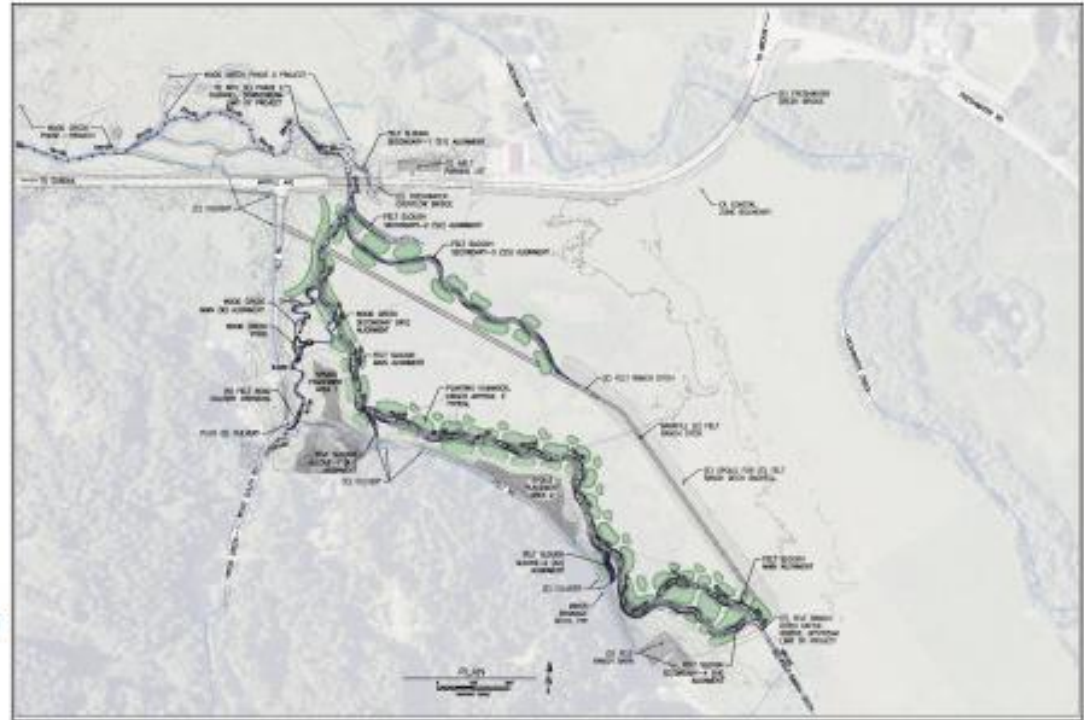


# Wood Creek Phase III Felt Ranch Off-Channel Rearing Habitat Project

This project will restore salmon habitat, tidal wetlands, and natural creek flows in the Freshwater Creek watershed, improving climate resilience, and supporting local agriculture, while benefiting wildlife and the surrounding community.



## Funded By:



## Project Partners:



Sean & Kathy O'Day



Thomas Gast & Associates  
Environmental Consultants



Roscoe & Associates



SCAN HERE  
to learn more about the Wood  
Creek Phase III Restoration Project!



NORTHCOAST REGIONAL LAND TRUST

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# Wood Creek Restoration

*Presentation and Tour  
at Freshwater Farms Reserve*

September 25, 2025

To implement the Phase III of restoration on and adjacent to Freshwater Farms Reserve, **NRLT is proud to partner with:**

- Sean and Kathy O’Day, Landowners of the Felt Ranch
- The Buckeye Conservancy
- California Department of Fish and Wildlife, Cannabis Restoration Grant Program
- Point Blue Conservation Science
- Wildlife Conservation Board
- National Fish and Wildlife Foundation
- California Sate Coastal Conservancy
- California State Polytechnic University Humboldt, Fisheries Dept.
- and area experts and agencies, including GHD, GR Sundberg, Michael Love and Associates, Pacific Earthscape, Pacific Watershed Associates, Samara Restoration, Thomas Gast and Associates Environmental Consulting, Wiyot Tribe, and more.

*The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government or the National Fish and Wildlife Foundation and its funding sources. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government, or the National Fish and Wildlife Foundation or its funding sources.*

## Schedule

*(all times approximate)*

**5:30-5:35pm** | Welcome + Sign in

**5:35 – 5:45pm** | Intro from NRLT by  
*Nadia Van Lynn*

**5:45 – 6:00pm** | Past Restoration  
(Phases I & II) and Fisheries Focus by  
*Mike Wallace and Mark Bowen*

**6:00 – 6:20pm** | Present and Future  
Restoration (Phase III) by  
*Michael Love*

**6:20 – 6:30pm** | Partner Perspectives

*\*Boot Up!\**

**6:30-7pm** | Restoration Site Walk  
Through and Q&A



# NORTHCOAST REGIONAL LAND TRUST

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## Vision

A sustainable community with a vibrant economy, resilient and productive landscapes and clean, abundant water.

## Mission

The Northcoast Regional Land Trust is dedicated to the protection and economic viability of working landscapes, farms, forests, and grazing lands, and to the preservation and protection of land for its natural, educational, scenic and historic values. We work with landowners on a voluntary basis to promote stewardship of Northern California's healthy and productive resource base, natural systems and quality of life.

## Northcoast Regional Land Trust Conservation Easements

- NRLT Completed CE
- NRLT CE in Progress
- ★ NRLT Property
- Additional CE's
- Public Lands
- Tribal Lands
- Highways
- Rivers
- Counties



# What we do

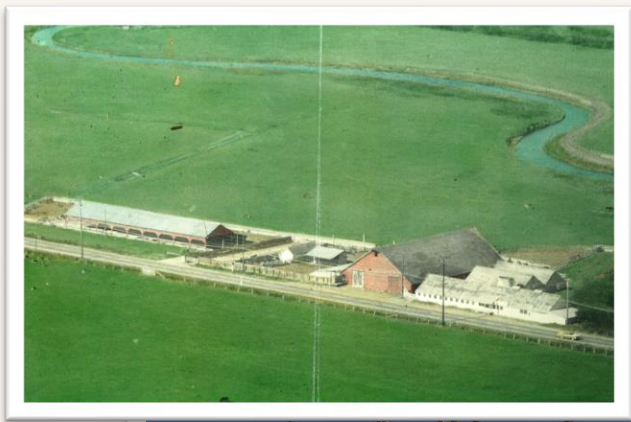
1. Land Conservation (*conservation easements, acquisitions, etc.*)
2. Land Stewardship (*restoration, landowner support, volunteer trail stewards, etc.*)
3. Build Community for Conservation (*education and outreach programs*)

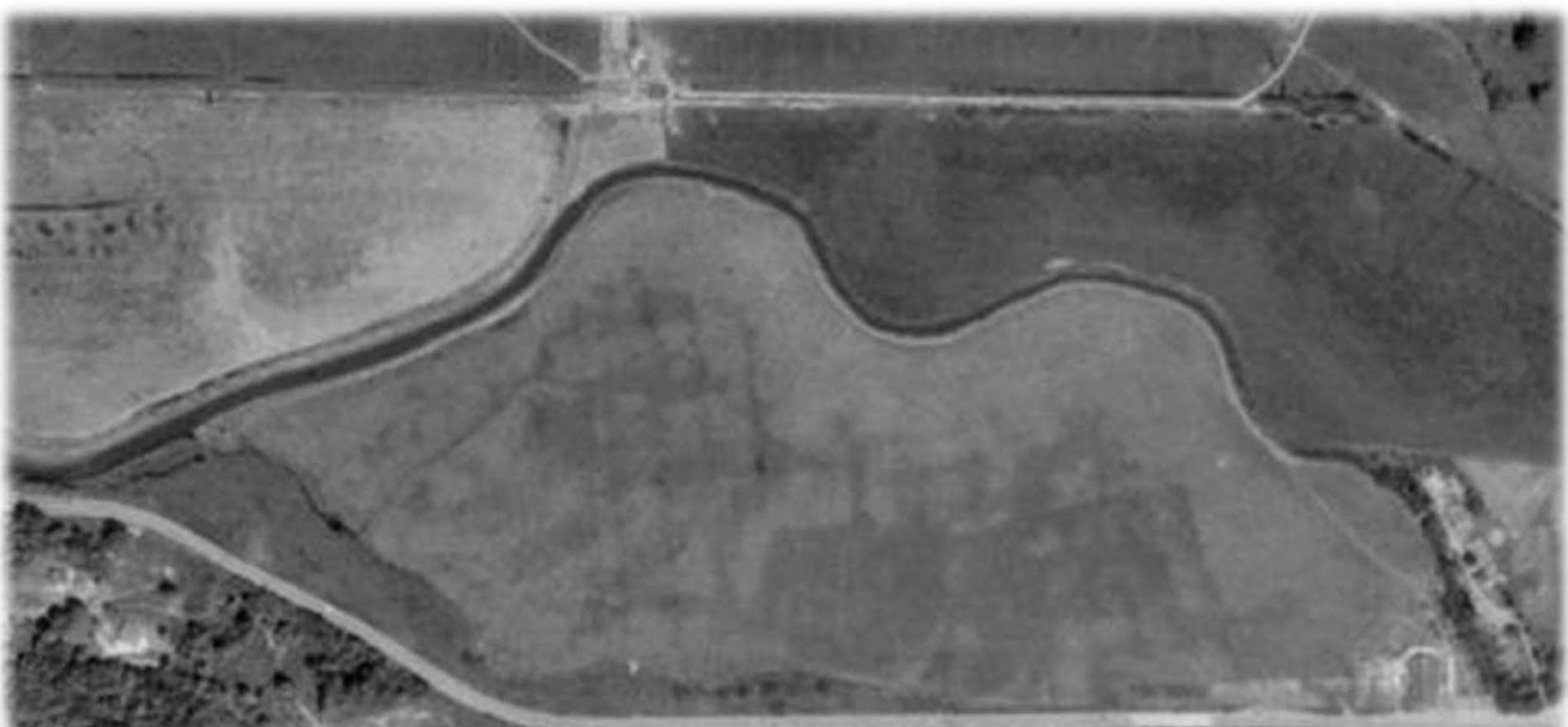
## Celebrating 25 Years!

