

BUILDING BACK SALMON HABITATS IN THE MIDDLE KLAMATH AFTER GOLD MINING

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Middle Klamath R

This topographic map illustrates the Klamath River watershed in Oregon, divided into five subbasins: Middle Klamath, Shasta, Scott, Salmon, and Trinity. The river is shown in blue, and the subbasins are outlined in purple. A prominent red line traces a path through the watershed, likely representing a proposed project route. Major dams, including Iron Gate Dam, Copco Dam #1 and #2, and Keswick Dam, are marked. The map also shows major roads like I-5, I-177, and SR-99, and various towns and cities such as Medford, Ashland, and Klamath Falls. The terrain is color-coded by elevation, with higher elevations in brown and lower elevations in green.

Shasta R subbasin

Scott R subbasin

Salmon R subbasin

Trinity R subbasin

Legacy of Degraded Floodplains and Off Channel Habitat Loss

Horse Creek Ecosystem Analysis Klamath National Forest Scott River Ranger District



Looking down Horse Creek, just above confluence with Middle Creek. Circa 1940



Flood Levee



United States Department of Agriculture, Forest Service
Pacific Southwest Region
Caring for the Land and Serving People
November 2002

PROBLEM: Humans and Coho are competing for the same space found on floodplains and stream valleys.



