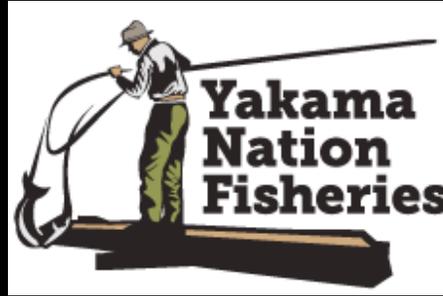


Rehydrating Landscapes: A Summary of Recent YN Fisheries' LTPBR Projects



**2024 Columbia Gorge Fisheries and Watershed Science Conference
April 16, 2024
David Lindley, STHP Coordinator, YN Fisheries**

Gratitude



Fahlenkamp and Calvert Families



Washington Department of
FISH & WILDLIFE



Gratitude



Water

“The environmental scientists tell us that if you restore the original water flow, everything will follow from that: the health of the fish, the bird life, and the plant life. When I heard that I thought to myself that is the lesson we learned as children from the elders. Each traditional meal begins with the respectful pouring out of water, then the men bring the salmon, the women bring the berries . . . Everything comes from the water.”

—Emily Washines, Yakama Nation



OCTOBER 2022 STATISTICS



RECORD warmest; +6.4°F

40th driest; -1.38", 67% of normal

Climate

The Columbian

Clark County, WA • Locally Owned Since 1890

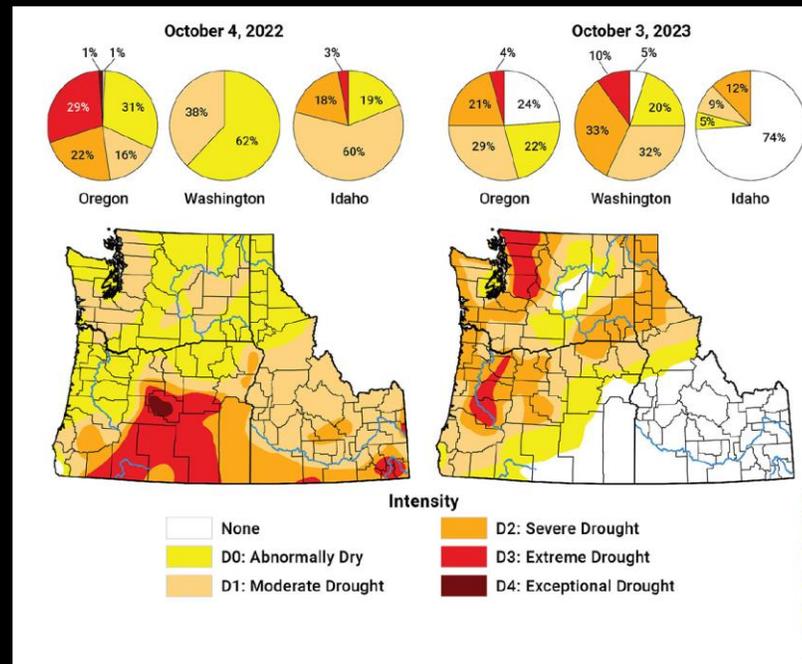
Forecasters expect Southwest Washington drought to continue

MAY 2023 STATISTICS

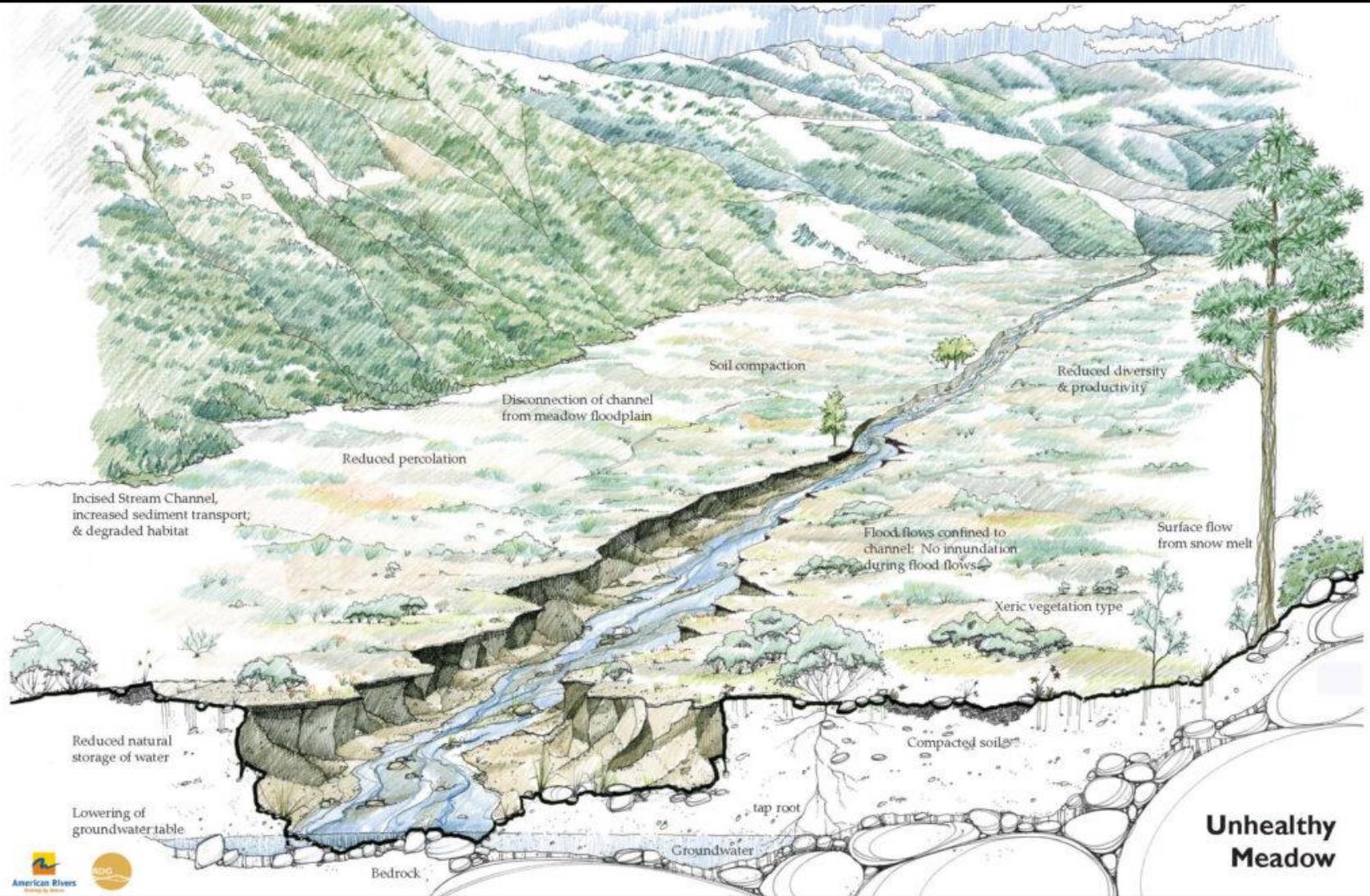


RECORD warmest (tied with 1958); +5.3°F

15th driest; -1.21", 51% of normal

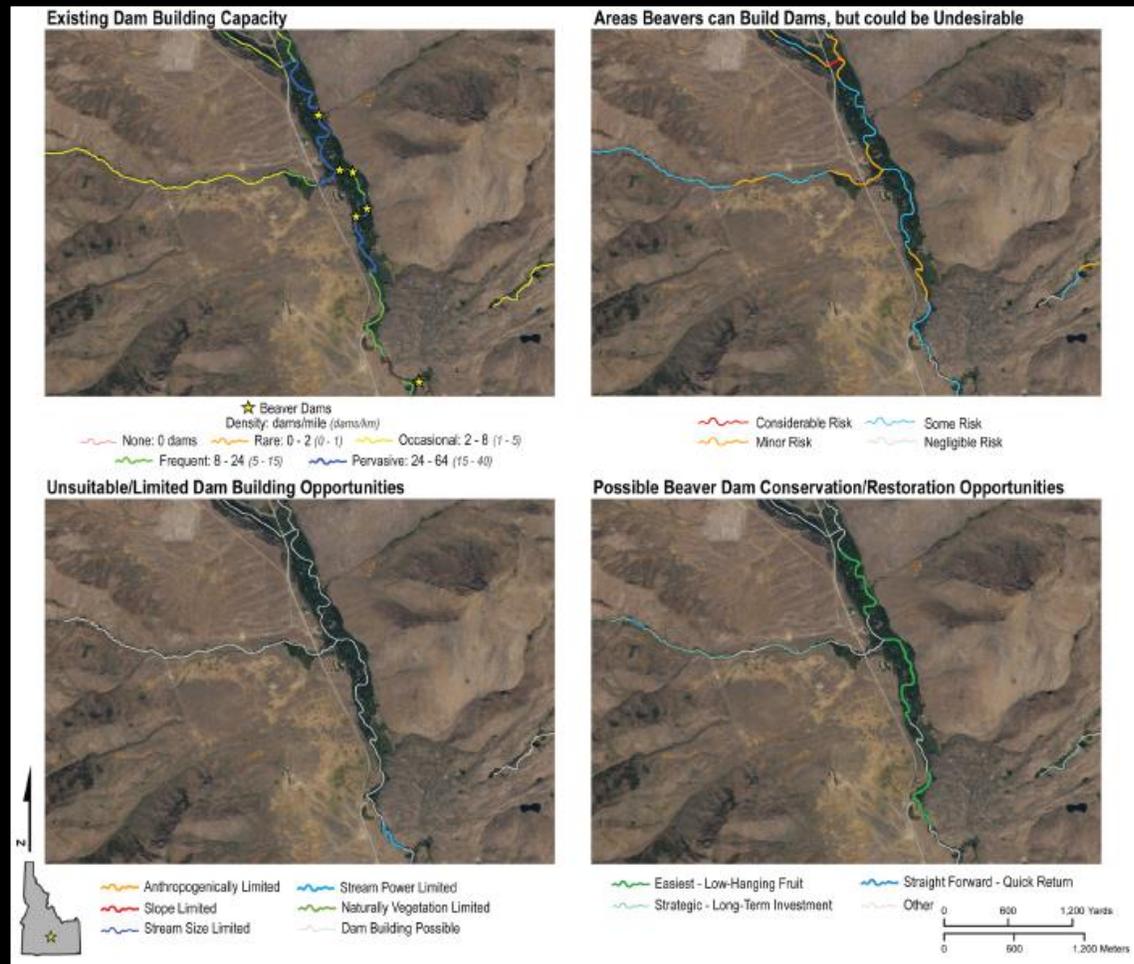
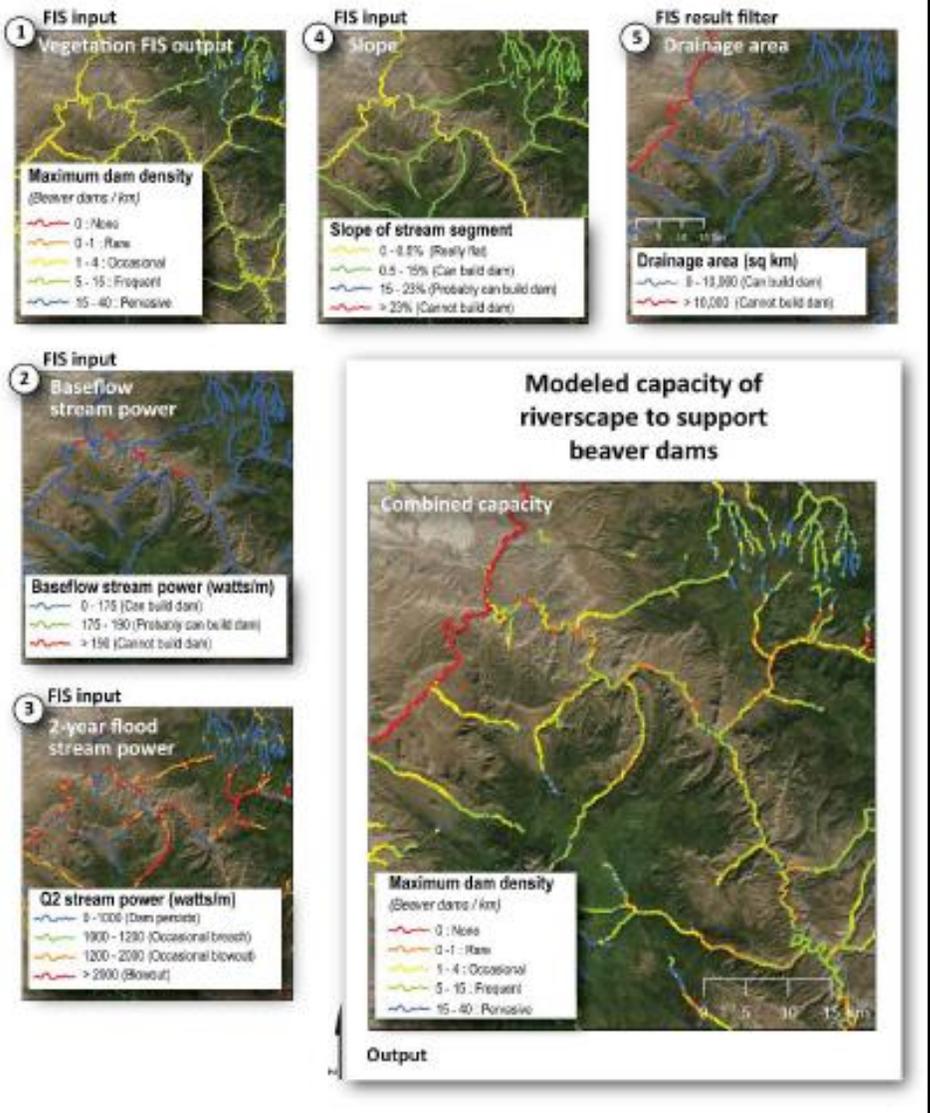