- Since 2000, thanks to the support of so many, NRLT has worked with private landowners to **permanently protect over 65,000** acres of wild and working landscapes in Northwestern California.
- Through our **education and outreach programs we've connected with thousands of people**, deepening connections to the land, broadening NRLT's community of support, and engaging the next generation of land stewards.

# Freshwater Farms Reserve

Community Conservation on a Historic Working Farm and Native Plant Nursery





With thanks to the many collaborators through the years:

- 2000: Initial conversations about importance of Wood Creek and tidal marsh restoration
- 2005: Supported by SCC, NRLT acquired initial 54-acre portion of “Freshwater Farms”
- 2010: Wood Creek Phase I Restoration completed
- 2012: NRLT acquired adjacent 20-acre “Freshwater Farms Nursery” property
- 2016: Freshwater Nature Trail completed and opened to the public
- 2017: Wood Creek Phase II Restoration completed
- 2025: Wood Creek Phase III Restoration begins!



*Freshwater Farms Reserve – Wetlands Reconnected and Restored (2017/2018)*

# Upcoming Events!

- **Boots & Birkenstocks Annual Celebration** – *October 11<sup>th</sup>, 5-9pm*
  - Our biggest fundraiser of the year! Complete with both a live and silent auction, dinner, live music, and our 25<sup>th</sup> Anniversary film premiere. Tickets and more information available on our website. *Interested in volunteering for a free ticket? Email [n.vanlynn@ncrlt.org](mailto:n.vanlynn@ncrlt.org).*
- **Trail Stewardship Day at Freshwater Farms** – *October 19<sup>th</sup>, 9am-12pm*
  - Join the NRLT, Humboldt Trails Council, & other partners for a morning of trail maintenance and invasive species removal!
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  - Come out and enjoy a spooky evening at Freshwater Farms Reserve! This event is suitable for all ages with pumpkin carving, cider making, a twilight walk, and other festive activities.

More info available on our website [ncrlt.org/](http://ncrlt.org/)

**WOOD CREEK 3 – FELT RANCH  
COHO HABITAT RESTORATION PROJECT  
SEPTEMBER 25, 2025**

**Mike Wallace, CDFW, Retired**

**And**

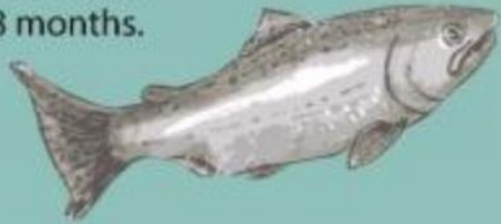
**Mark Bowen, Ph.D., CFP,  
Thomas Gast & Associates  
Environmental Consultants**



Thomas Gast & Associates  
Environmental Consultants

# salmon life cycle

**Adults** Once in the ocean, smolts will feast on smaller fish and shrimp until they mature into adults. Coho will usually stay in the ocean for about 18 months.



**Spawners** Coho transform into spawning adults and, generally, return to the stream of their birth to lay eggs before they die. Most coho return when they are three years old, but some (known as jacks) return a year early.



**Eggs** are laid in coarse gravel in the winter.



**Alevin** are tiny salmon that hatch from their eggs and survive on nutrients in their yolk sacs until they are absorbed in a few weeks and they emerge as free-swimming fry.



**Fry**, or "young-of-the-year" (yoy), are young fish with stripes called "parr marks".



**Smolts** After about a year, fry transform into silvery smolts and migrate downstream to the ocean. This usually happens in the spring.