DREDGING THE KLAMATH RIVER AT HUMBUG CREEK -
1941



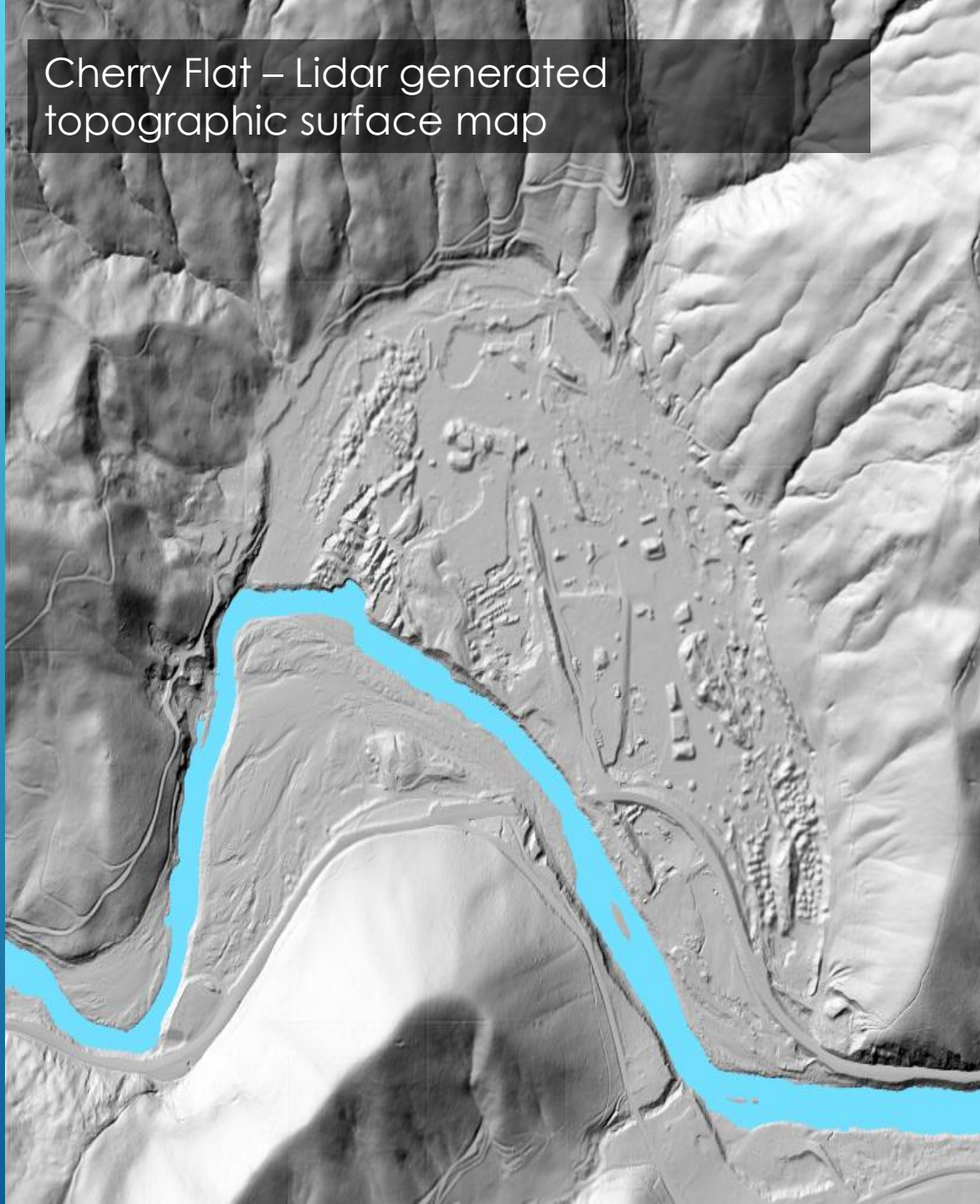
Klamath River at Humbug Creek - Today

Cherry
Flat
1944



Gold Dredge

Cherry Flat – Lidar generated
topographic surface map



Seiad Valley
1944

000-71-82

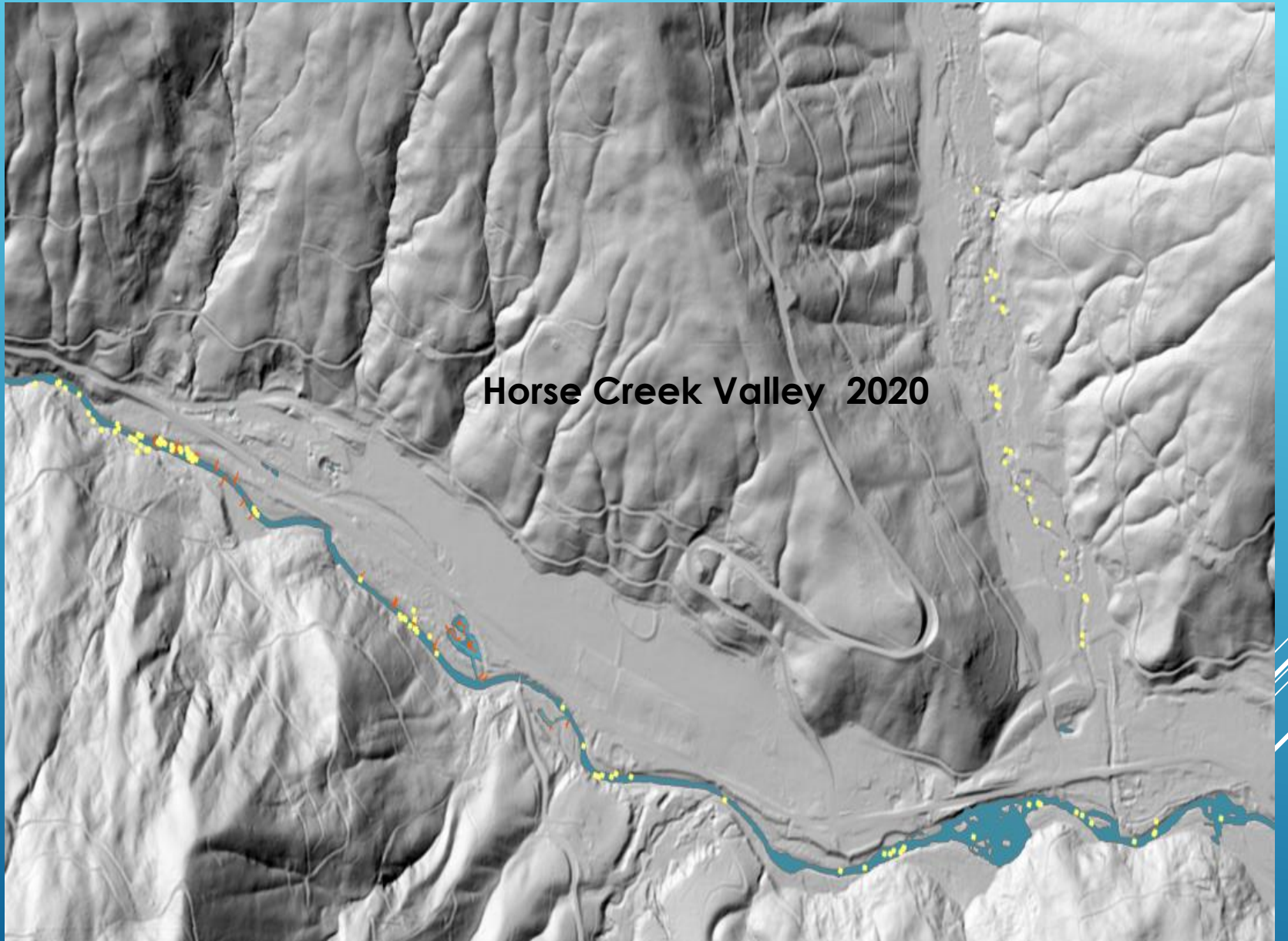


Gold Dredge

Horse Creek Valley 1944

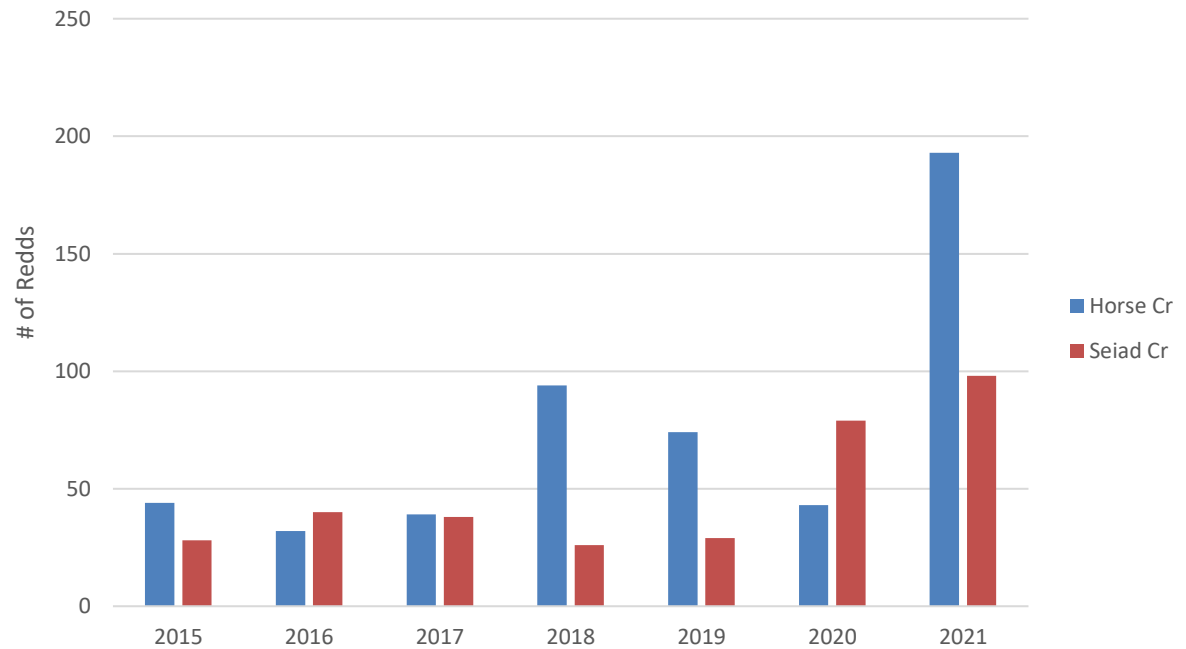
Gold Dredge





Horse Creek Valley 2020

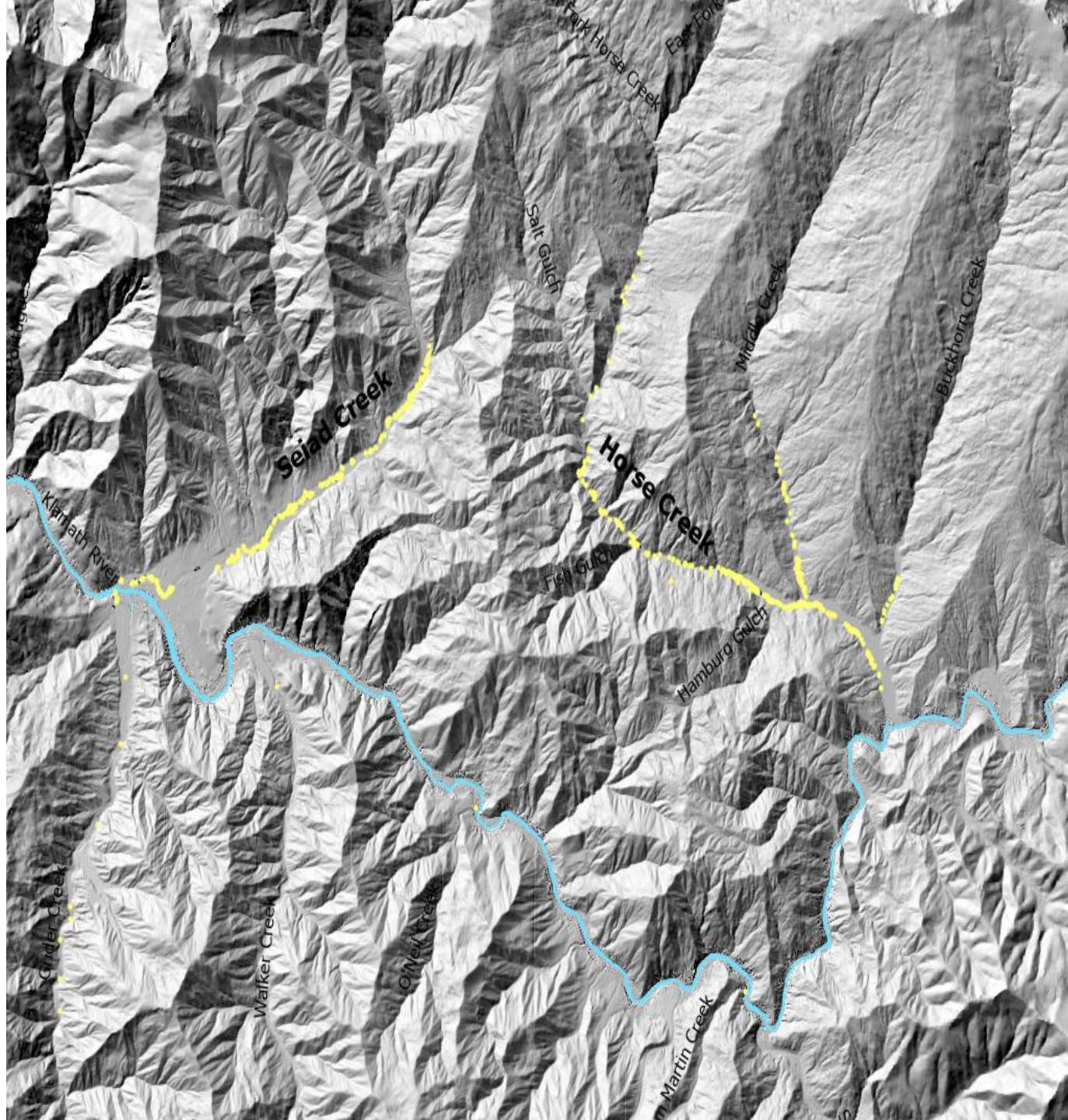
Coho Spawner Survey Results: Horse Creek and Seiad Creek



Middle Klamath Adult Coho Population

- ESA listed species since 1997
- Most spawning occurs in just a few tributaries- Horse Creek and Seiad Creek
- The adult spawning population is small- usually less than 300 spawners.