Current Conditions

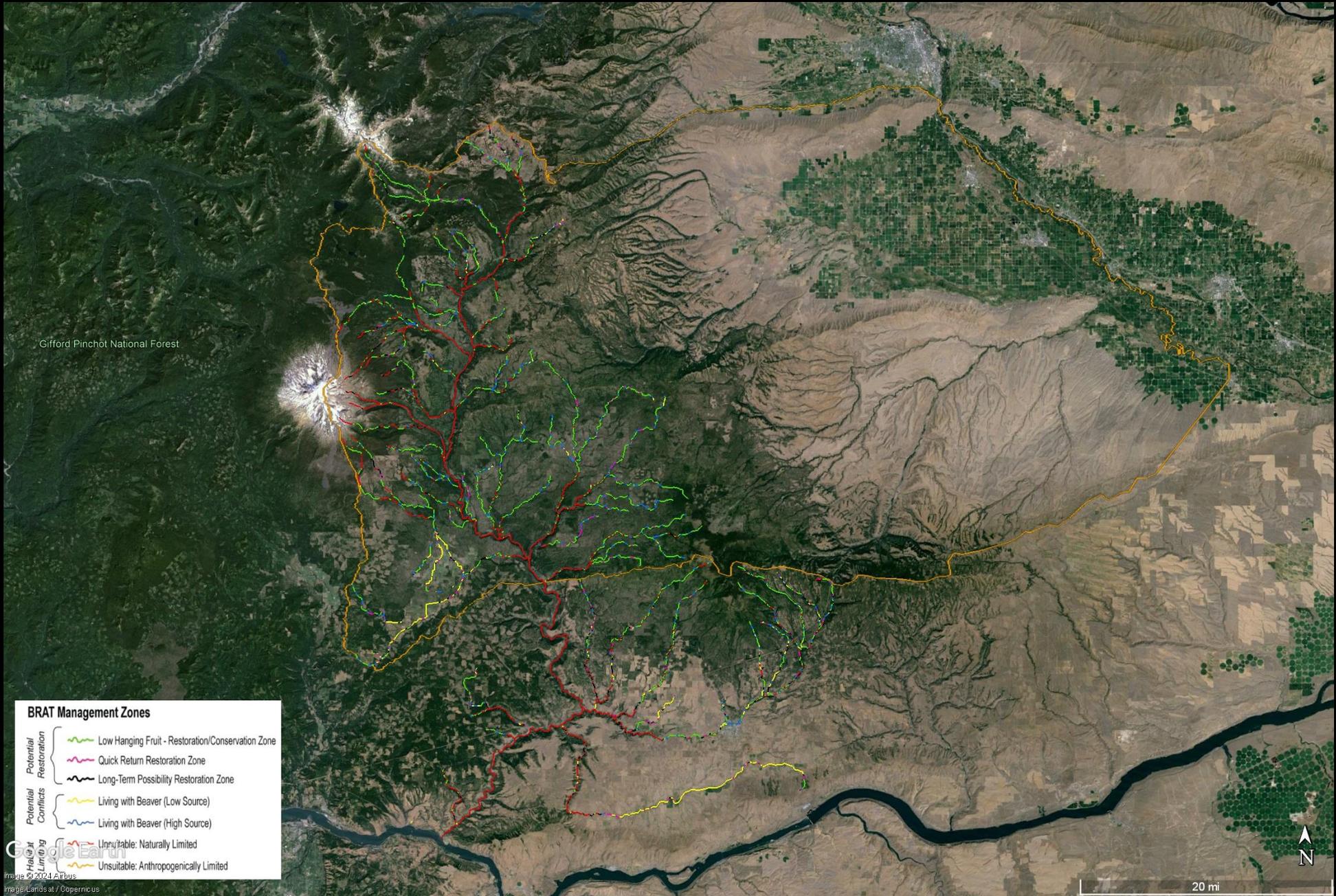


BRAT Modeling

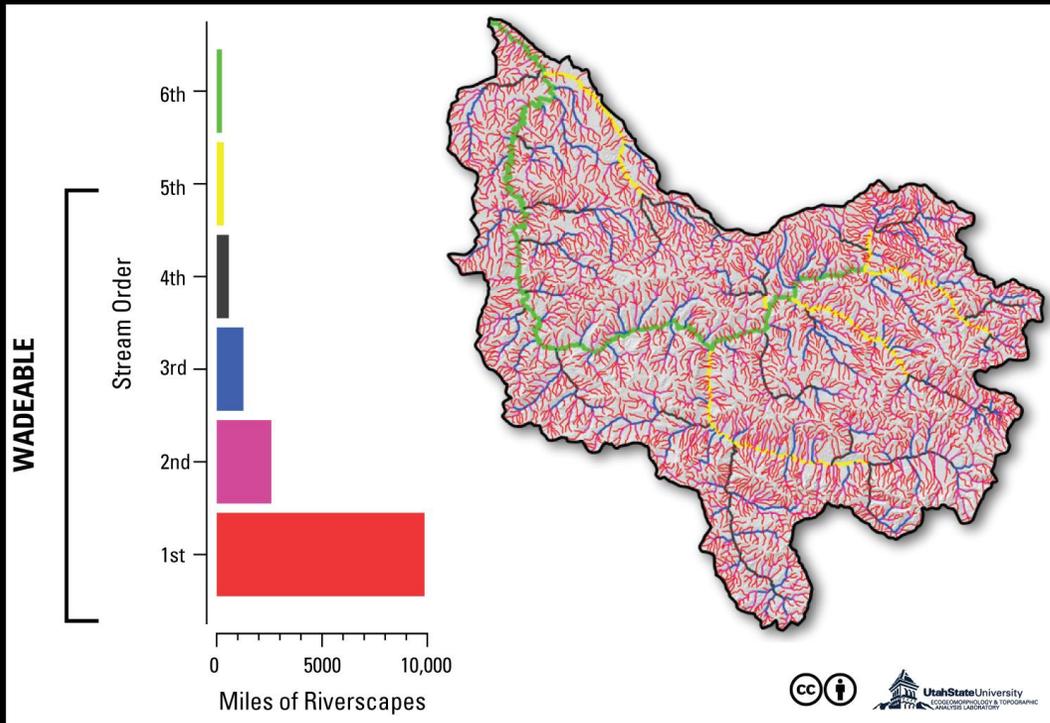
- Availability of water to support beaver ponds
- Availability/extent of woody building materials
- Ability of beaver to build dams at baseflow
- Likelihood of dams to withstand high flows
- Likelihood that a stream is small enough to dam



BRAT Modeling – Klickitat Watershed



Low-Tech Process-Based Restoration



In the American West alone, it is estimated that conservatively between 50,000 to 100,000 miles of perennially flowing riverscapes are degraded. (USEPA, 2016)

HANDBOOK

of

EROSION CONTROL IN MOUNTAIN MEADOWS

by

Charles J. Kraebel, Senior Silviculturist

and

Arthur F. Pillsbury, Assistant Conservationist

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
California Forest and Range Experiment Station
E. I. Kotok, Director
331 Giannini Hall, Berkeley, California

April 1934

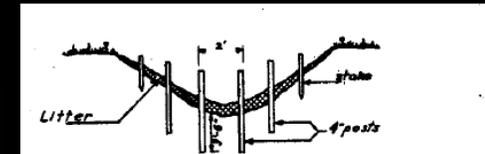


Figure 21
Elevation of gully after banks have been dug back. The posts have been set, and the layer of litter has been placed.

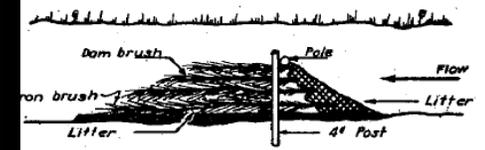


Figure 22
Side section of completed dam. Note that the longer brush is on the bottom to form an apron.

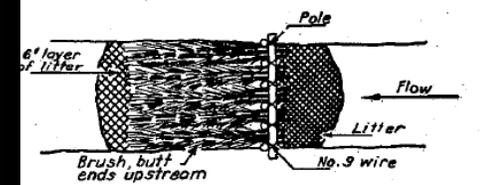


Figure 23
Plan of completed dam. Note that the brush is carefully piled and tramped, with the butt ends laid upstream between the posts.

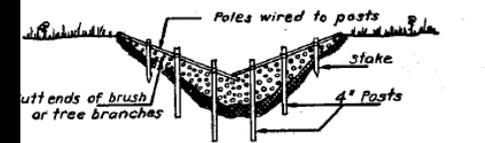


Figure 24
Elevation of dam, looking downstream, complete except for litter against upstream face.

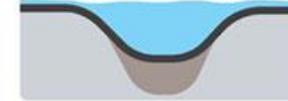
Homogeneous => Heterogeneous



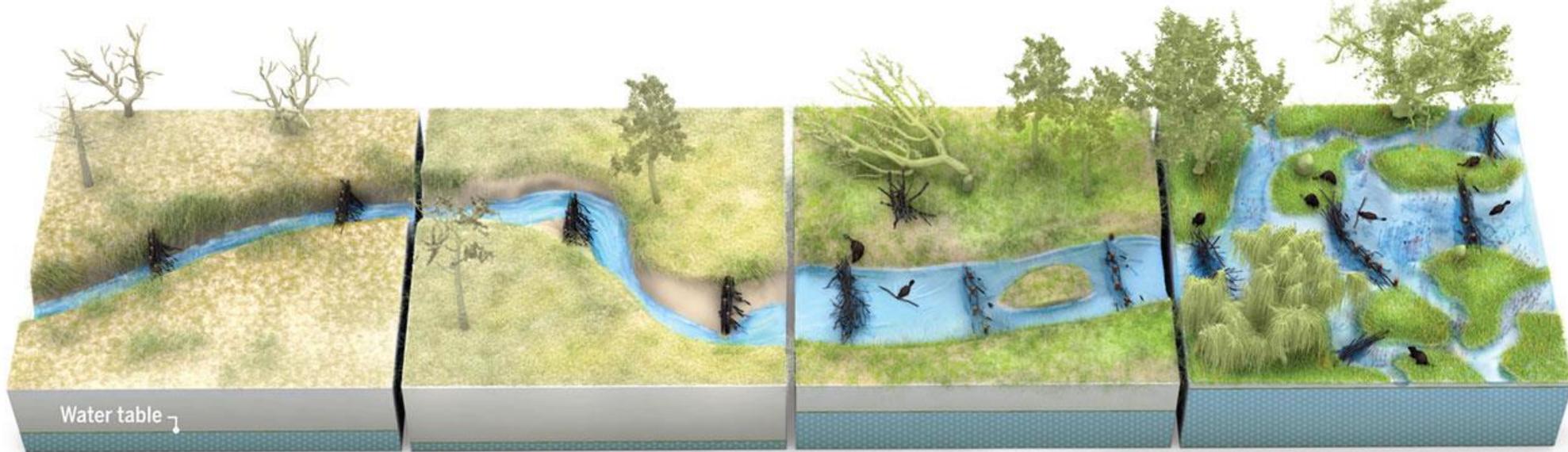
Incised stream

A stream comes back to life

Across the U.S. West, scientists and land managers are using beaver dam analogs (BDAs) to heal damaged streams, re-establish beaver populations, and aid wildlife. In some cases, researchers have seen positive changes in just 1 to 3 years.