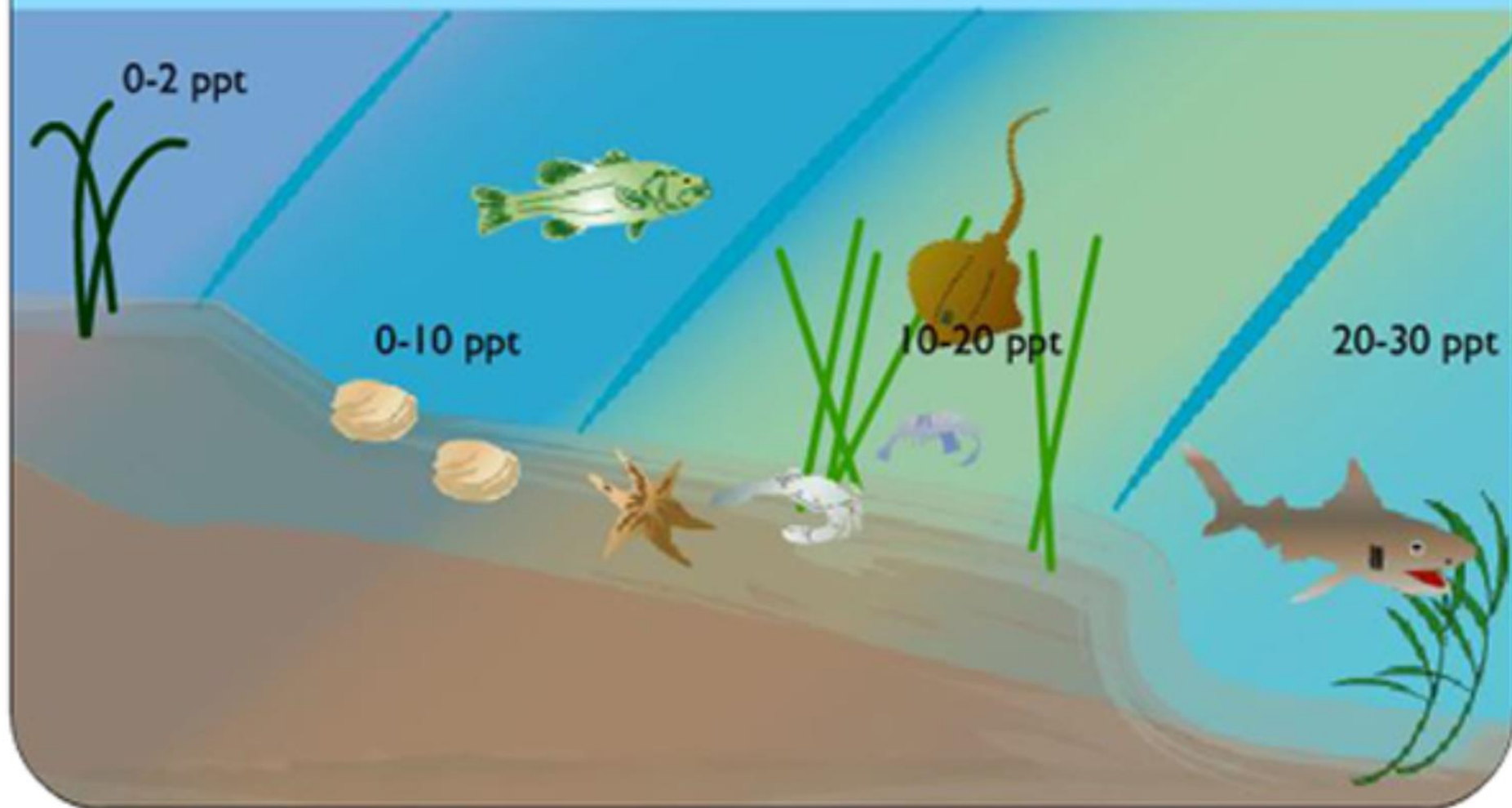


Aquatic organisms are adapted for certain ranges of salinity

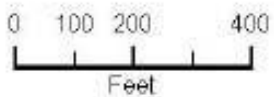
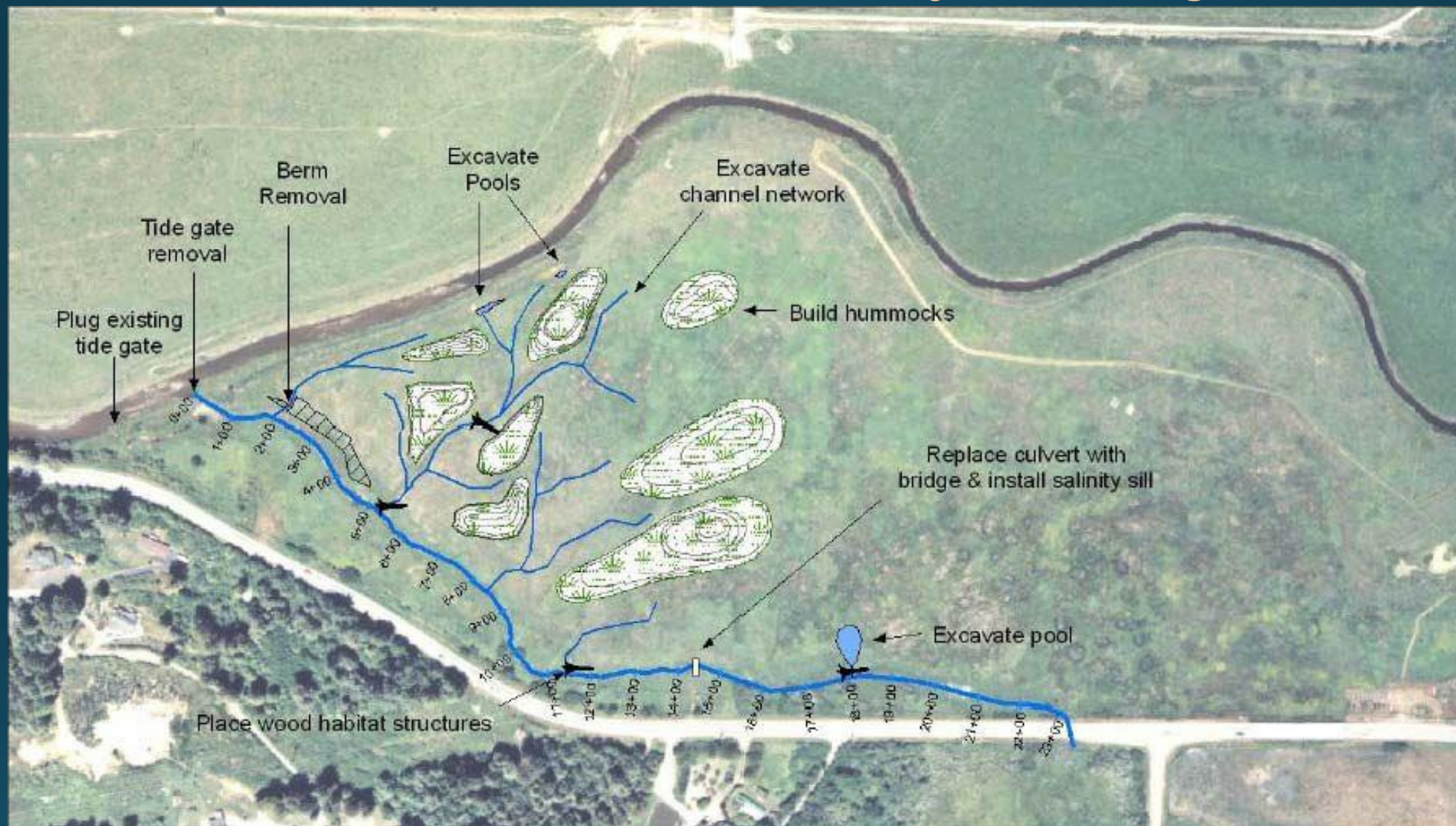
Low salinity

High salinity

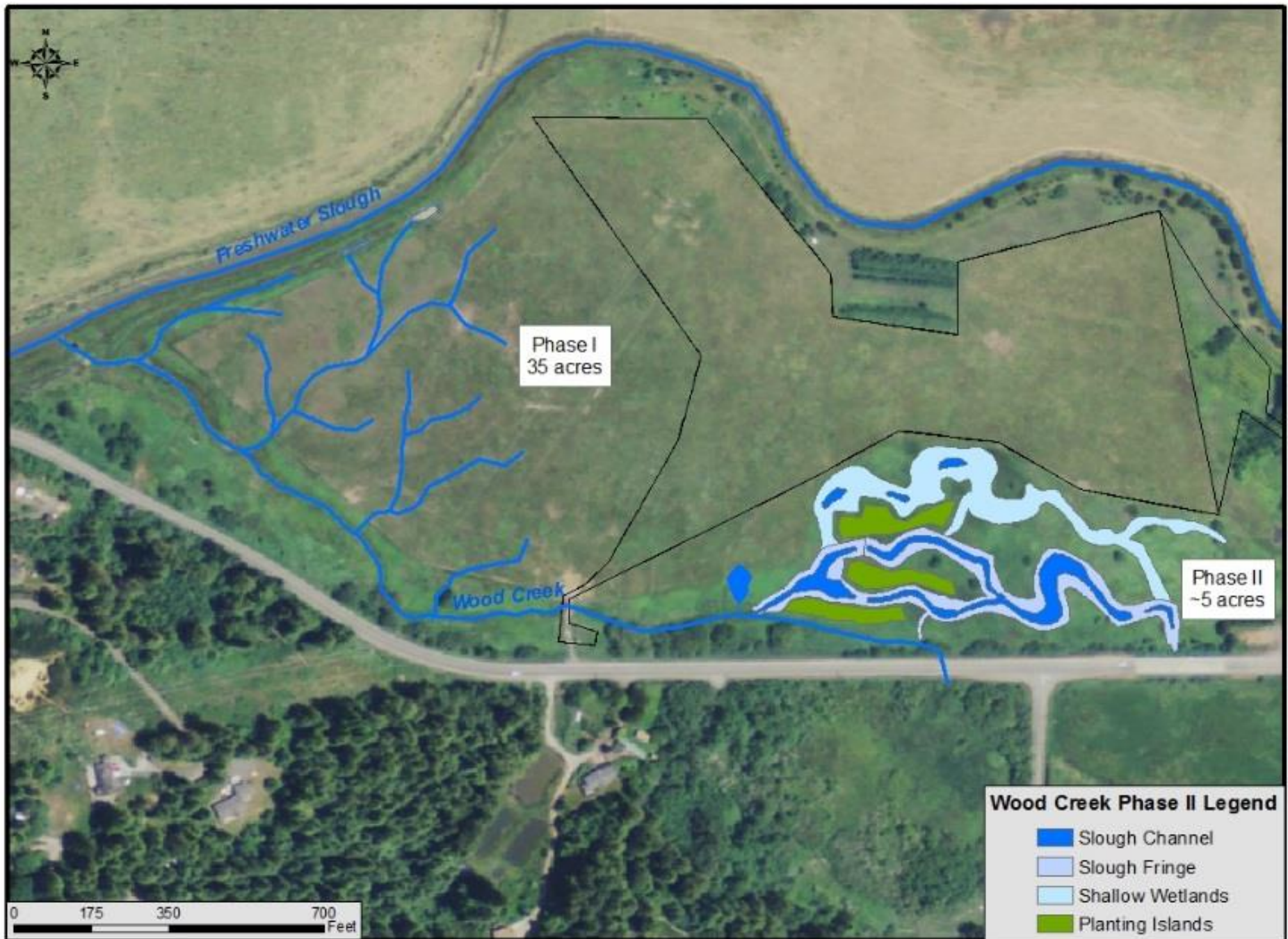
Salinity also affects water chemistry and water density



# Wood Creek Phase 1 Project Design



- ▲ Wood habitat structure
- Hummock Contours (0.25 ft)
- Excavated channels
- Wood Creek
- ▨ Hummock Extent
- ▨ Berm Removal
- Excavated pools



# Estuary Residency (in days)

Sub-yearling Coho Salmon

## Freshwater Slough

## Elk River Slough

<u>Year</u>	<u>n</u>	<u>Avg</u>	<u>Range</u>	<u>n</u>	<u>Avg</u>	<u>Range</u>
2008	0	-	-	104	58	6-168
2007	12	68	6-167	55	44	5-124
2006	57	33	5-106	41	39	6-128
2005	112	32	4-128	121	34	4-110
2004	36	38	5-244			