Seiad &
Horse
Creek
Coho
Spawning
Sites for
past 10
years





Klamath River Coho Ecology Study



Karuk Tribe and Yurok Tribe collaborative effort since 2007

- Diverse Coho life history patterns exist and non-natal stream rearing is common
- Seasonal movements of age 0+ juveniles to find suitable winter and summer rearing habitat is common.
- Quality winter and summer habitat along the Mid Klamath is in short supply due to floodplain degradation and stream channelization.
- Restoration goals should focus on habitat quality and consider constructed off channel habitats to improve survival of juveniles.



Diverse Life History Patterns

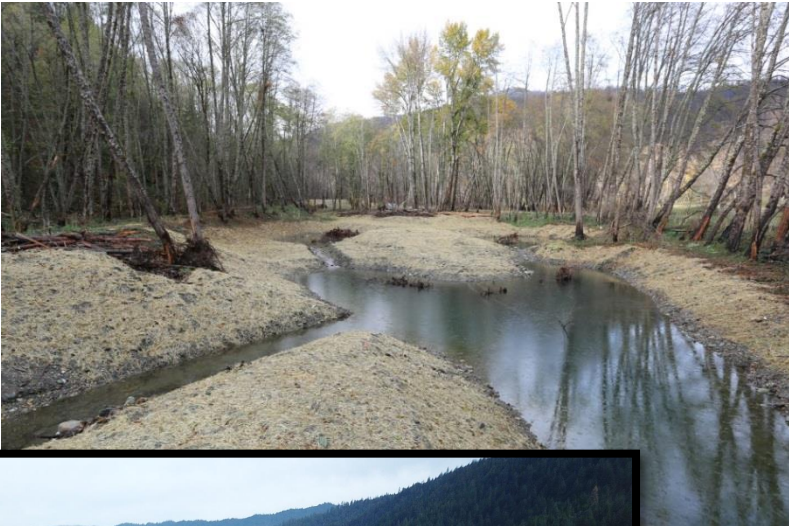
- Early Summer Movements to Cold Water
- Late Fall/Winter Movements to Slow Water