Restored stream



Adding dams

Beaver trapping and overgrazing have caused countless creeks to cut deep trenches and water tables to drop, drying floodplains. Installing BDAs can help.

Widening the trench

BDAs divert flows, causing streams to cut into banks, widening the incised channel, and creating a supply of sediment that helps raise the stream bed.

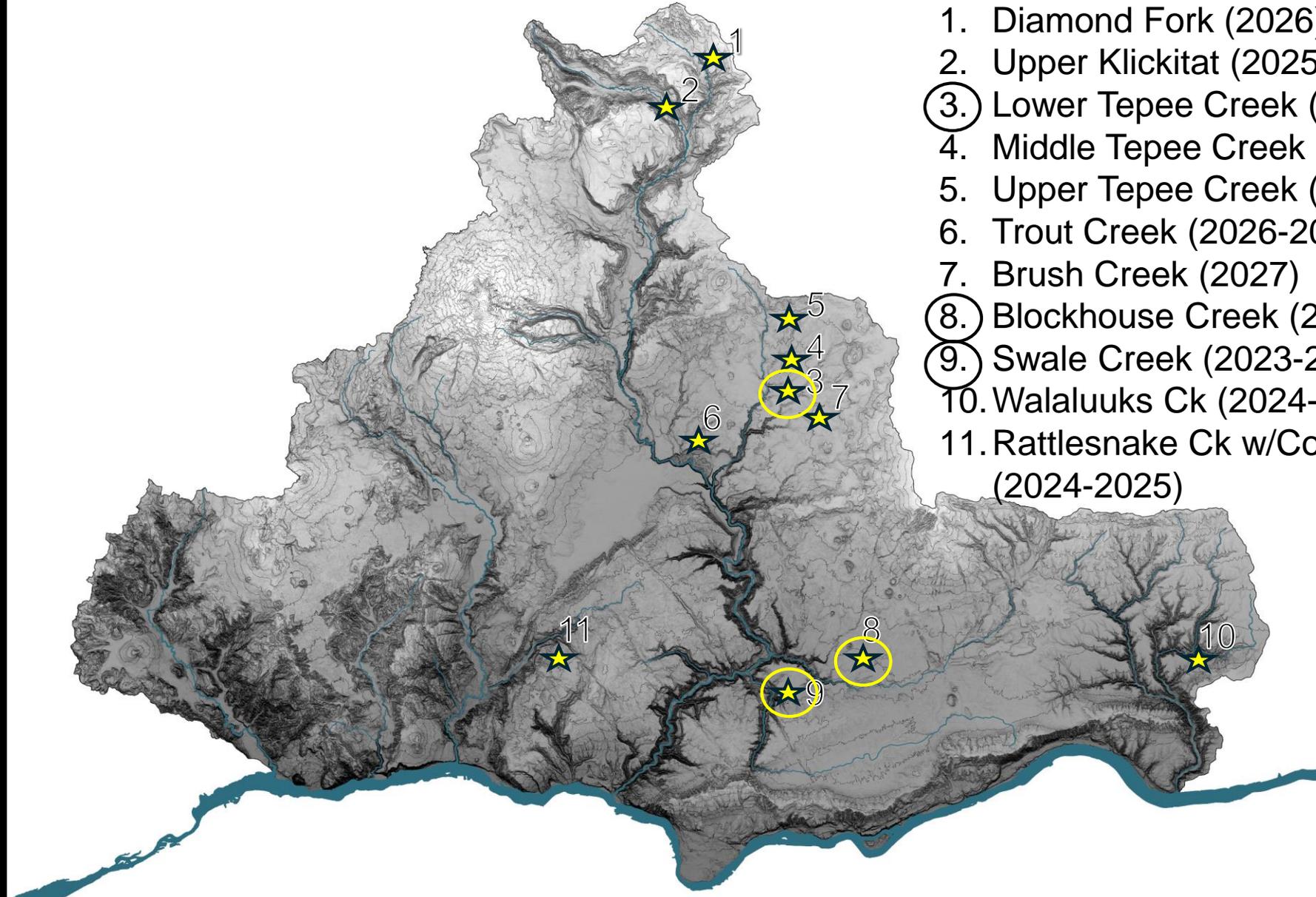
Beavers return

As BDAs trap sediment, the stream bed rebuilds and forces water onto the floodplain, recharging groundwater. Slower flows allow beavers to recolonize.

A complex haven

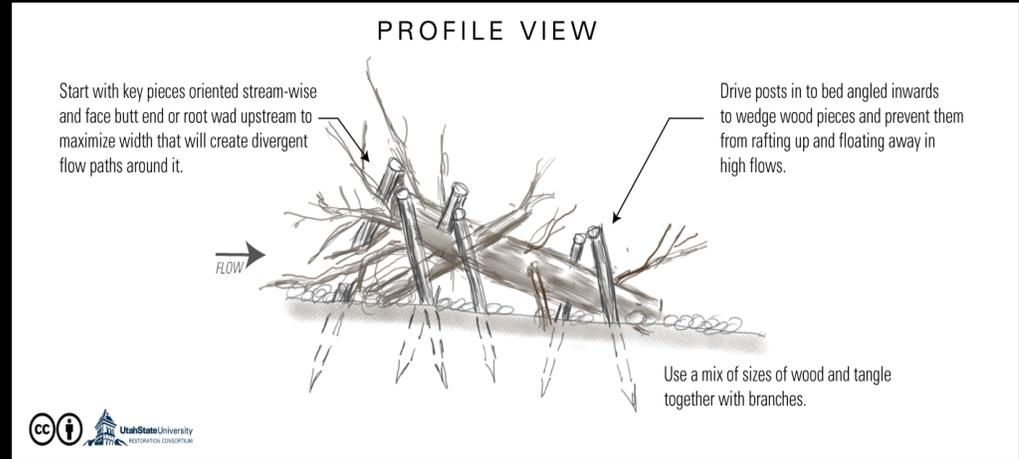
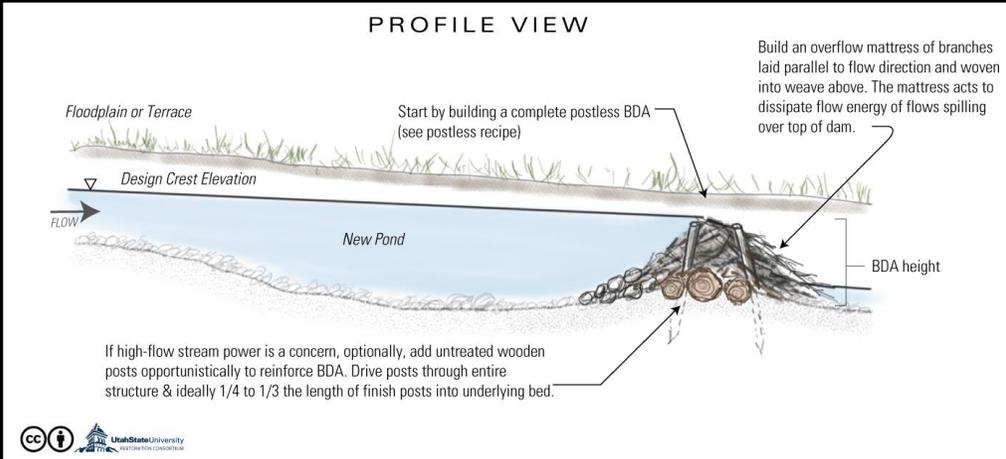
Re-established beavers raise water tables, irrigate new stands of willow and alder, and create a maze of pools and side channels for fish and wildlife.

STHP LTPBR Project Sites

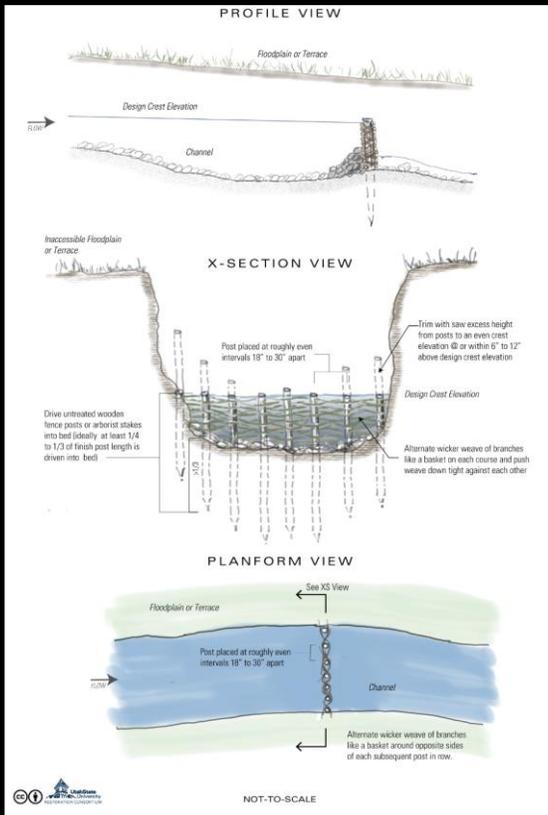


1. Diamond Fork (2026)
2. Upper Klickitat (2025)
3. Lower Tepee Creek (2022-2023)
4. Middle Tepee Creek (2024-2025)
5. Upper Tepee Creek (2026-2027)
6. Trout Creek (2026-2027)
7. Brush Creek (2027)
8. Blockhouse Creek (2023-2024)
9. Swale Creek (2023-2024)
10. Walaluuks Ck (2024-2025)
11. Rattlesnake Ck w/Columbia Land Trust (2024-2025)