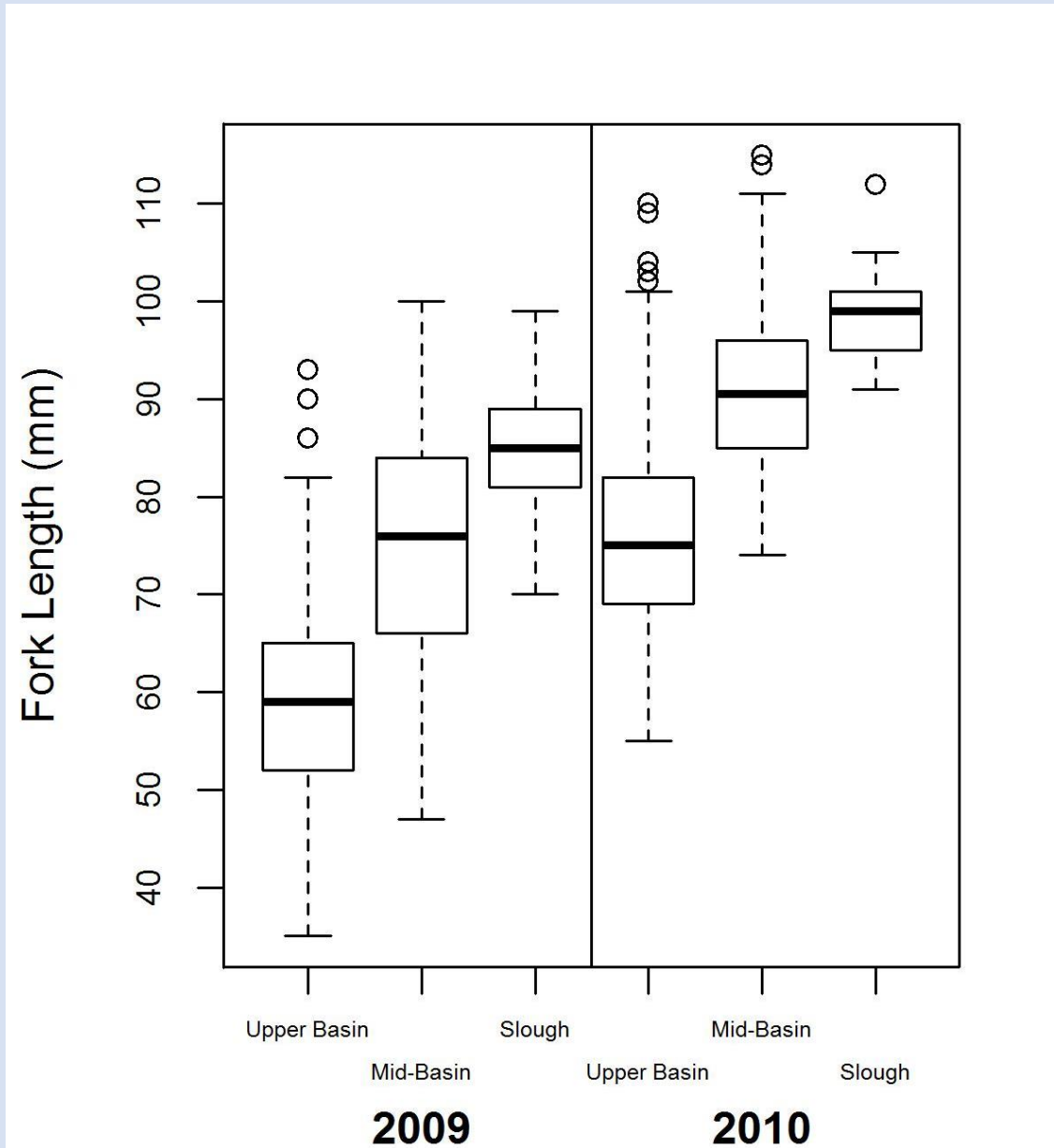
Table 21. Origin of PIT tagged juvenile Coho Salmon tagged in Freshwater Creek basin detected at Wood Creek pond antennas during January to September 2010, October 2010 to October 2011, October 2011 to July 2012, September 2012 through August 2013, and September 2013 through August 2014, September 2014 to August 2015, and September 2015 through August 2016, and Wood Creek Phase 2 antennas September 2016 to August 2017.

\*Wood Creek Phase 2 restoration sites

\*\* Wood Creek Phase 1 restoration sites

Fish Origin	2010	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Stream Estuary Ecotone	7	1	-	1	0	1	3	6
Lower Mainstem Freshwater Cr	11	6	26	2	0	6	1	11
Middle Mainstem Freshwater Cr	-	11	16	1	1	4	8	11
Upper Mainstem Freshwater Cr	7	6	12	4	0	4	1	8
Little Freshwater Creek	12	-	-	-	-	-	-	-
Cloney Gulch	9	4	6	4	0	1	3	6
South Fork Freshwater Creek	-	0	10	2	0	1	6	6
Freshwater Creek (total)	46	28	70	14	1	17	22	48
Wood Creek Pond	74	8	199	42	5	2	3	270*
Wood Creek	27	19	20	11	11	13	2	41**
Ryan Slough/Creek	0	0	7	3	0	0	0	1
Freshwater Creek Slough	5	0	8	6	0	2	5	25
HFAC Weir	1	0	2	0	4	1	0	1
Estuary Ecotone (total)	107	27	236	62	20	18	10	338
Grand Total	153	55	306	76	21	35	32	386

# Size of Sub-Yearling Coho in the fall Freshwater Cr



# Growth Rate of Juvenile Coho Salmon Ponds vs. Stream (Feb-May)

Location	Year	Pond Growth Rate	Stream Growth Rate
Wood Creek	2013-2015	0.39	0.28
Martin Slough	2015	0.48	0.21
Jacoby Creek	2016;14/15	0.28	0.12
Salmon Creek	2013-2015	0.82	n/a
Freshwater Sl	2013-2015	n/a	0.18-0.31
Ryan Slough	2013-2015	n/a	0.19-0.42

# **Stream-Estuary Ecotone Importance to Coho Salmon**

- **Prolonged residence**
- **Used by multiple life stages**
- **Good growth/survival**
- **Substantial portion of population uses habitat**
- **Provides habitat during stressful periods**