Building Juvenile Coho Habitats



Project Types

- **Off-Channel Floodplain Ponds**-25 sites since 2010



- **Stream Channel Restoration Projects**



- **Large Wood Loading**

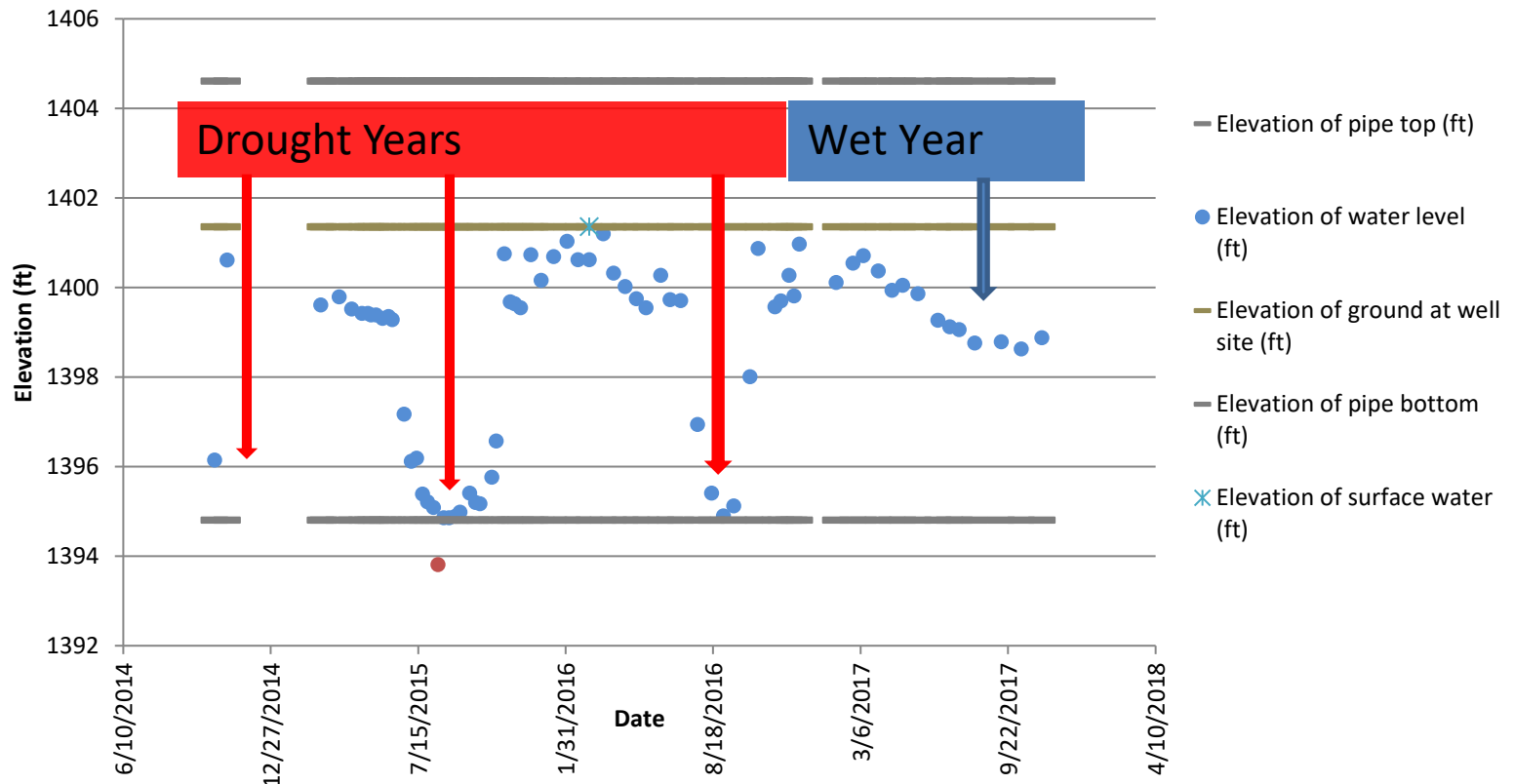


Installing Groundwater Monitoring wells within project site



Groundwater Elevation Monitoring- Dry and Wet Years

WELL SITE 16



Seaid Creek Channel Restoration



Seiad Creek Project-Construction Phase

Meander Jams



Levee Removal



Before Project View

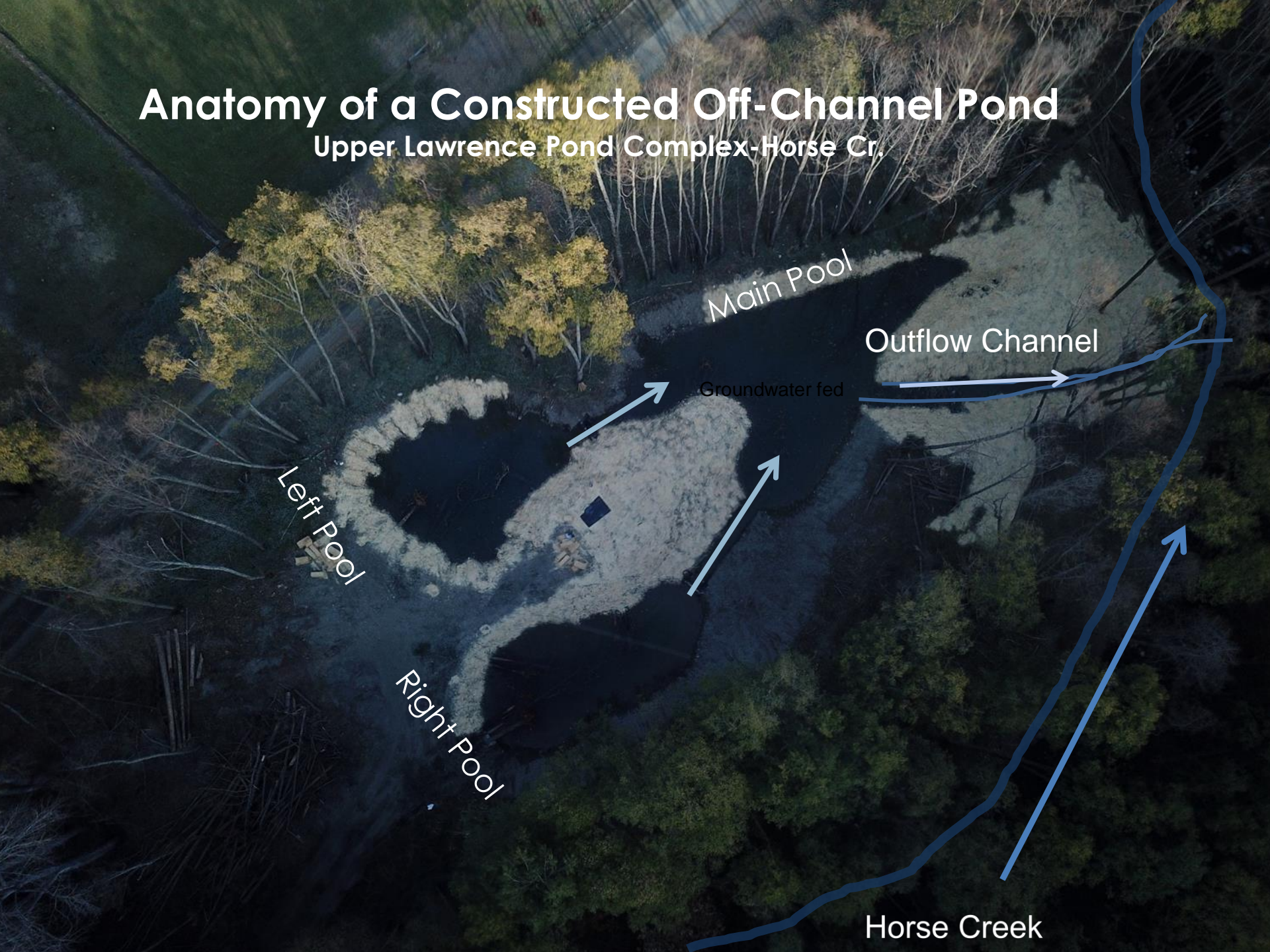


AFTER PROJECT VIEW



Anatomy of a Constructed Off-Channel Pond

Upper Lawrence Pond Complex-Horse Cr.