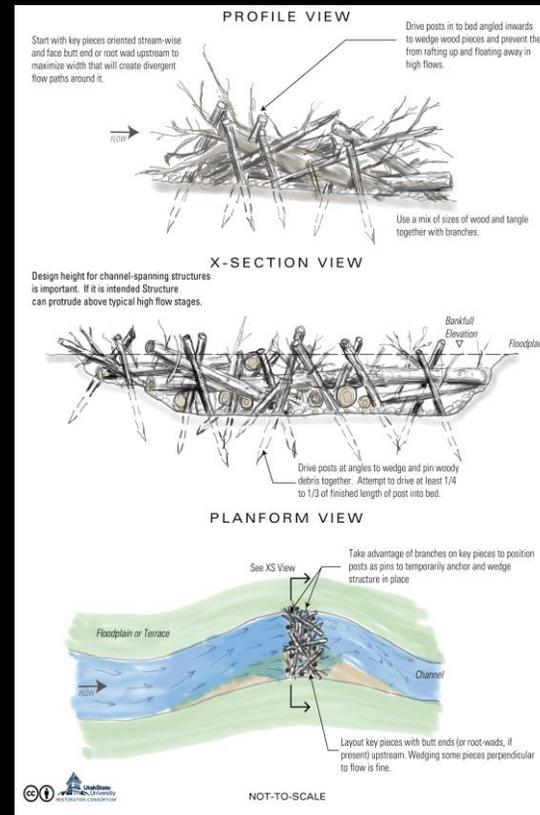
LTPBR Structures



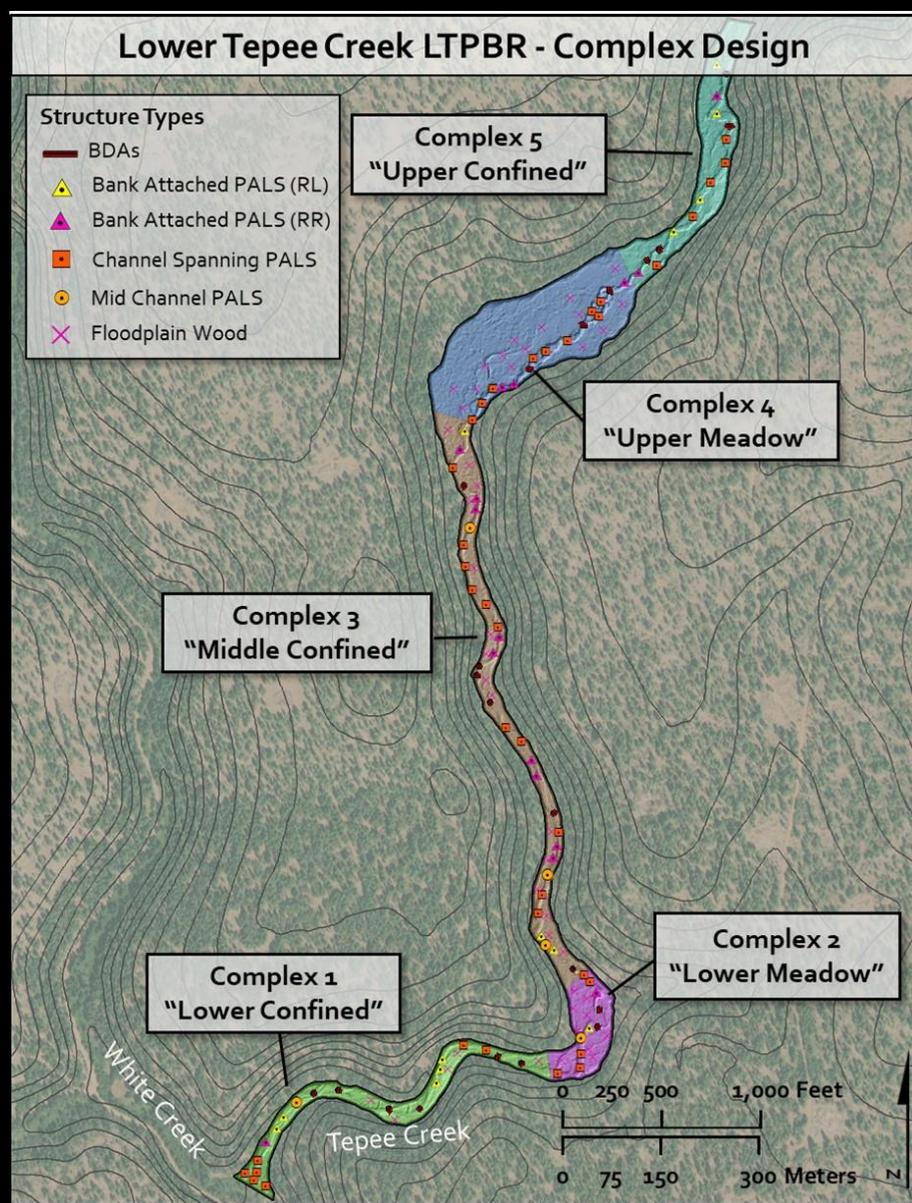
BDA



Channel-spanning PALS



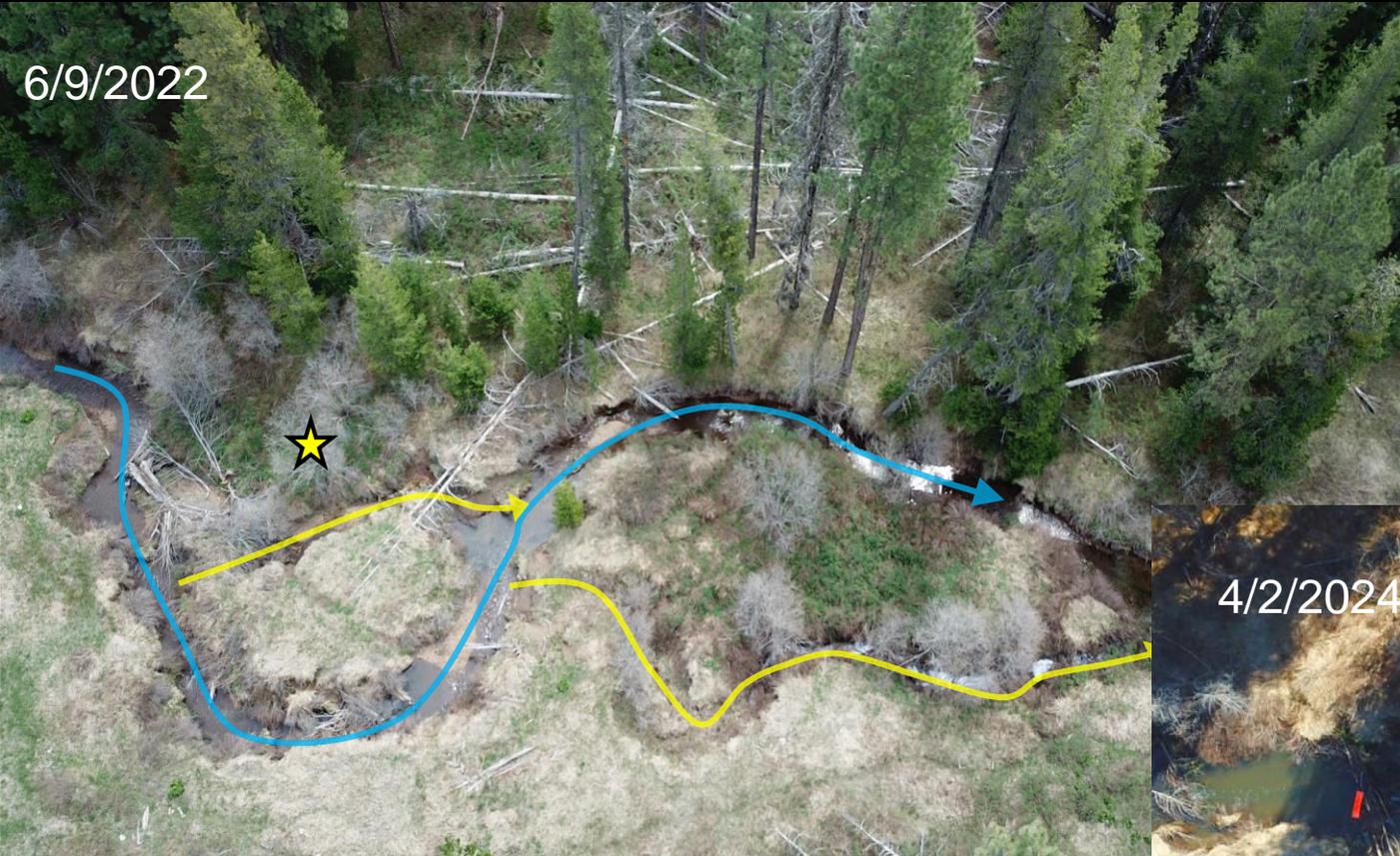
Tepee Creek



Objective	Description	Link to Restoration Goals
1	Increase the abundance of beaver dams and large wood accumulations.	Both artificial and natural beaver dams along with large wood accumulations (e.g., large wood jams) increase in-channel habitat diversity and help to accelerate recovery. An expanding beaver population is indicative of self-sustaining riverscape processes.
2	Increase in-channel geomorphic diversity.	<u>Geomorphically</u> diverse streams provide higher quality habitat for adult and juvenile steelhead.
3	Increase the proportion of the valley bottom composed of active channel and active floodplain.	Increased active channel and floodplain area contributes to the expansion of wetland and riparian vegetation and increasing steelhead habitat quantity.
4	Increase wetland and riparian vegetation extent, diversity, and abundance.	Riparian vegetation is essential to support wood accumulation, as forage and building material for beaver, and suitability for culturally significant plants.
5	Increase perennial surface flow extent during low flow periods.	Surface flow creates conditions that support woody riparian vegetation establishment, steelhead habitat quantity, and suggests efforts to attenuate flow are successful.

Tepee Creek

6/9/2022



4/2/2024



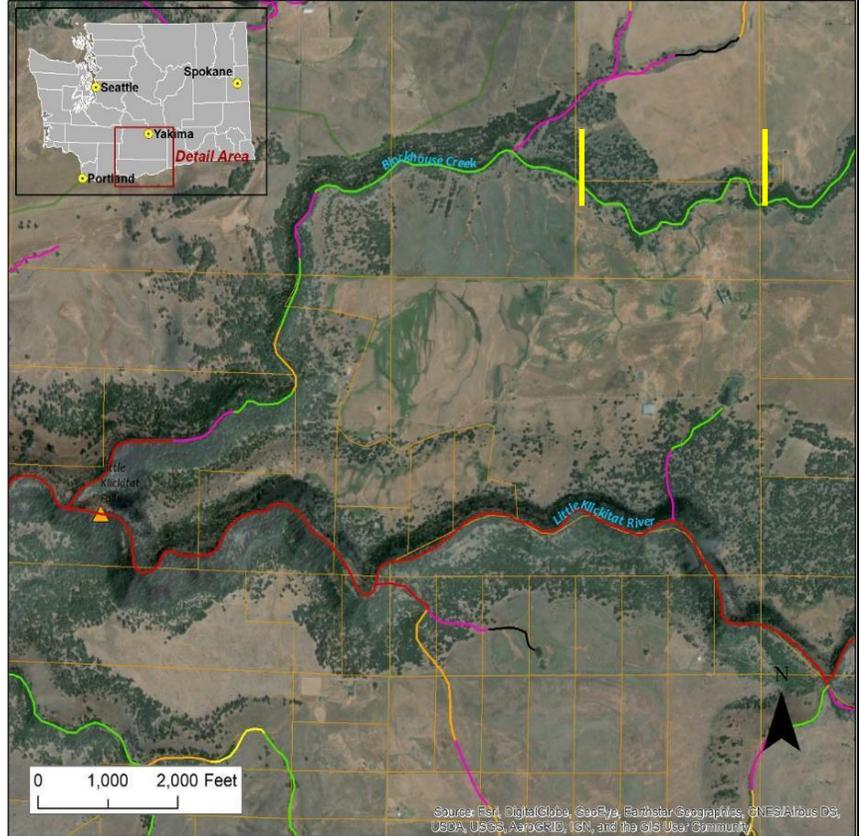
Tepee Creek



Tepee Creek



Blockhouse Creek



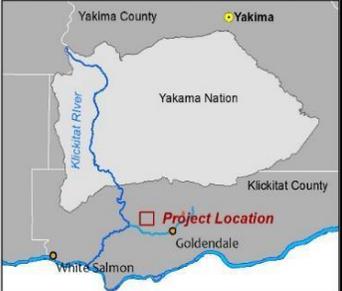
Blockhouse Creek Project Site

Beaver Suitability-Conservation and Restoration Model

- Living with Beaver (Low Source)
- Long Term Possibility Restoration Zone
- Low Hanging Fruit - Potential Restoration/Conservation Zone
- Quick Return Restoration Zone
- Unsuitable: Anthropogenically Limited
- Unsuitable: Naturally Limited