# Wood Creek Phase 3 – Felt Ranch

Fish Sampling  
2022-2023

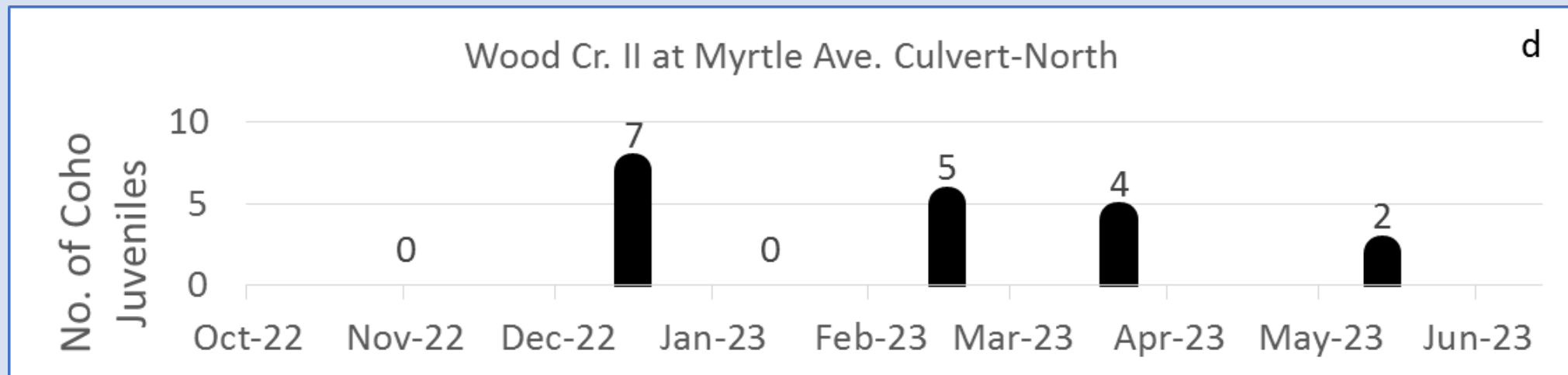


# Wood Creek Phase 3 – Felt Ranch

Hypotheses regarding making the SEE longer

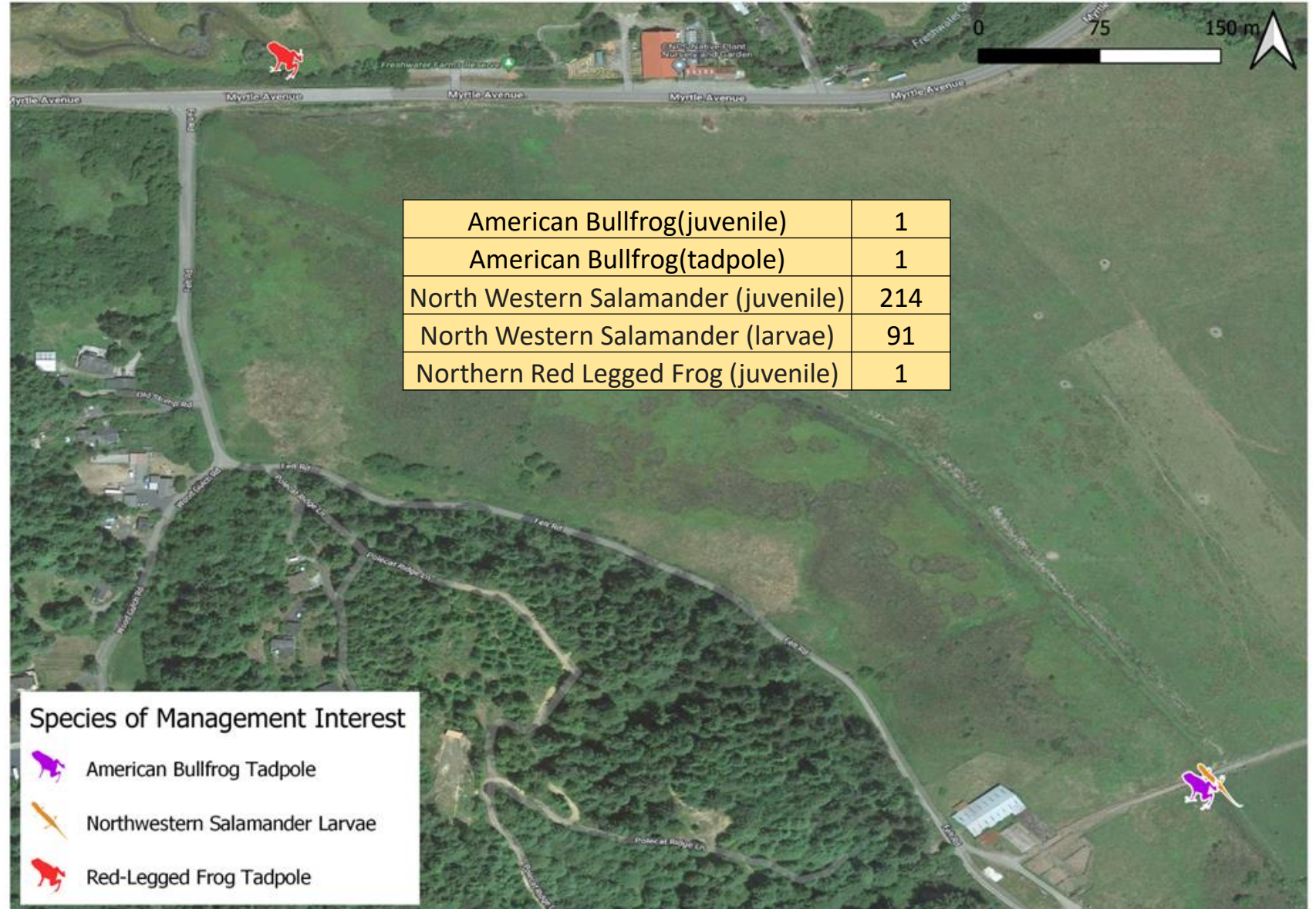
Hypothesis 1: The range of months that Coho juveniles use the SEE will increase on Wood Creek and Felt Ranch.

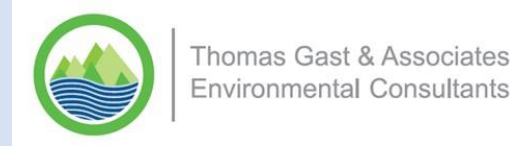
Hypothesis 2: Tidewater Goby range will expand south with saltwater.



# Wood Creek Phase 3 – Felt Ranch

Amphibian Sampling  
Colored Icons: 2022-2023  
Results Table: Sept-2025





Thank you for your attention!

Wood Creek Phase III

# Felt Ranch Off-Channel Rearing Habitat Planning Project



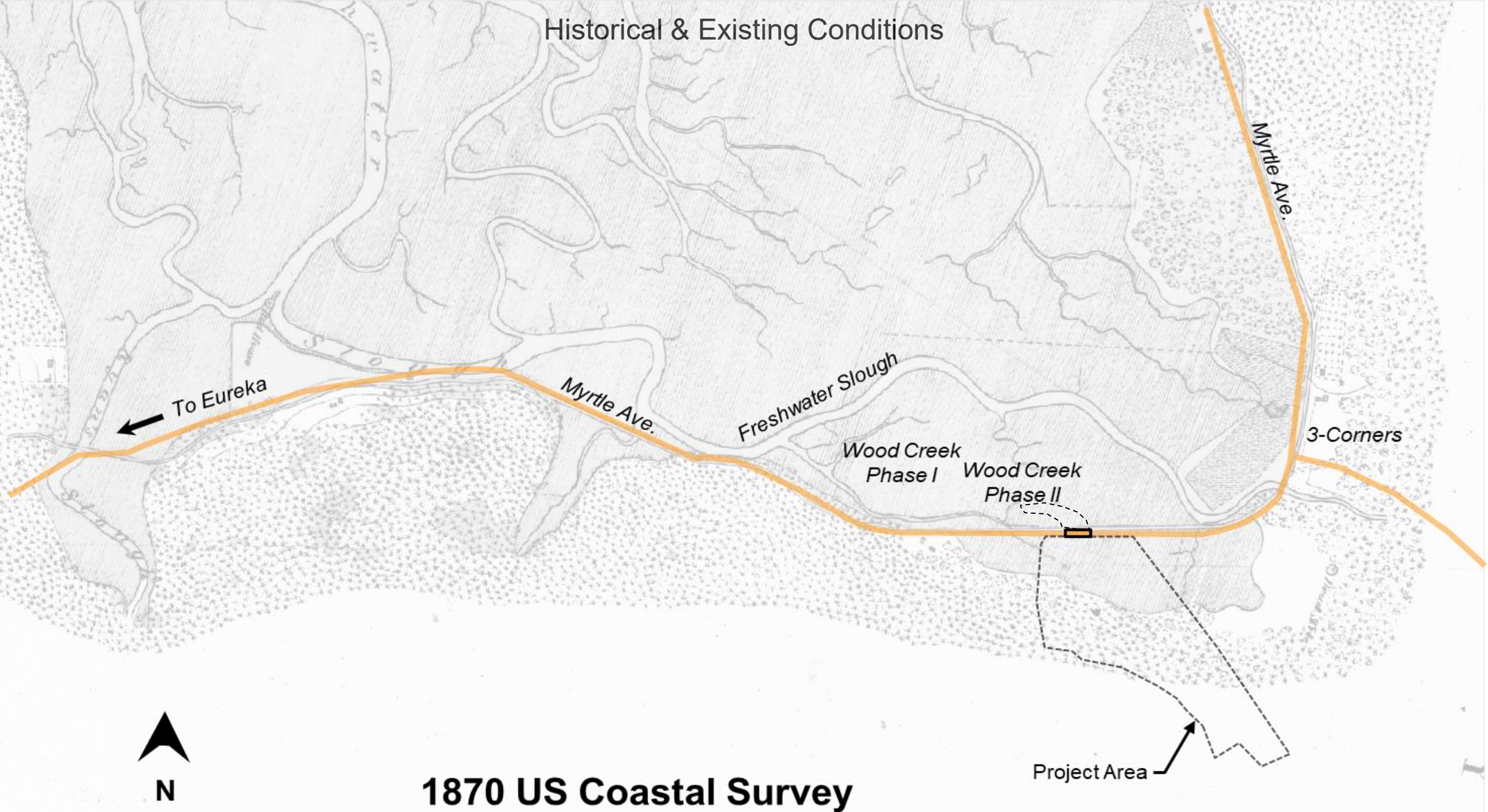
## Project Objectives

- Restore hydrologic connectivity and fish access between Wood Creek Phase I & II restoration project areas and the wetlands on Felt Ranch
- Reintroduce tidal influence onto Felt Ranch to elongate the transition zone from brackish to fresh-water conditions
- Enhance existing freshwater wetlands on Felt Ranch creating a diversity of slow-water productive habitats for native wetland dependent fish, wildlife and vegetation
- Enhance drainage and reduce inundation of adjacent agricultural areas on Felt Ranch



*NRLT Wood Creek Phase II and Felt Ranch*

Historical & Existing Conditions



To Eureka

Myrtle Ave.

Freshwater Slough

Wood Creek Phase I

Wood Creek Phase II

Myrtle Ave.