Main Pool

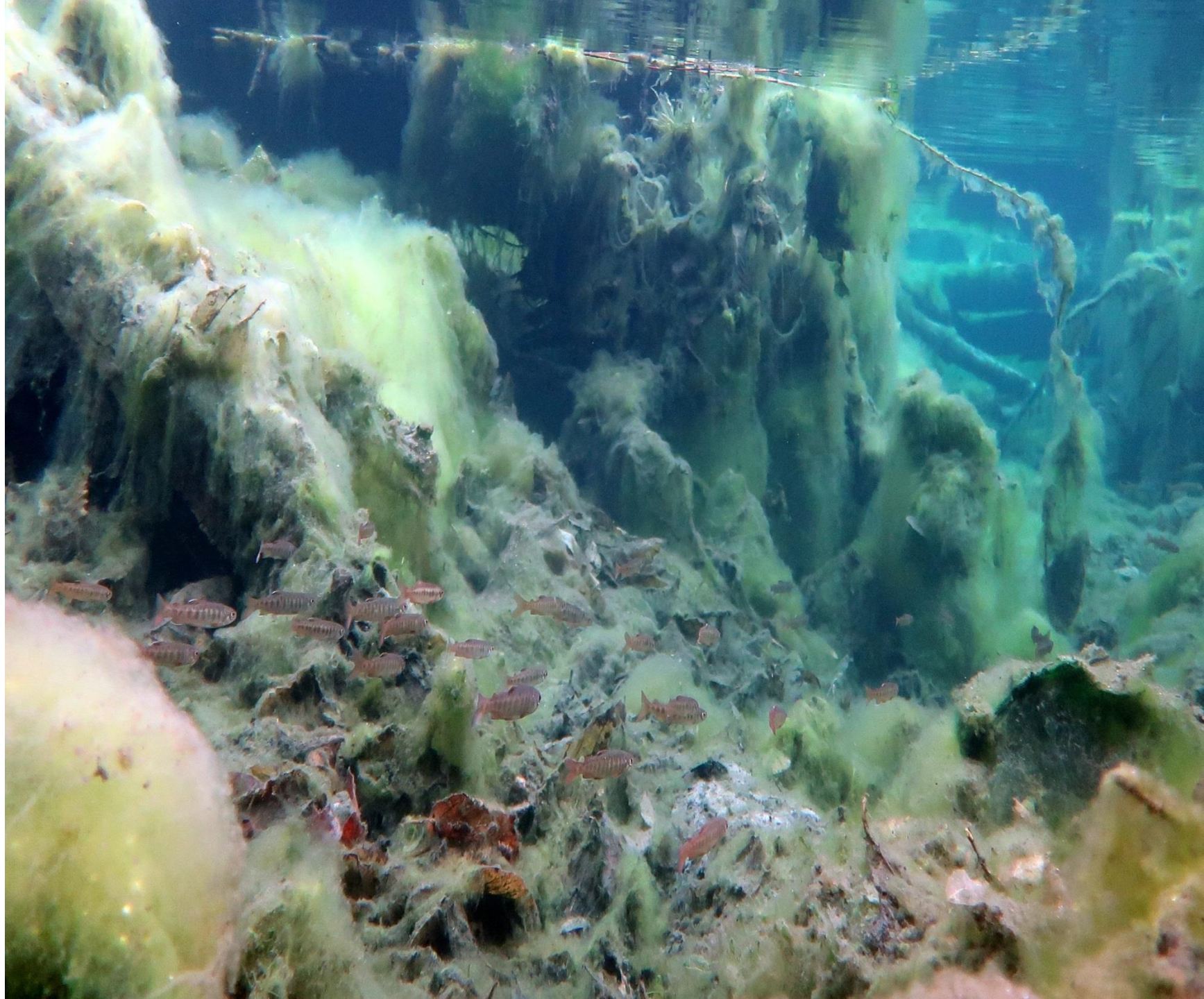
Outflow Channel

Groundwater fed

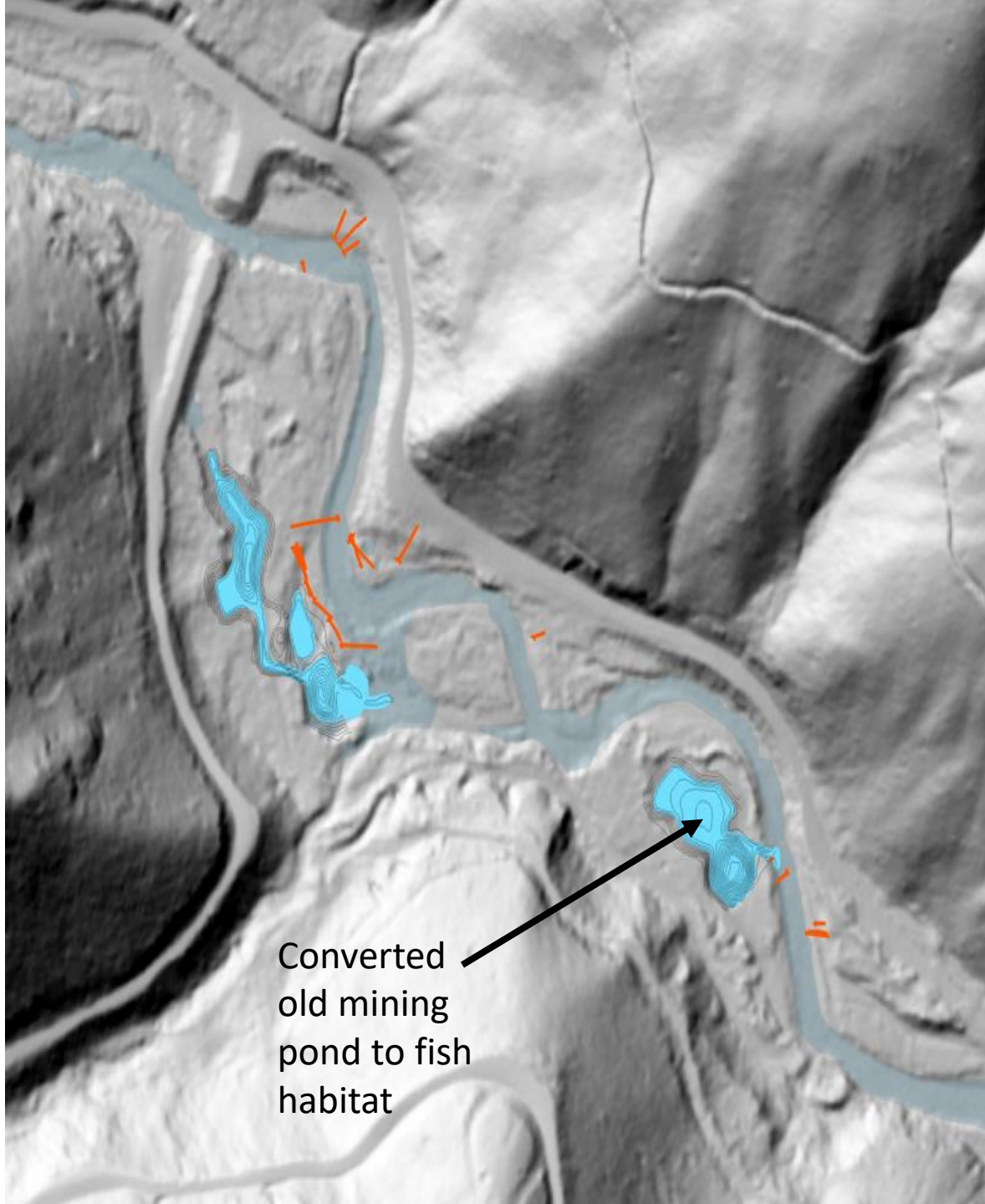
Left Pool

Right Pool

Horse Creek



Fish Gulch
Off-Channel
Ponds
& LWD
Project



Converted
old mining
pond to fish
habitat

Fish
Gulch
Mining
Pond –
showing
shallow
bench
connect
ed to old
mining
pond,
and
aquatic
vegetati
on

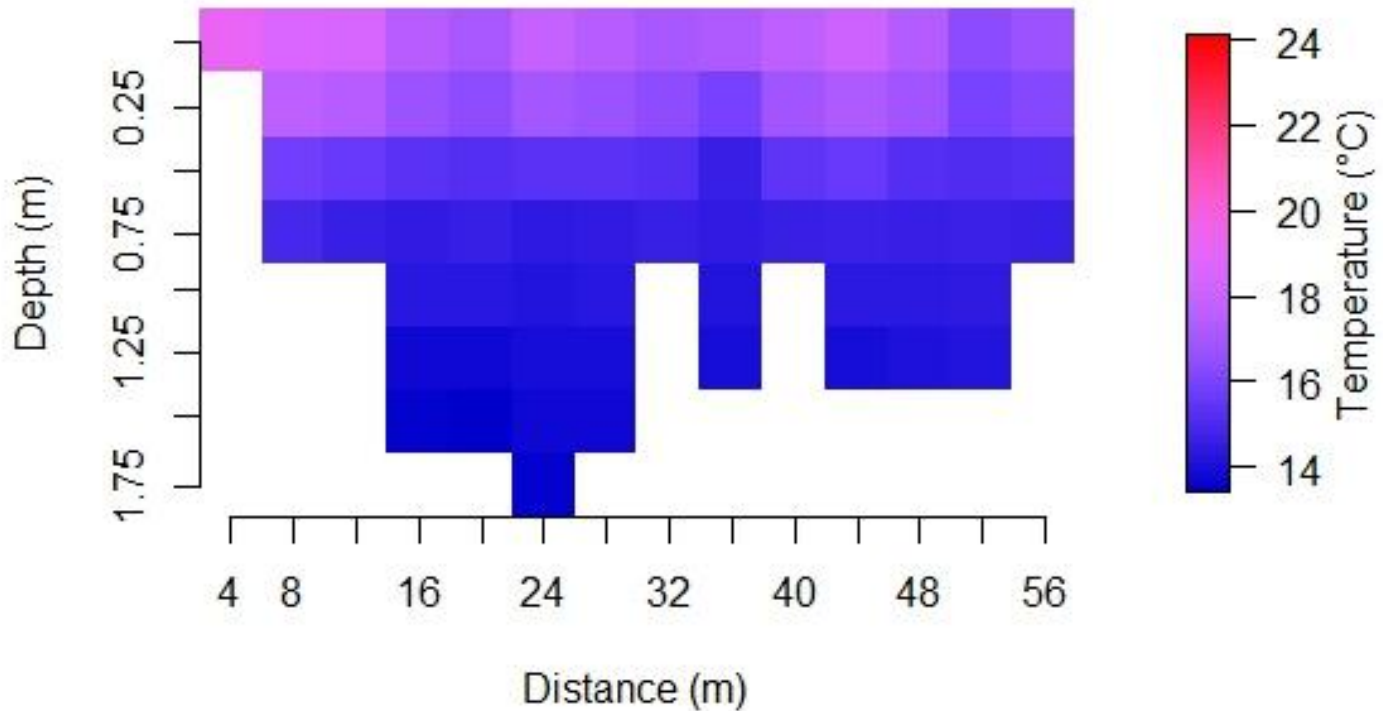


Old
mining
pond

Shallow
bench
with
aquatic
veg

Alexander Pond (May)