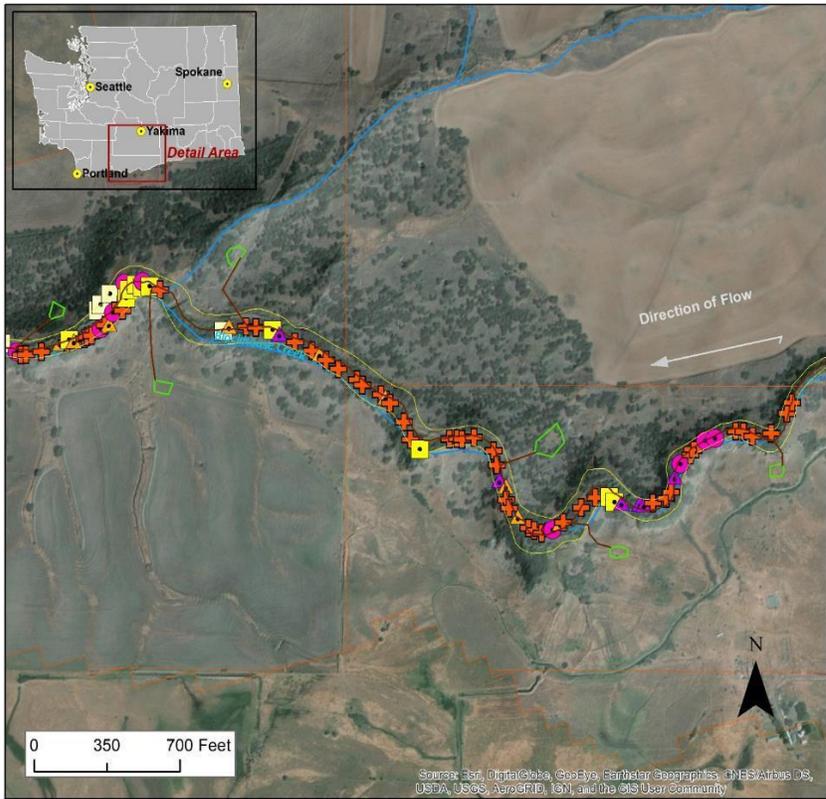
Streams

- Perennial Streams



Drawn by AG

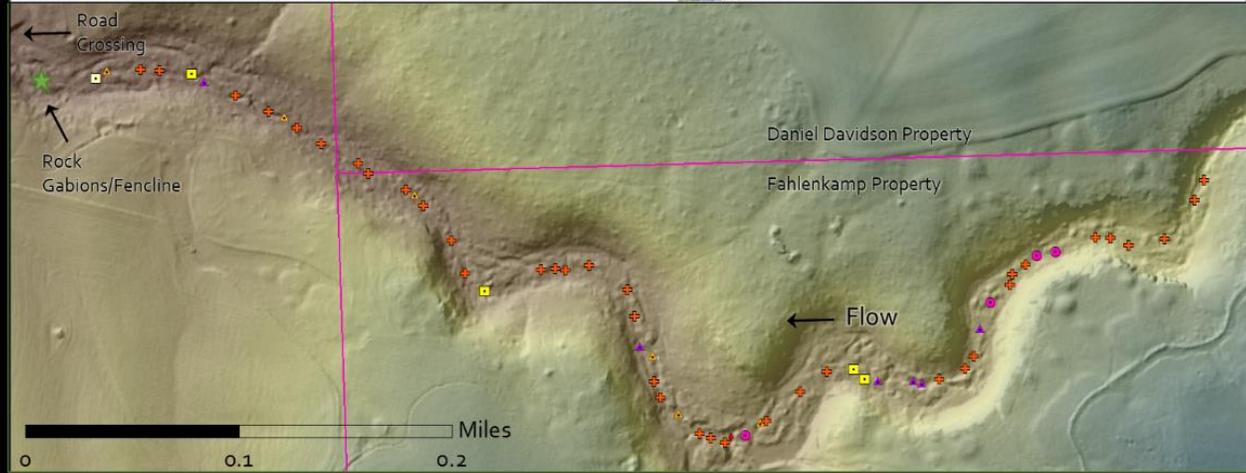
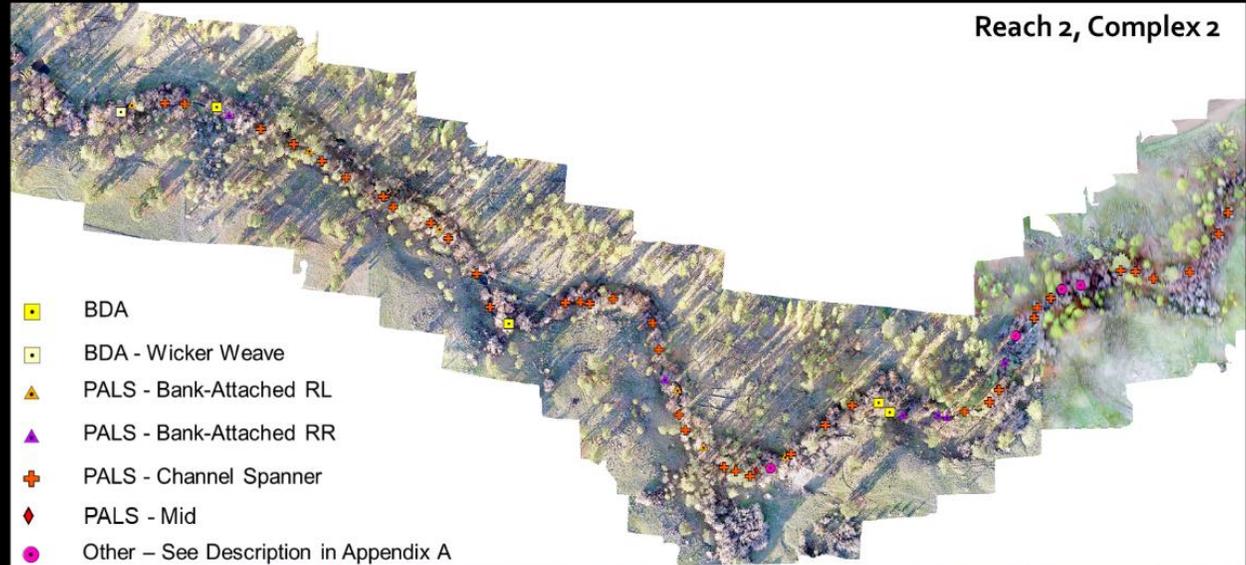
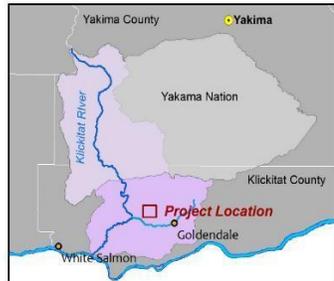
Blockhouse Creek



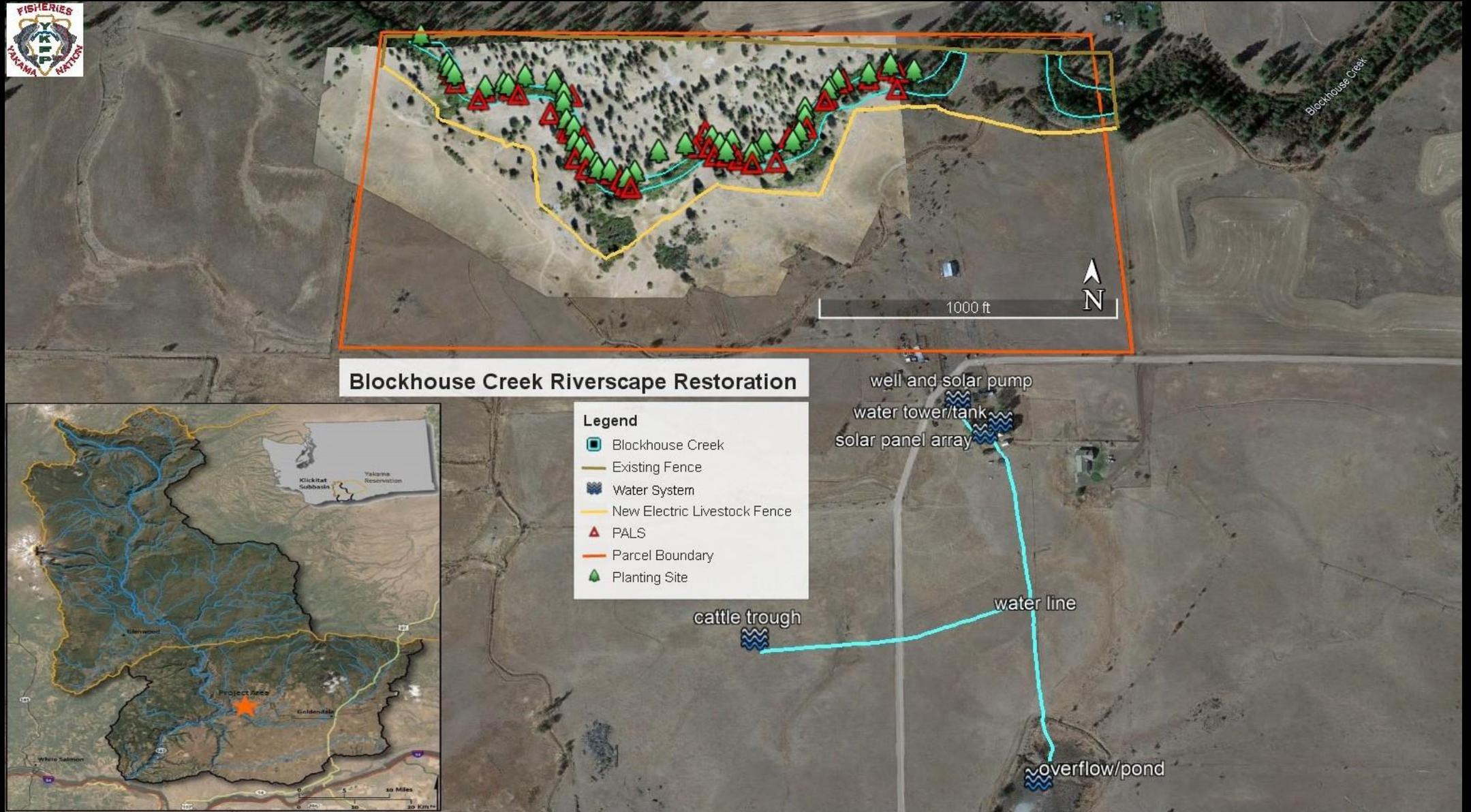
Blockhouse Creek Project Site

Structure Type

- BDA
- ◻ BDA - Wicker Weave
- Other - Describe
- ▲ PALS - Bank-Attached RL
- ▲ PALS - Bank-Attached RR
- + PALS - Channel Spanner
- ◆ PALS - Mid
- Access routes
- Staging & Fueling
- Blockhouse_Valley Bottom
- Blockhouse_Parcels
- Blockhouse_Reaches