3-Corners



1870 US Coastal Survey

Project Area



Figure 2-6. 1947 oblique aerial image looking southeast up Freshwater Valley and across the project study area (from Cal Poly Humboldt Shuster Collection)

# Wood Creek Phase II

NRLT Freshwater Farms Reserve



Existing Freshwater Creek  
Overflow Bridge

Freshwater Creek

Phase III Project Area

Realign Felt Ditch  
and Wood Creek

Phase II – Phase III  
Tie-in Locations

Felt Ditch

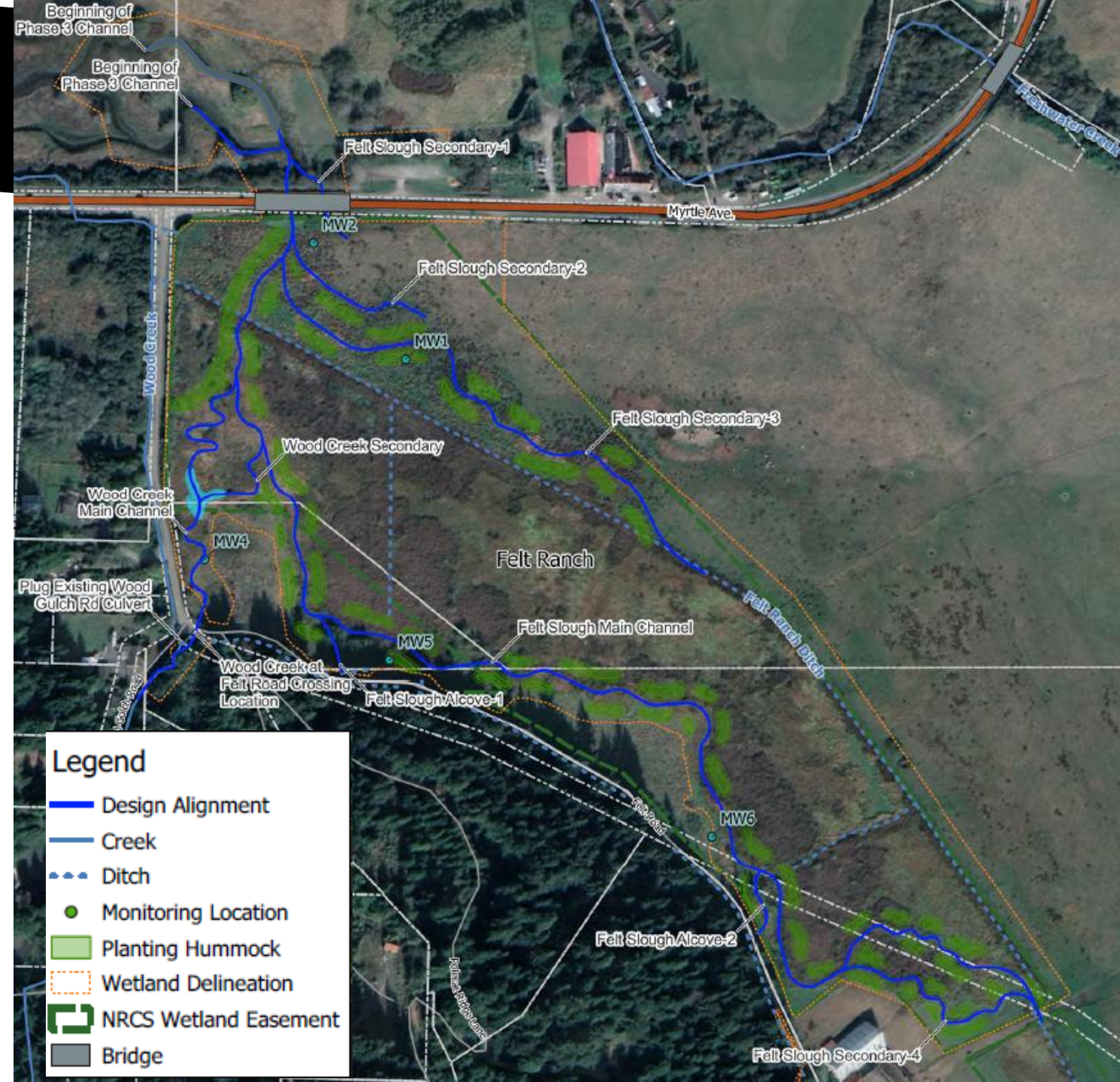
Wood Creek in Road Ditch

Myrtle Ave.

Wood Creek Phase II Project

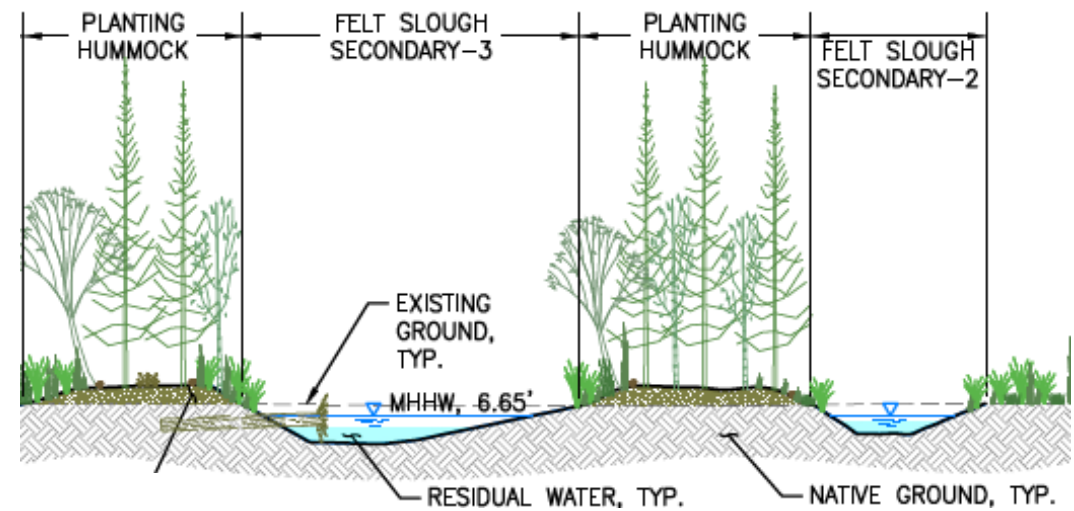
# Preliminary Design Features

- Felt Slough Channel - 5,440 feet (partial tidal)
- Secondary Channels – 2,550 feet (partial tidal)
- 2 Alcoves at Springs
- 4 acres of Planting Hummocks
- Realign 900 feet of Wood Creek
- Wood Creek Pond at Head of Tide
- New Wood Creek Crossing on County Rd
- Two Upland Areas for Soil Placement
- Excavation Approximately 25,000 yards<sup>3</sup>
- Overall Limits of Disturbance ~27 acres



## Planting Hummocks Intended to:

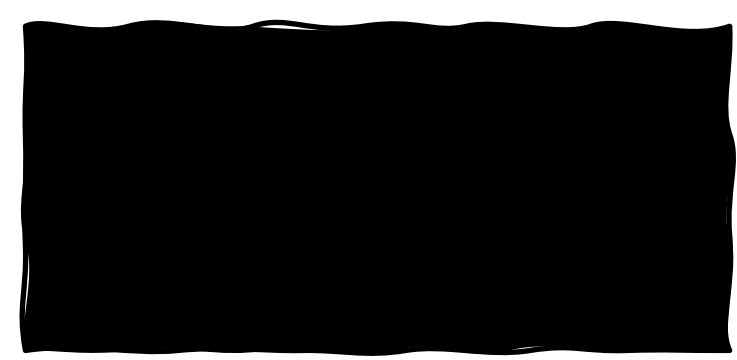
- Restore “tidal swamp” microtopography to support a diversity of tidal forest/woodland and tidal scrub-shrub wetland species similar to pre-agricultural conditions
- Shade out Cattails in new Felt Slough
- Provide future source of wood recruitment for channels
- Reuse of excavated materials



Example of Spruce and Willow Planting Hummocks (Mounds)



From Anderson Creek, South Slough National Estuary Research Reserve, Oregon



# Lower Reaches

Connect to Phase III

Freshwater Creek Overflow  
Bridge

Parking Lot

Myrtle Ave.

Planting Hummock  
Blocks Connection to  
Existing Culverts/Ditch

Tidal Channels Capture  
Freshwater Creek Overflow

SECTION A

Ditch Plug

Felt Road

Near Head of Tide

New Wood Creek Pond  
(freshwater with tidal influence)

Spoils Area 1  
(0.74 acres)