Air Temp: 26.5°C

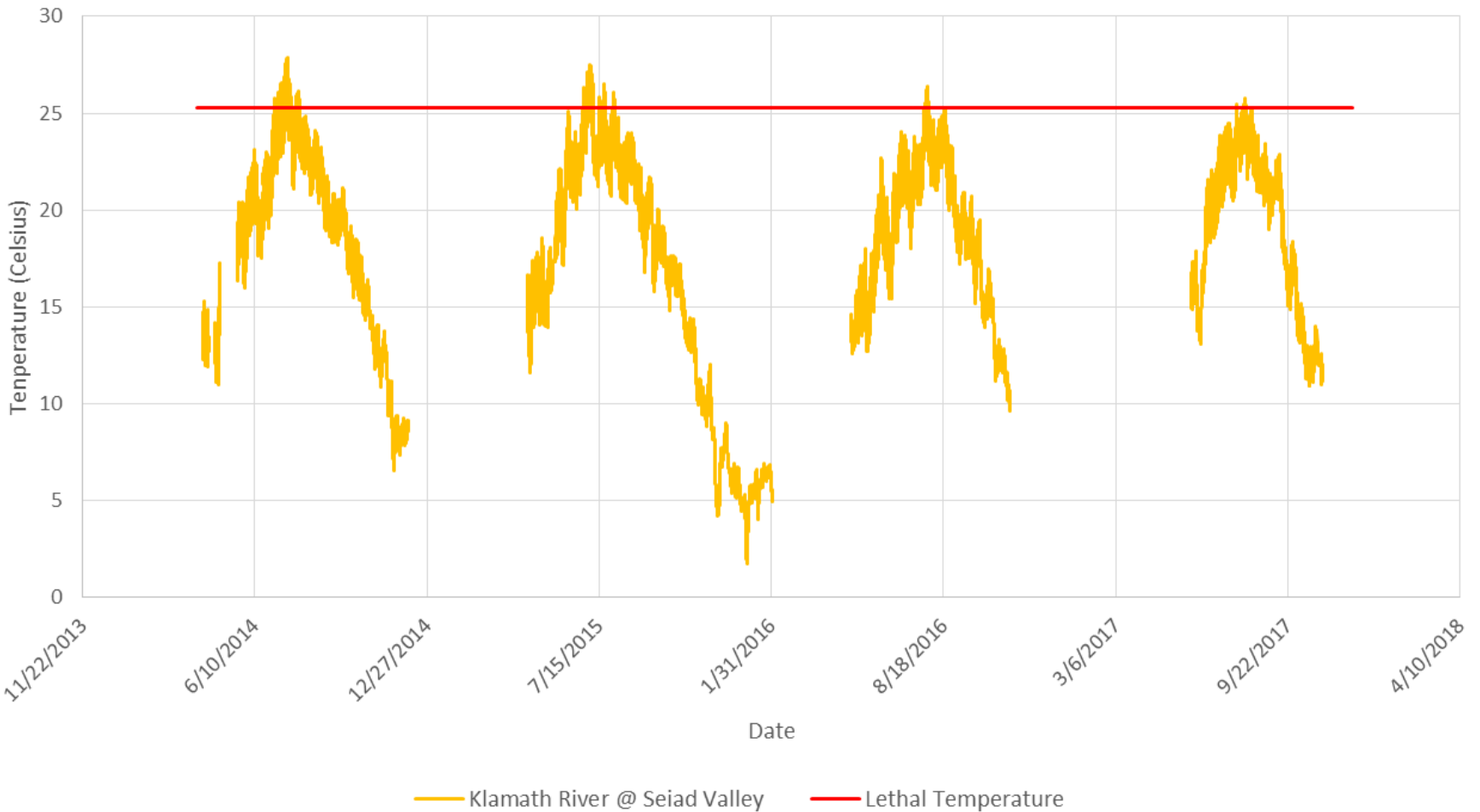


Pond Temperature and Depth Profile

Data: Michelle Krall

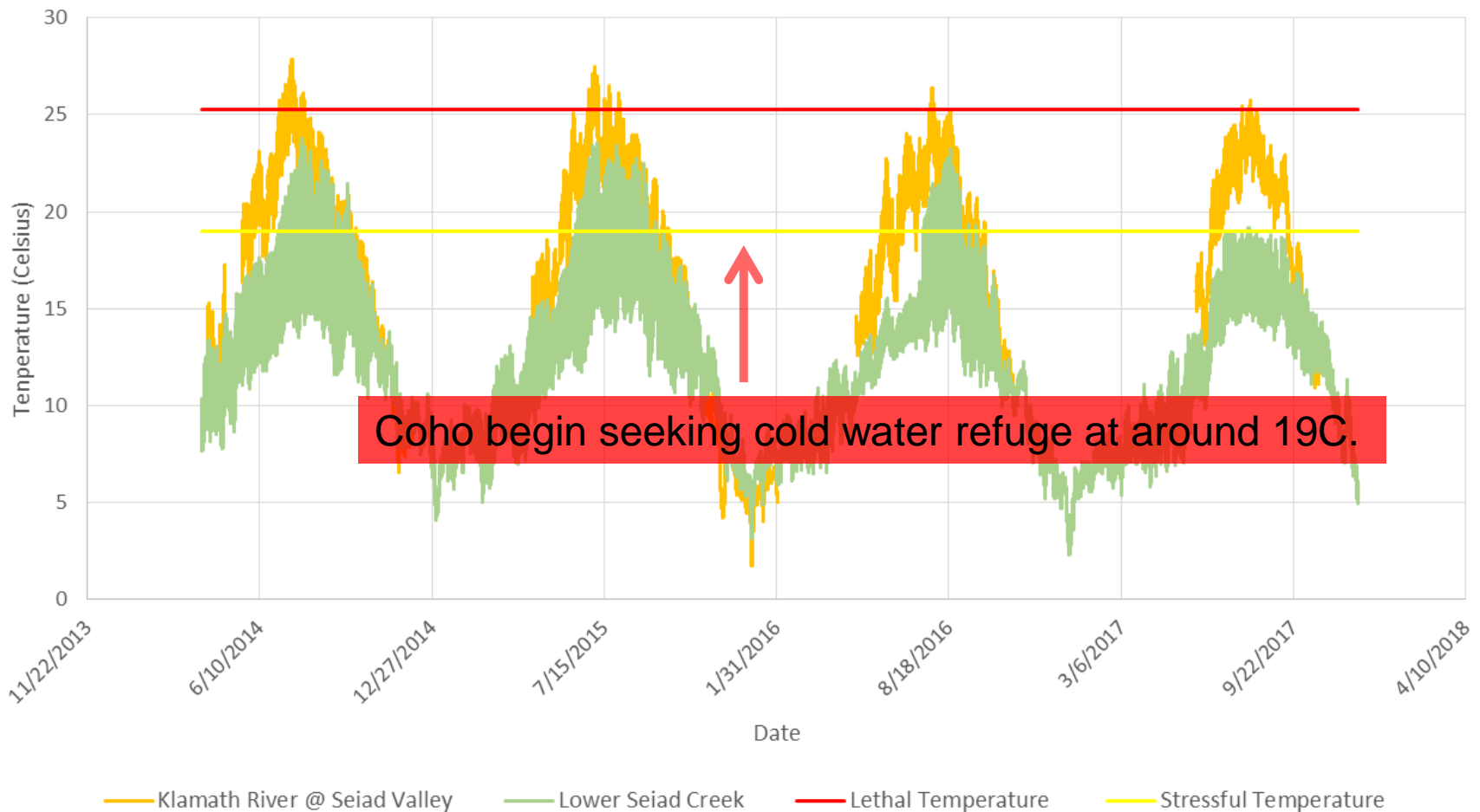
Mainstem Klamath Summer Temperatures

May Pond Temperature Data :2014-2017

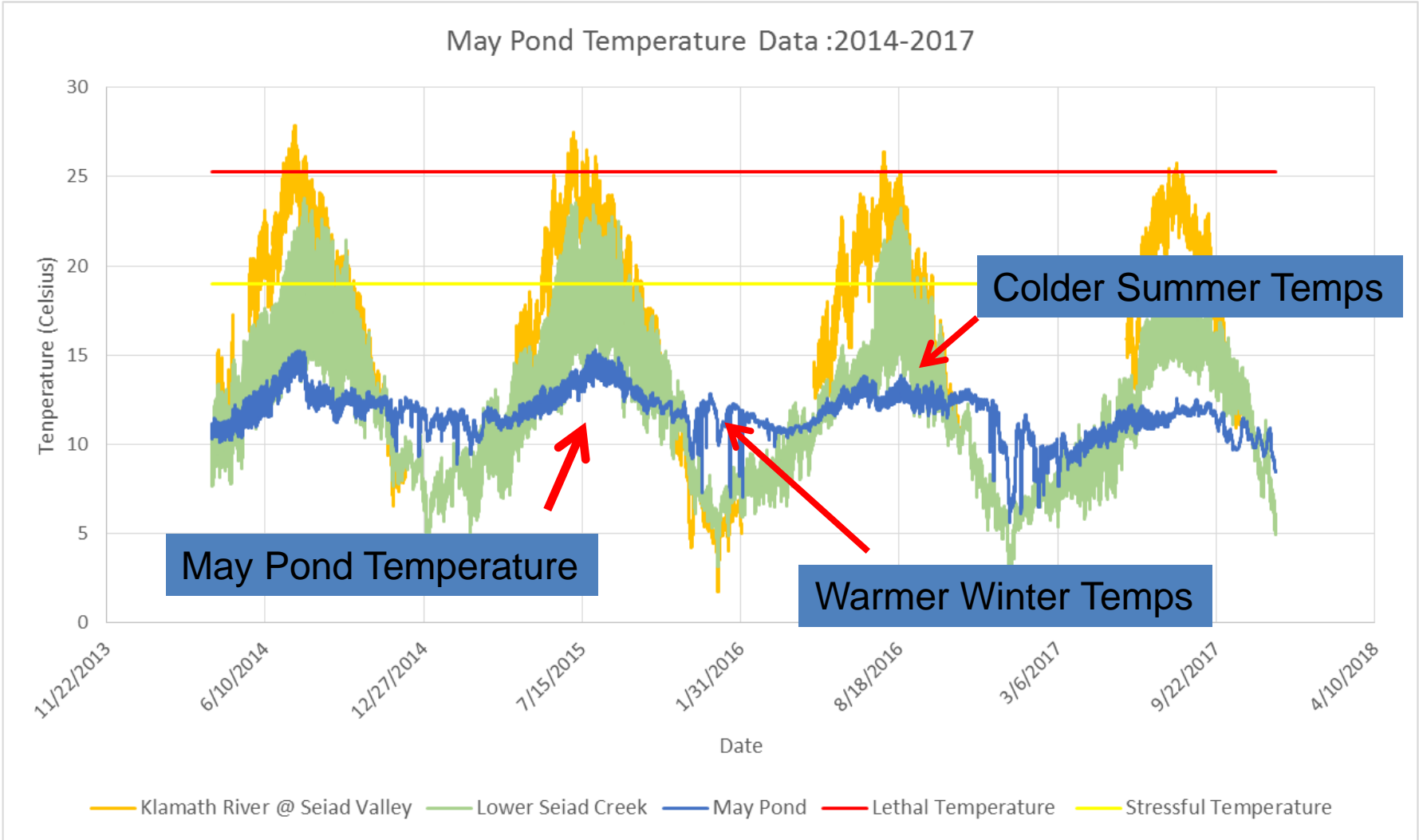


Lower Seiad Creek & Mainstem Klamath Summer Temperature

May Pond Temperature Data :2014-2017

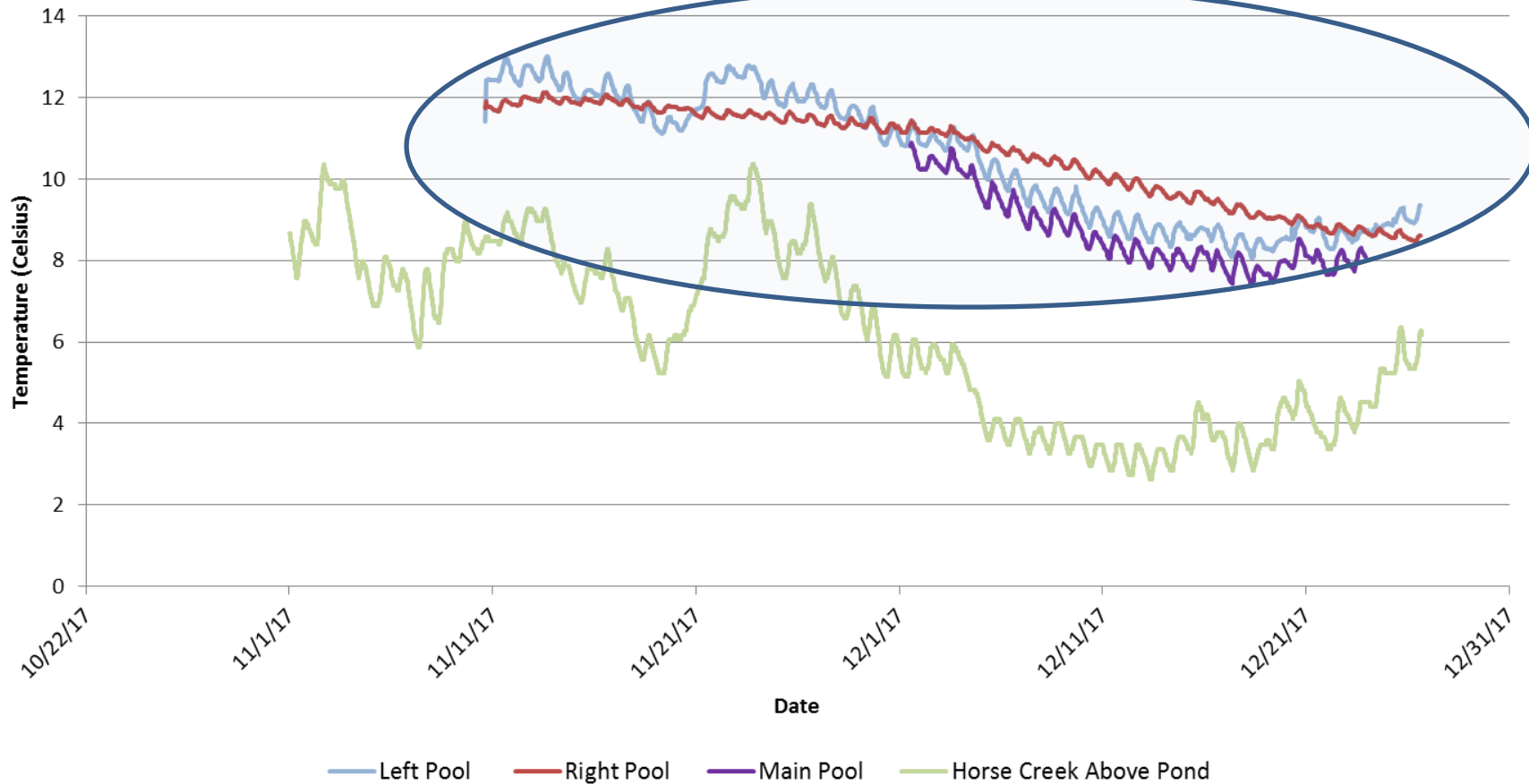