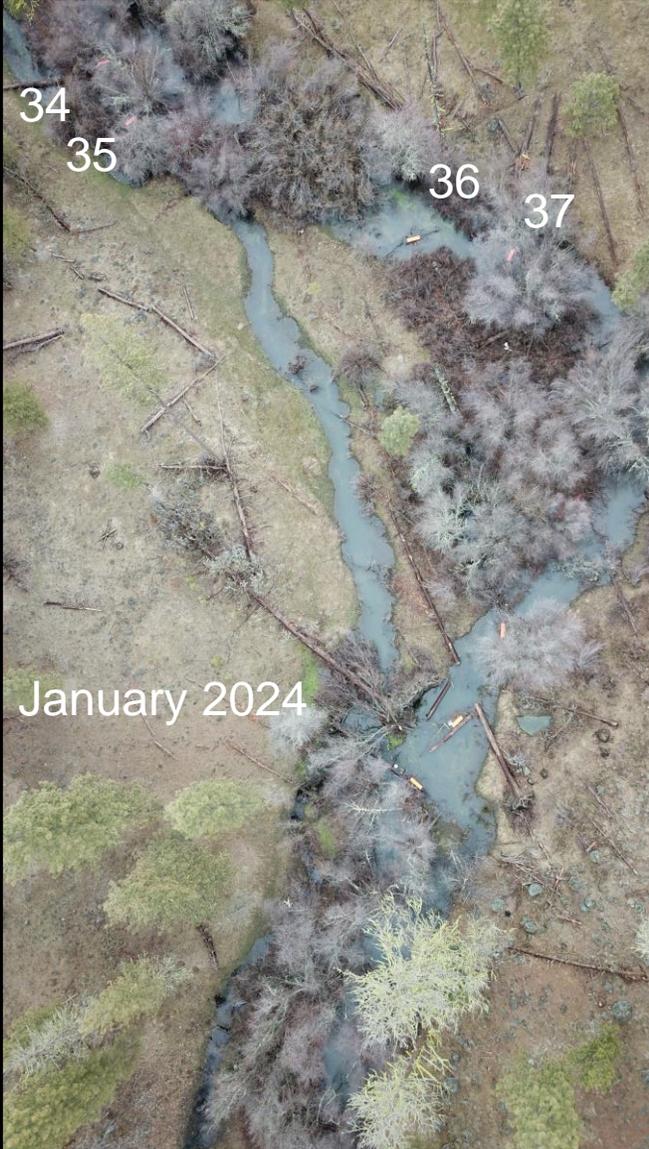


Blockhouse Creek



Blockhouse Creek

November 2021

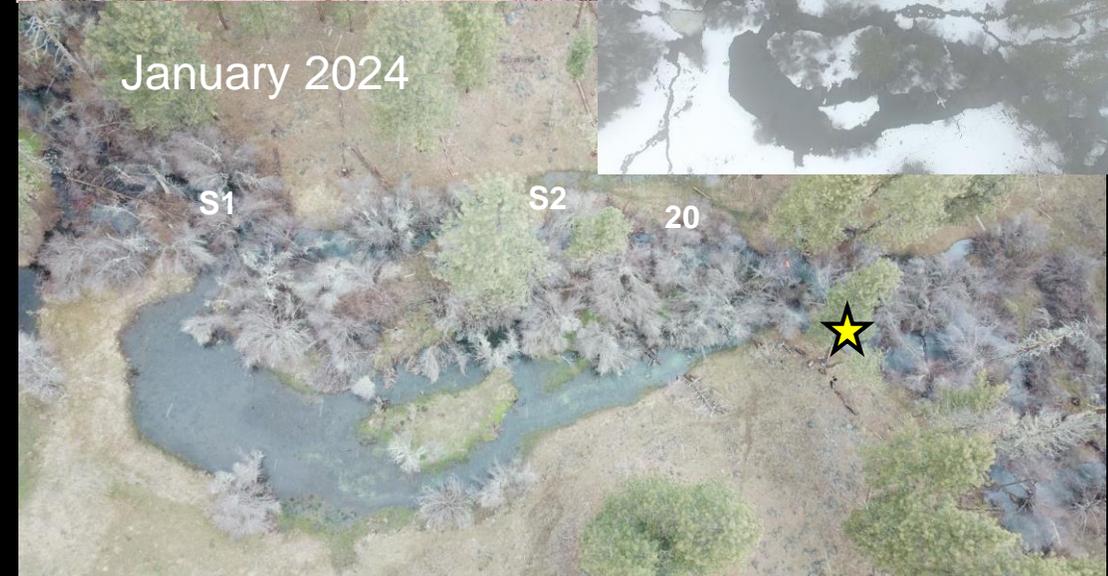


January 2024

Blockhouse Creek



Blockhouse Creek



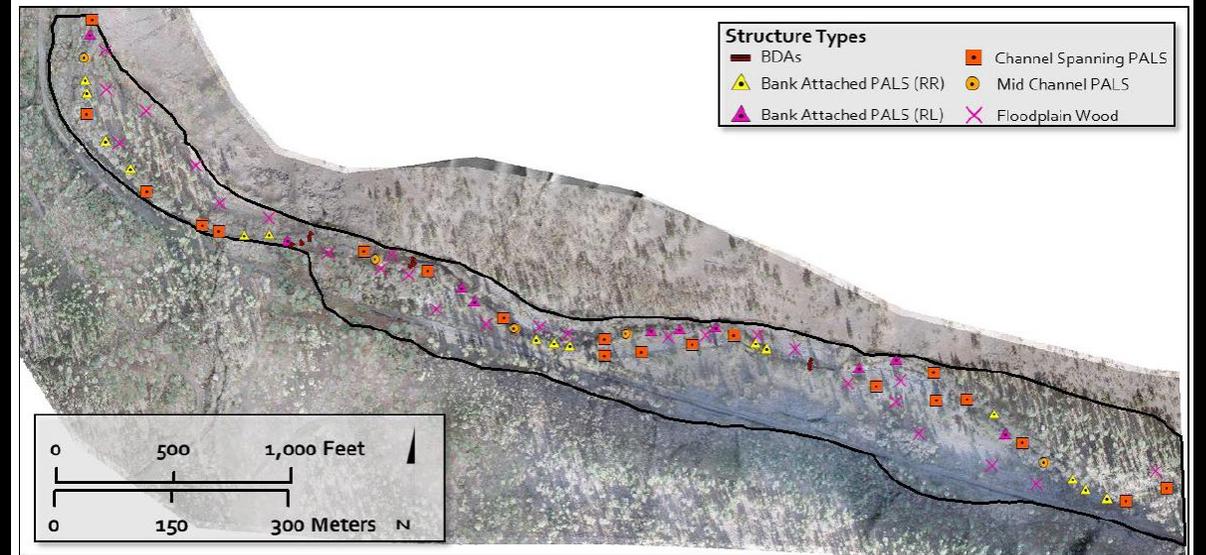
Blockhouse Creek



Blockhouse Creek

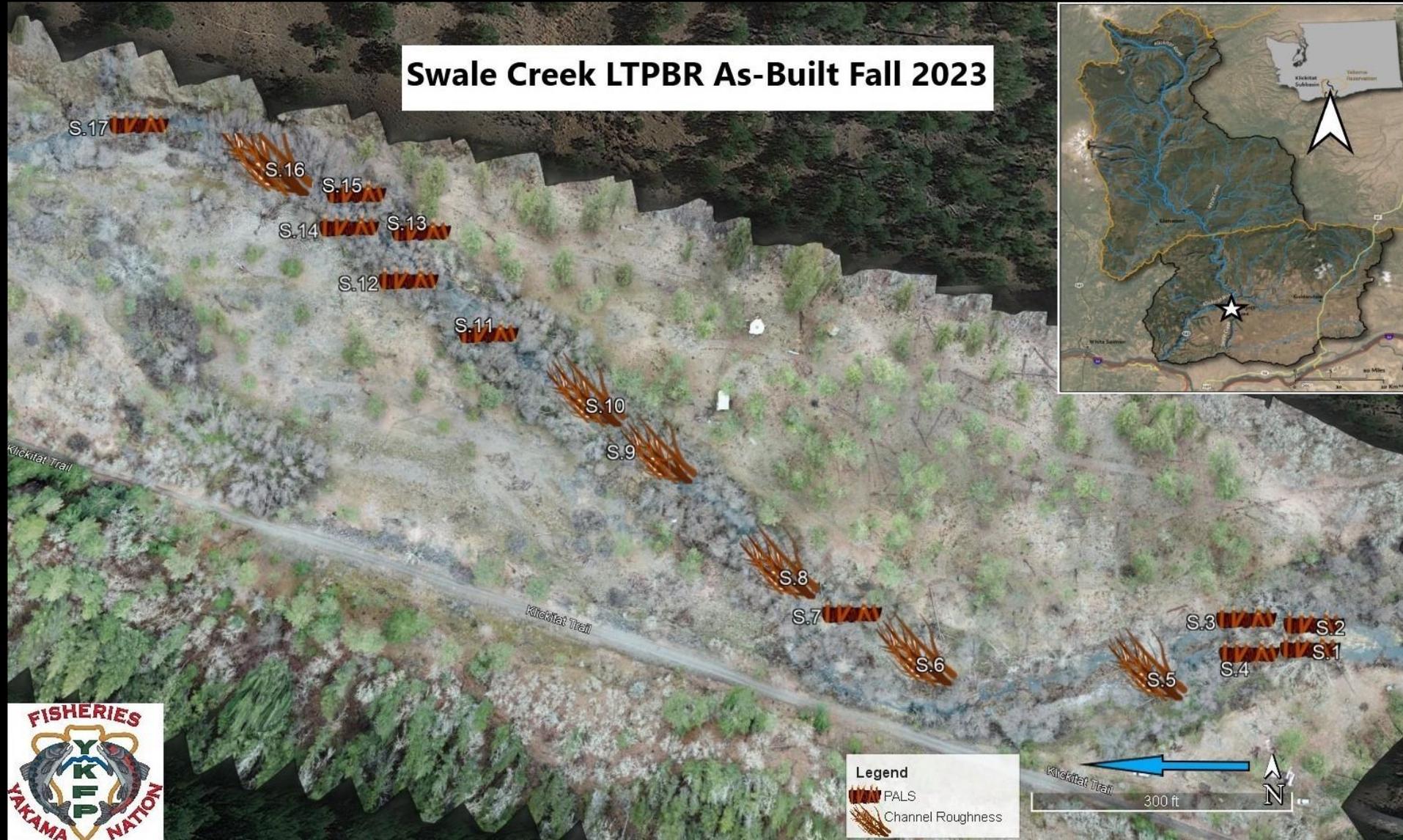


Swale Creek



Swale Creek

Swale Creek LTPBR As-Built Fall 2023