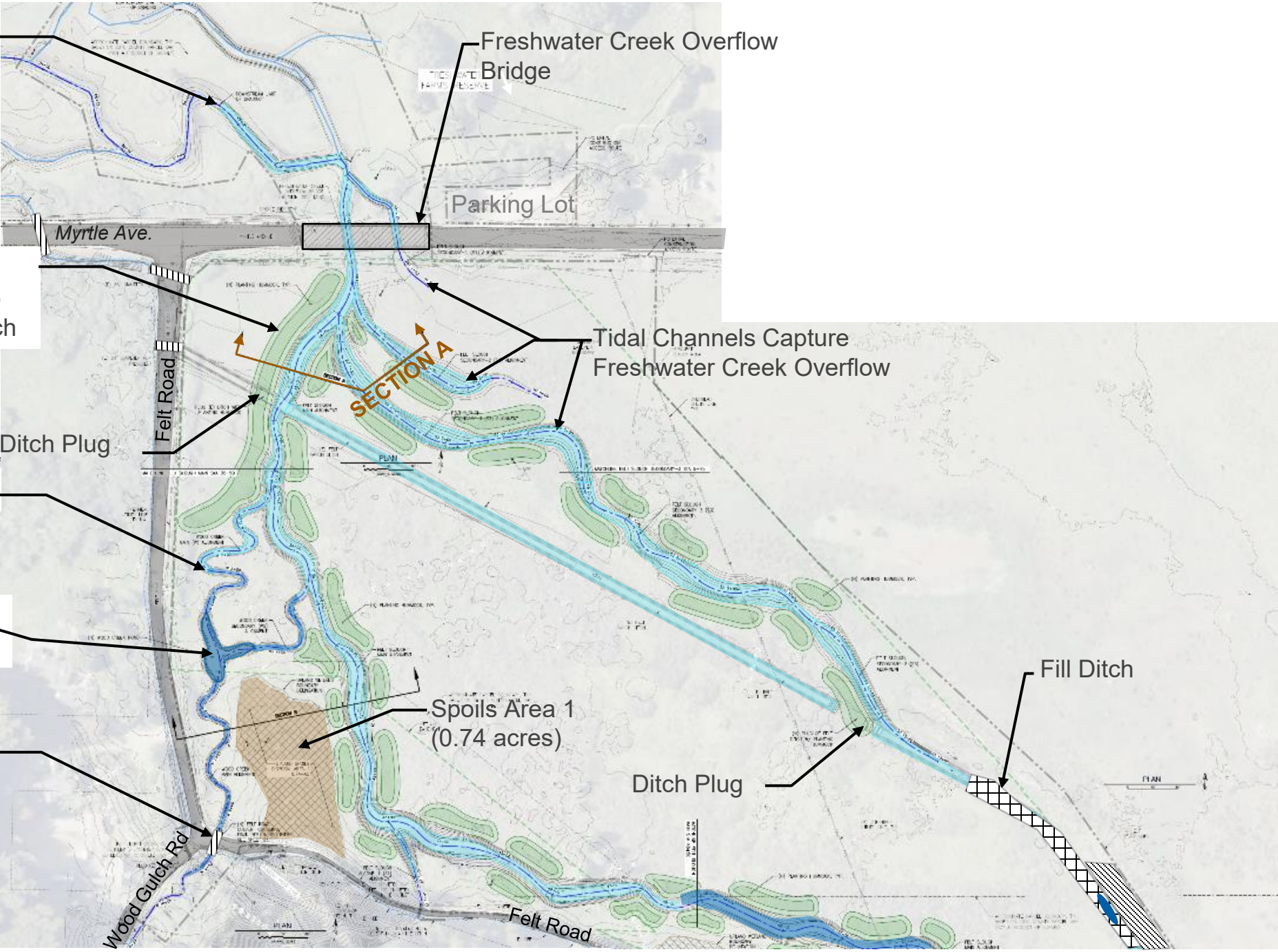
Fill Ditch

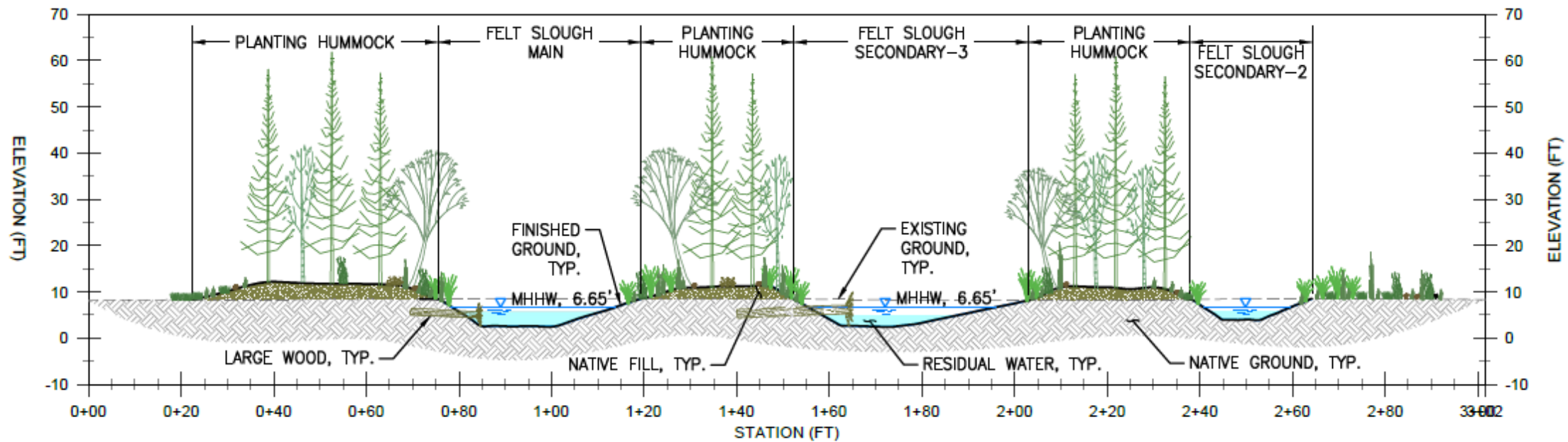
New Fish Friendly  
Culvert Crossing

Ditch Plug

Wood Gulch Rd

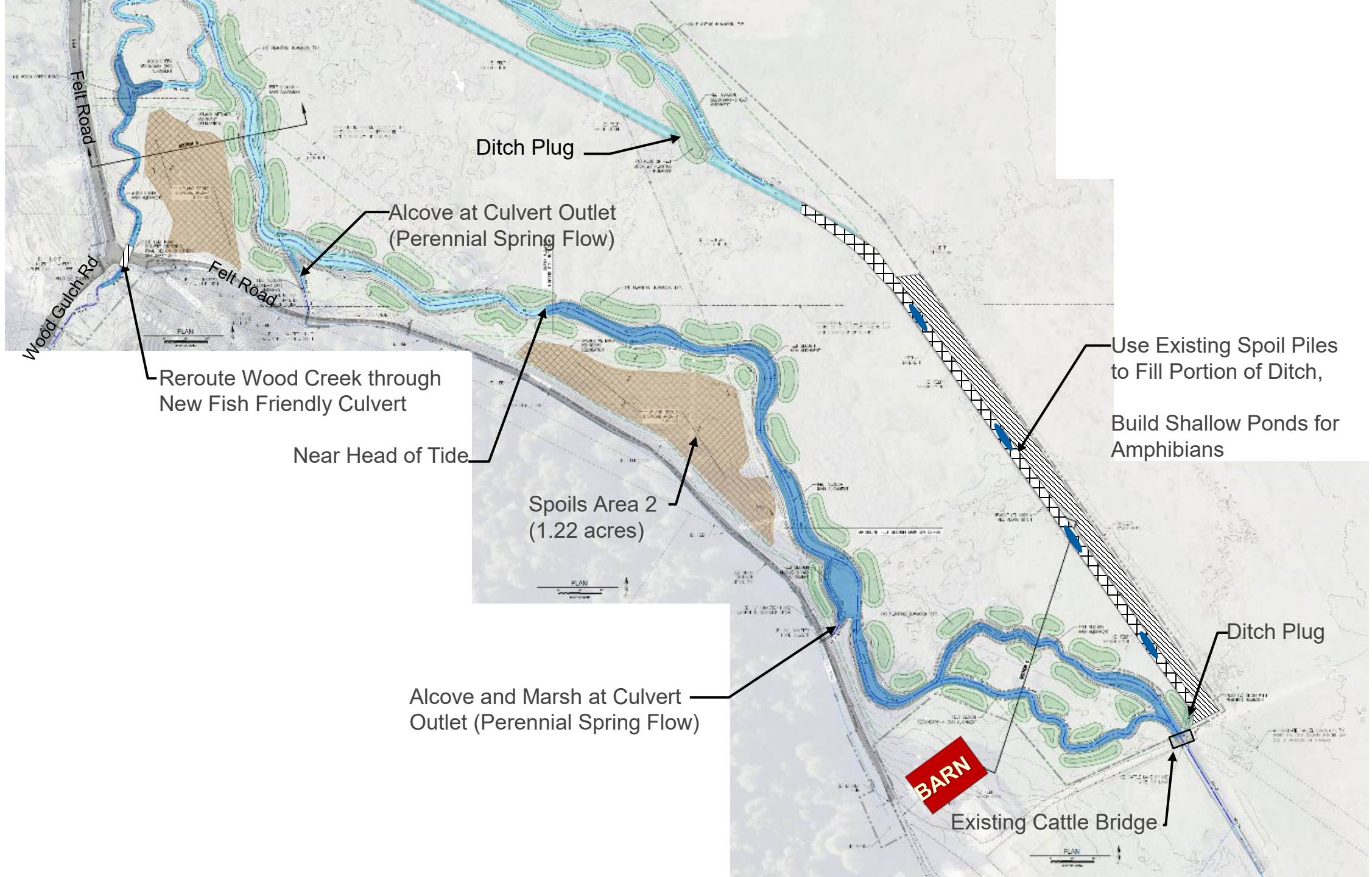
Felt Road





SECTION A

# Upper Reaches



Wood Gulch Rd  
Felt Road

Ditch Plug

Alcove at Culvert Outlet  
(Perennial Spring Flow)

Reroute Wood Creek through  
New Fish Friendly Culvert

Near Head of Tide

Spills Area 2  
(1.22 acres)

Use Existing Spoil Piles  
to Fill Portion of Ditch,  
Build Shallow Ponds for  
Amphibians