Klamath River vs Seiad Creek vs May Pond



Warmer Winter Temperatures

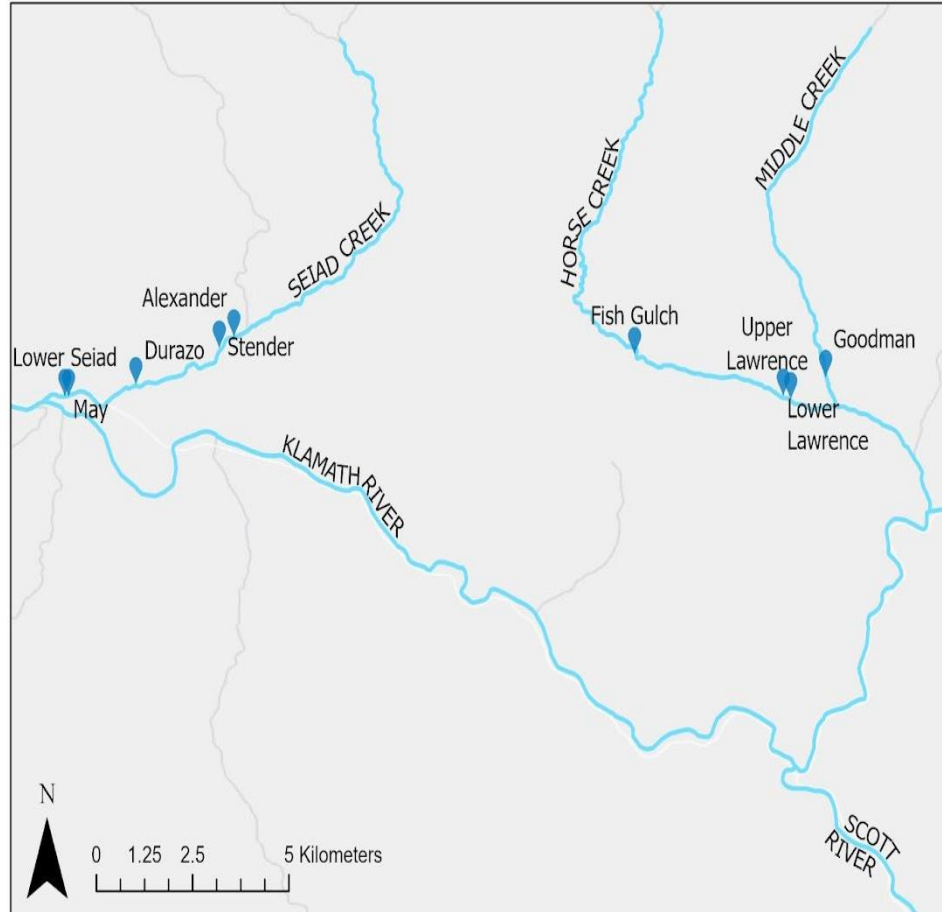
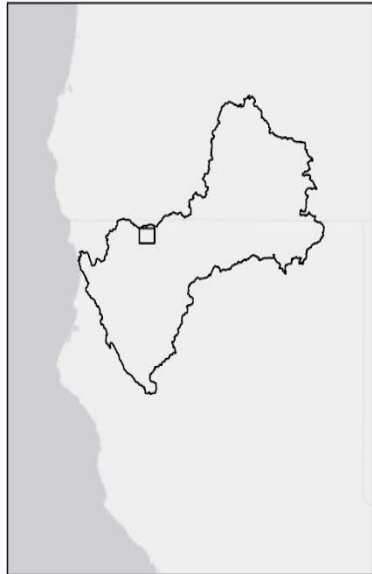
Upper Lawrence Pond Temperature Data



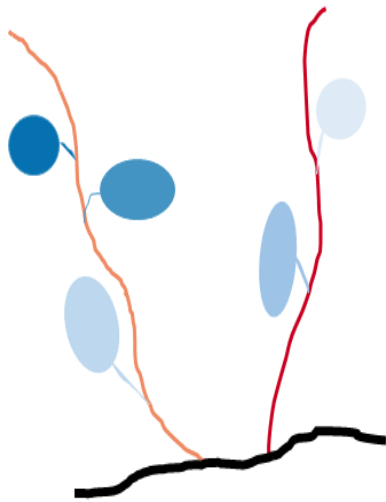
Ongoing Research at Seiad Creek and Horse Creek ponds

by UC Berkeley
PhD Student Jessie Moravek

9 ponds
2-4 HOBO
temperature
loggers per
pond and
creek