Swale Creek

March 2022



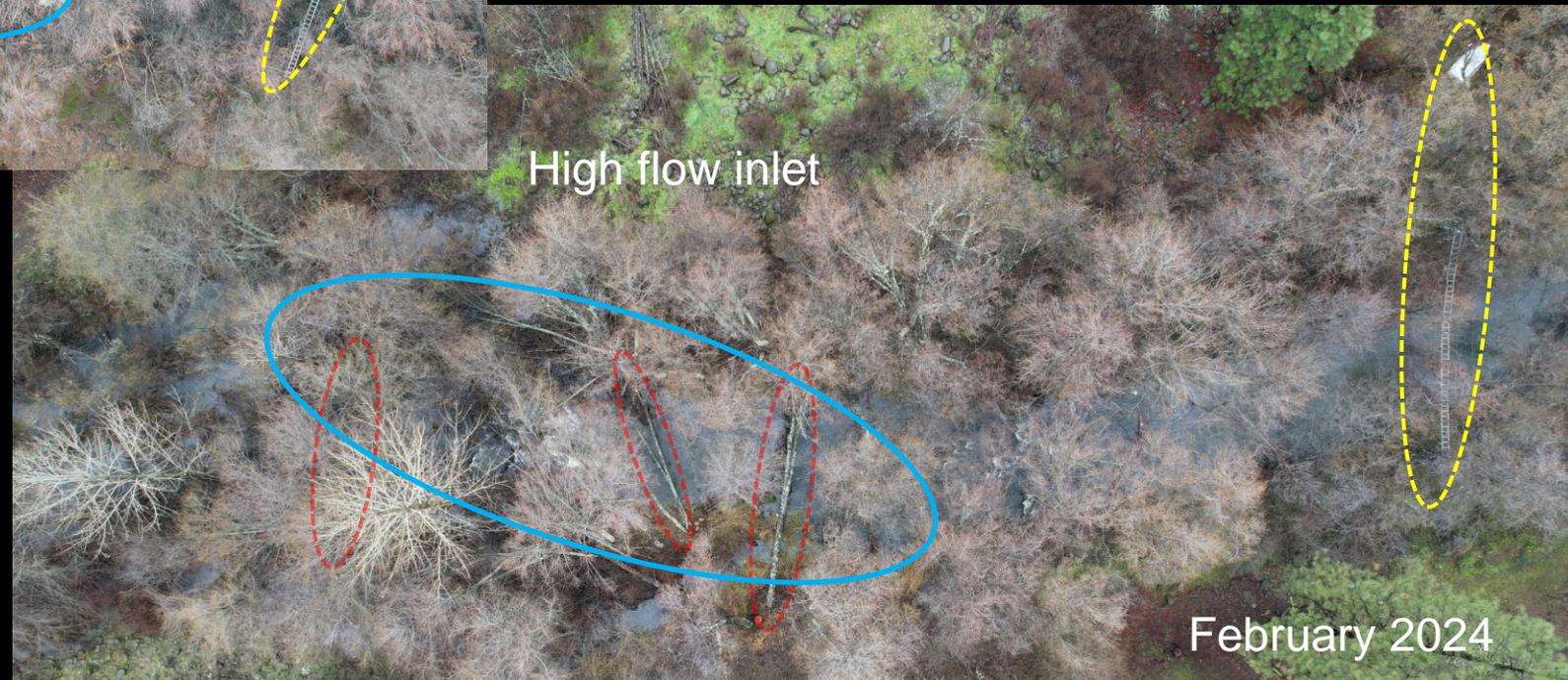
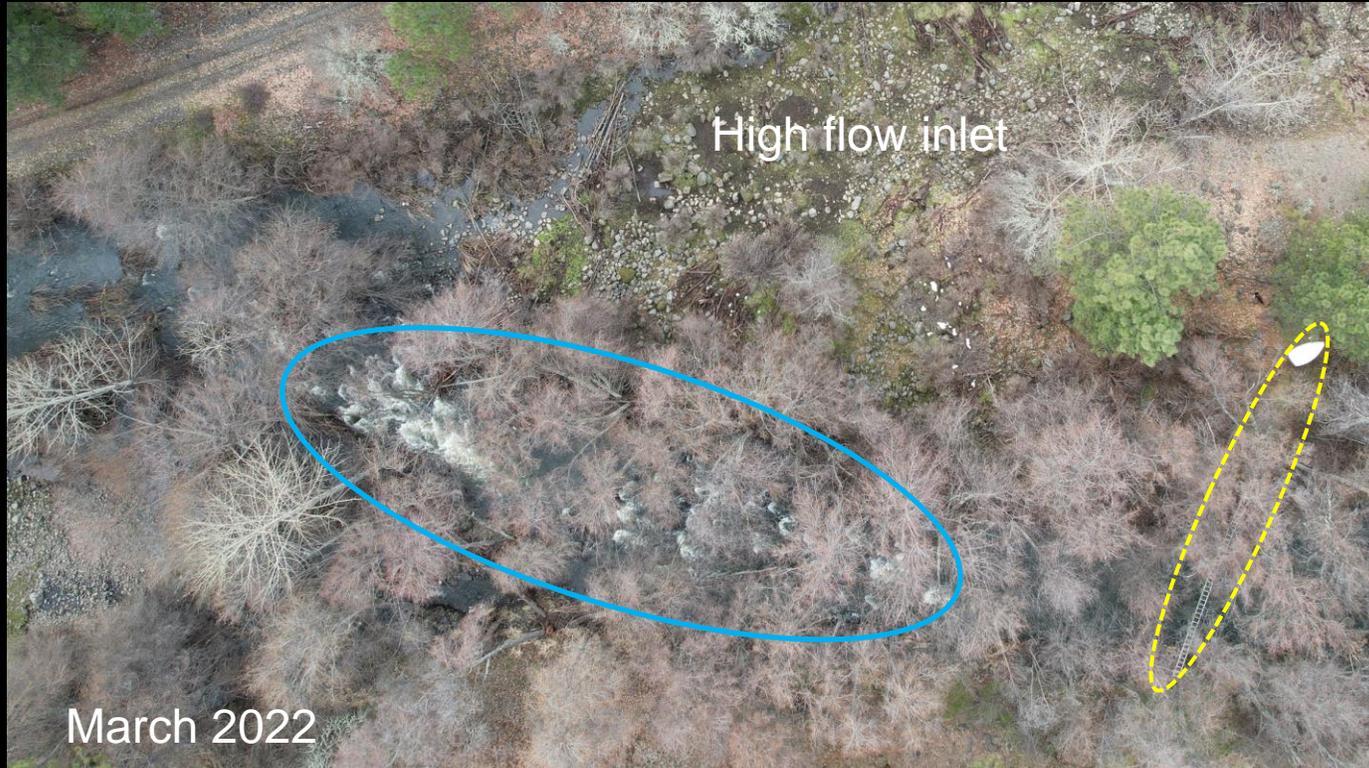
February 2024



Swale Creek



Swale Creek



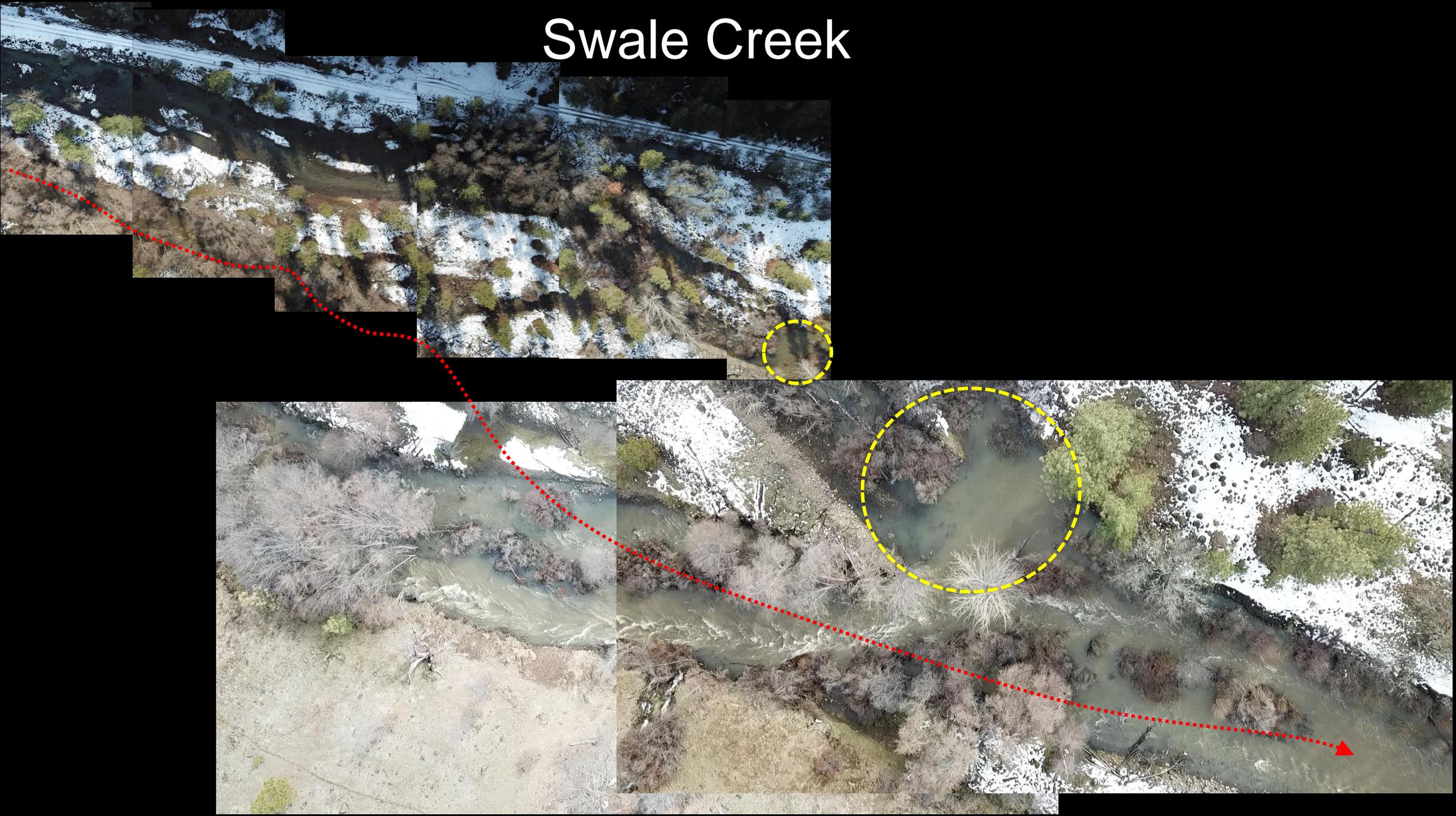
Swale Creek

High Flow Channel

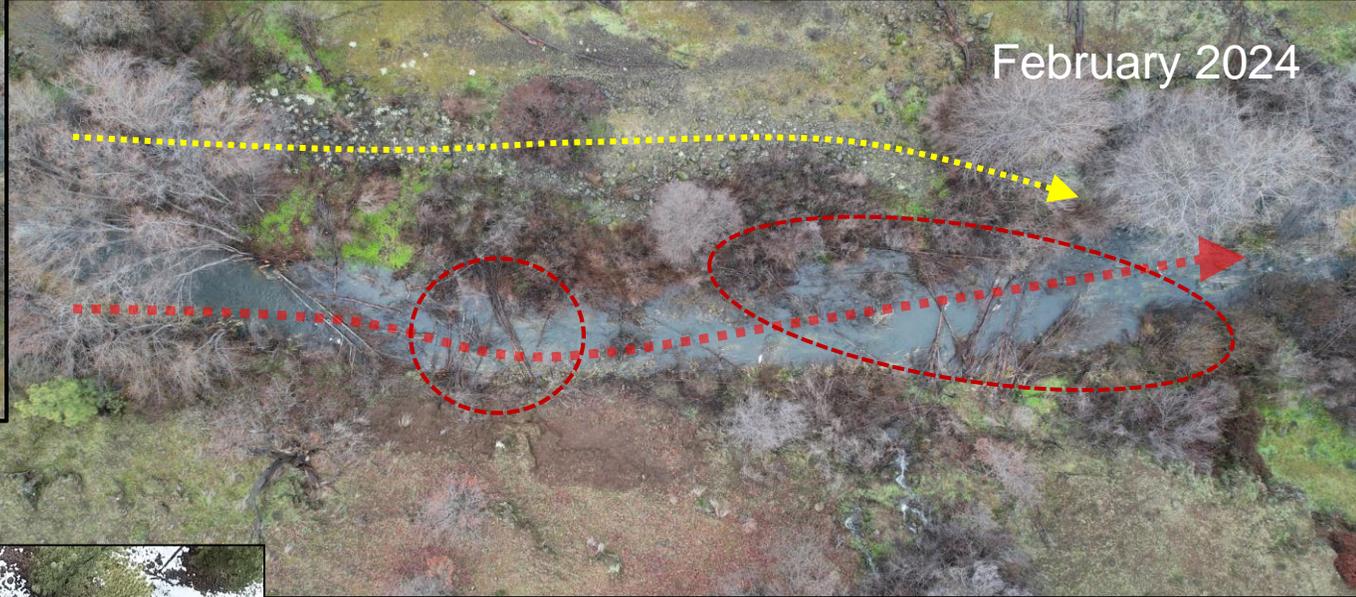
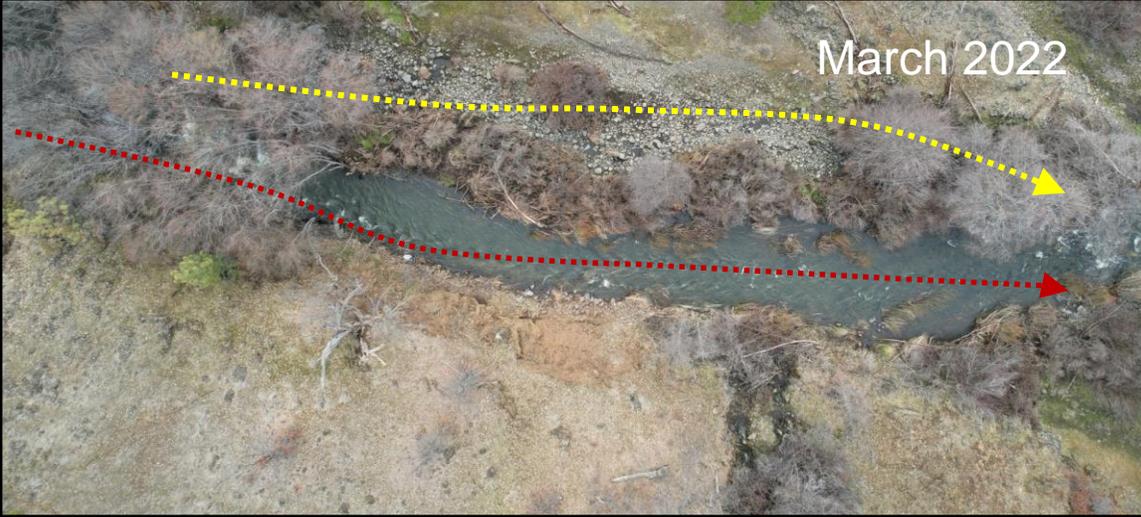
Overbank flows, floodplain connectivity