Alcove and Marsh at Culvert  
Outlet (Perennial Spring Flow)

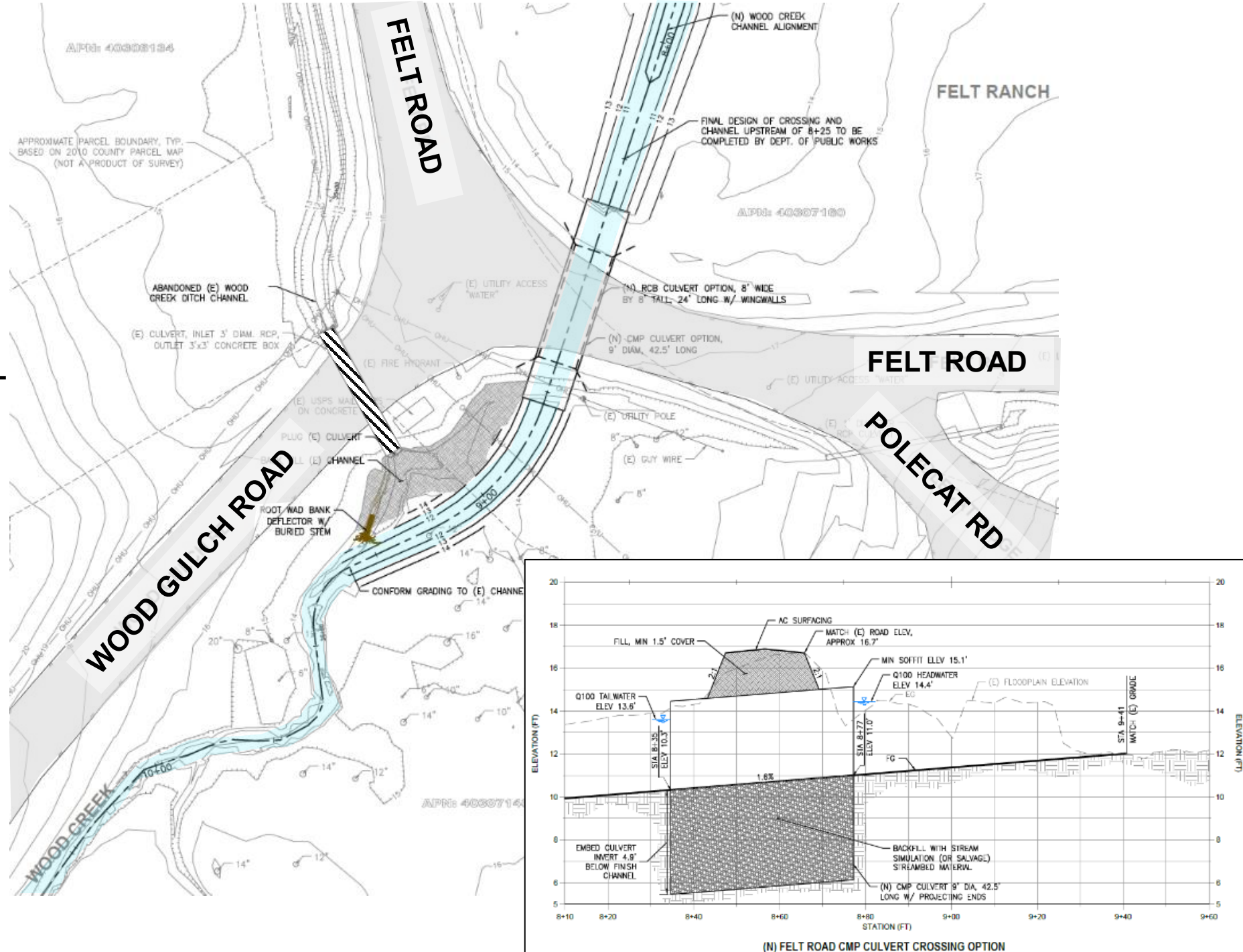
**BARN**

Existing Cattle Bridge

Ditch Plug

# Wood Creek – Felt Road Crossing

- Realign Wood Creek onto Felt Ranch
- Stream Simulation Design - Embedded 9' circular or 8'x8' box culvert
- County Designed Crossing





September 23,  
2025



Phase II  
Restoration

September 23,  
2025



September 23,  
2025



September 23,  
2025



## Want to get involved or learn more?

Email [info@ncrlt.org](mailto:info@ncrlt.org) to **sign up for NRLT's email list**- write "Volunteer" in the message if you are also interested in volunteering.

Find **updated information** on [www.NCRLT.org](http://www.NCRLT.org) *News and Announcements*, or in our biannual newsletter. If you're not already on our mailing list, you can join by sending your mailing address to [info@ncrlt.org](mailto:info@ncrlt.org).

**Support our work!** Donate on our website or by scanning the QR code (right) to help NRLT continue supporting, protecting, and restoring wild and working lands in our region.



# Upcoming Events!

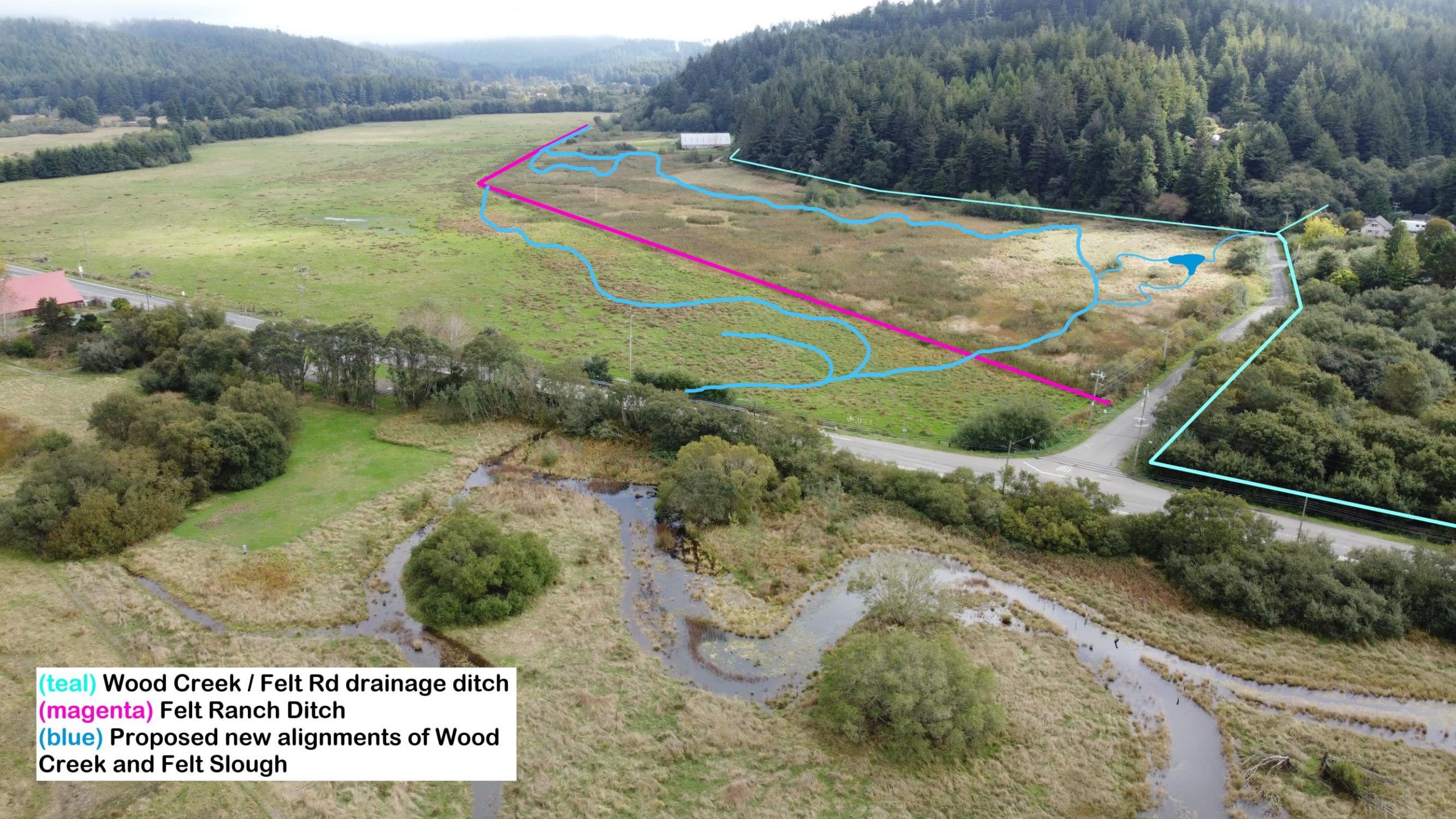
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More info available on our website [ncrlt.org/](http://ncrlt.org/)



Photo by Thomas Dunklin





**(teal)** Wood Creek / Felt Rd drainage ditch  
**(magenta)** Felt Ranch Ditch  
**(blue)** Proposed new alignments of Wood Creek and Felt Slough