Swale Creek

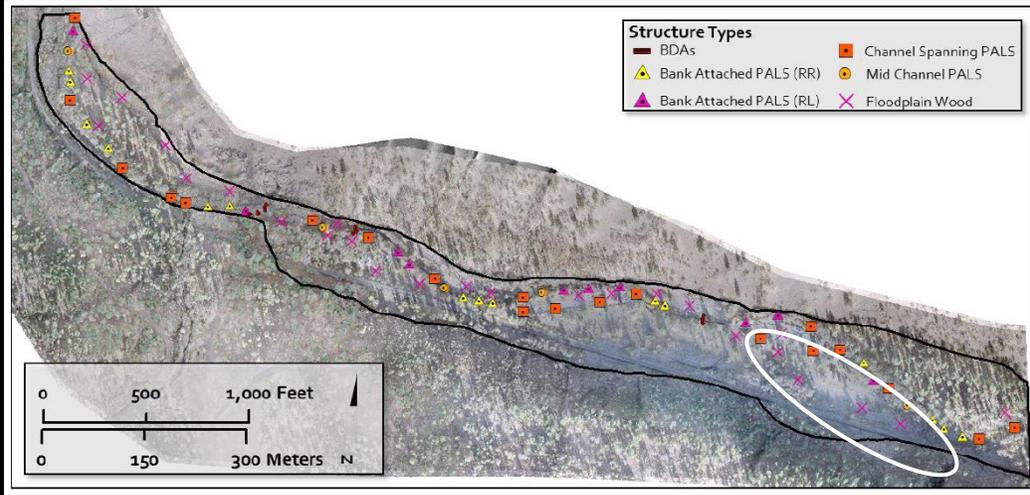


Swale Creek



2024 Projects

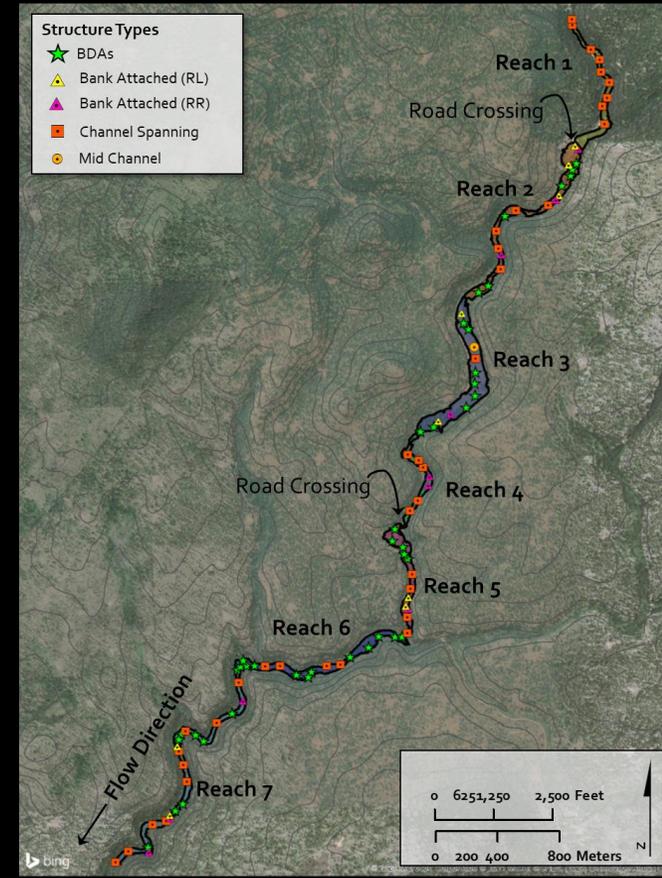
Swale Yr. 2



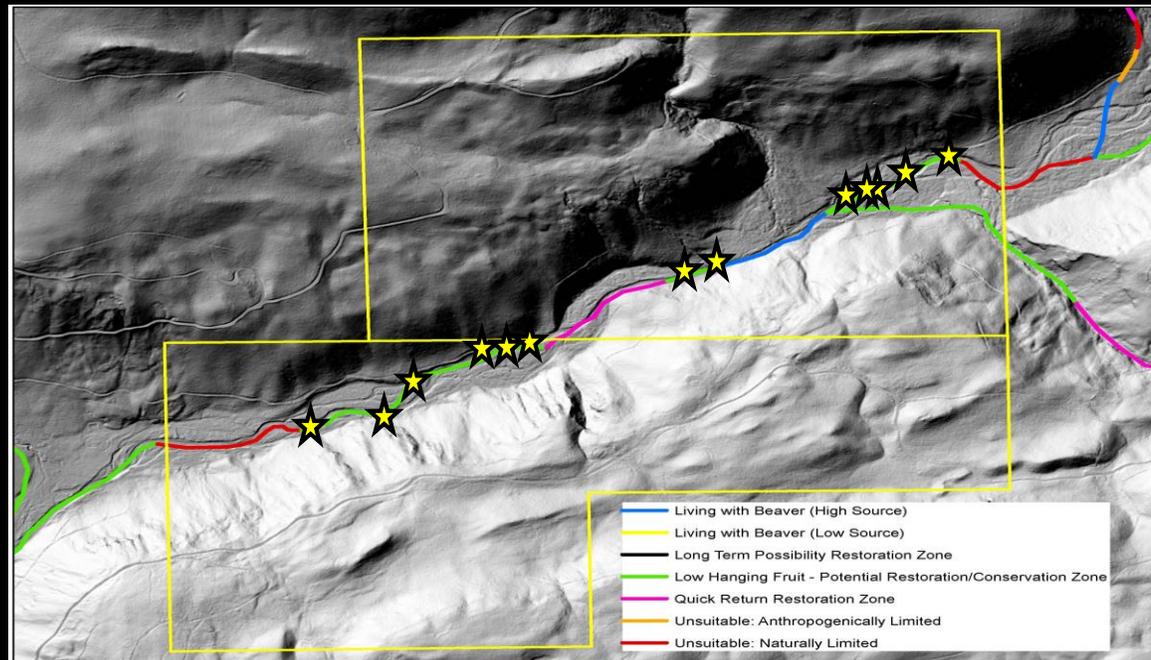
- 8-10 structures
- ~2,000 linear ft

Middle Tepee Ck

- 125 Structures
- ~5 miles



Rattlesnake Ck, WSR, Columbia Land Trust



- 35 Structures
- 13 Complexes
- ~1.2 miles



Yakama Nation Fisheries

Organization Website:

<https://yakamafish-nsn.gov/>

Organization Contact:

Organization Description

Yakama Nation Fisheries is a program of the Confederated Tribes and Bands of the Yakama Nation. We work "To honor, protect and restore Nch'i-Wa'na (the Columbia River), its tributaries and its resources for the benefit of current and future generations of the Yakama people as reserved for them in the Treaty of 1855 (12 stat. 95).

LTPBR Explorer

PROJECTS

3

Process-based riverscape restoration projects



LENGTH

1.5mi

Total channel length of riverscape restoration implementation



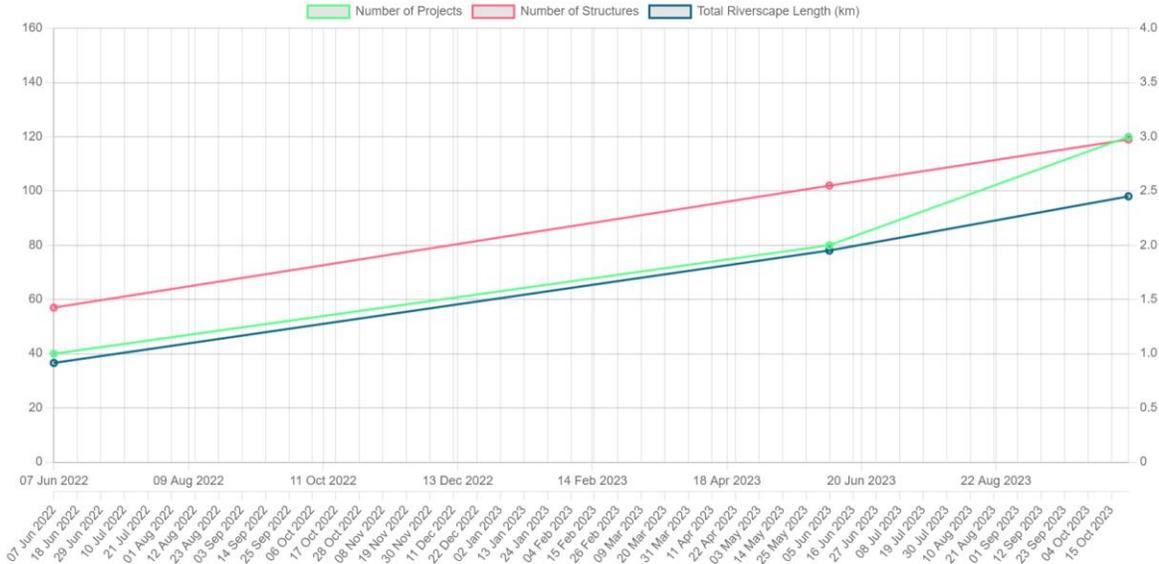
STRUCTURES

119

Beaver dam analog (BDA) and post-assisted log structures (PALS)



Graphing Yakama Nation Fisheries's Projects from 07 Jun 2022 Onward



Affiliated Projects

Lower Tepee Creek LTPBR

Tepee Creek, Tepee Creek



Yakama Nation Fisheries **Implementor**

Lower Swale Creek LTPBR

Swale Creek, Swale Creek



Yakama Nation Fisheries **Implementor**

Blockhouse Creek Riverscape Restoration Project

Blockhouse Creek, Blockhouse Creek



Yakama Nation Fisheries **Implementor**



Questions



Link to StoryMaps



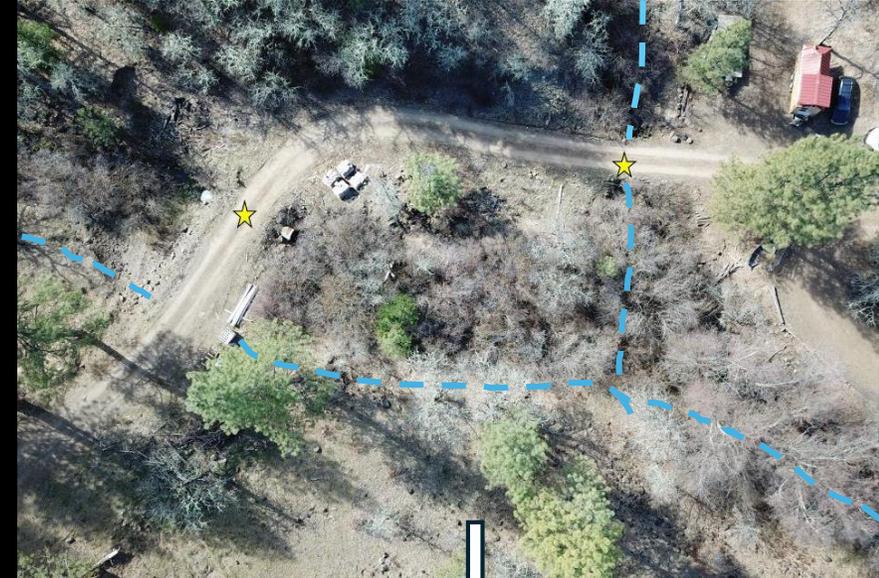
Recent Klickitat Watershed Fish Passage Projects

Piscoe Ck 80 Road Crossing – 5.5 miles (2020)



Rattlesnake Gulch Ck – 3.5 miles (2023)

Collab with MCFEG



White Creek 191 Road Crossing – ~3.0 miles (2021)