15-minute
temperature
data from July
2020 - July
2021
Time series
modelling
(MARSS and
wavelets)



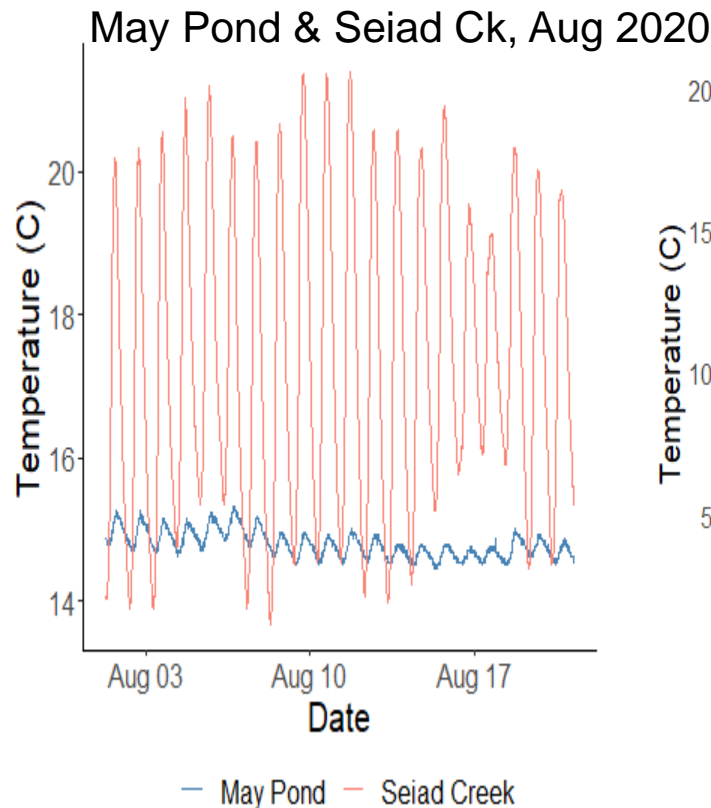
All ponds and creeks have different temperature patterns



Ponds add thermal diversity to the riverscape

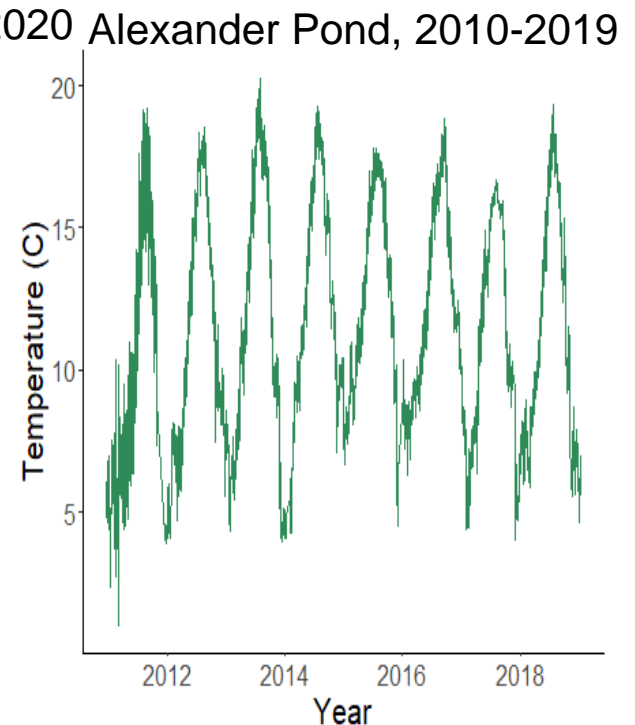
Ponds provide thermal habitat stability

Daily temperatures were 9x more stable in May Pond than Seiad Creek

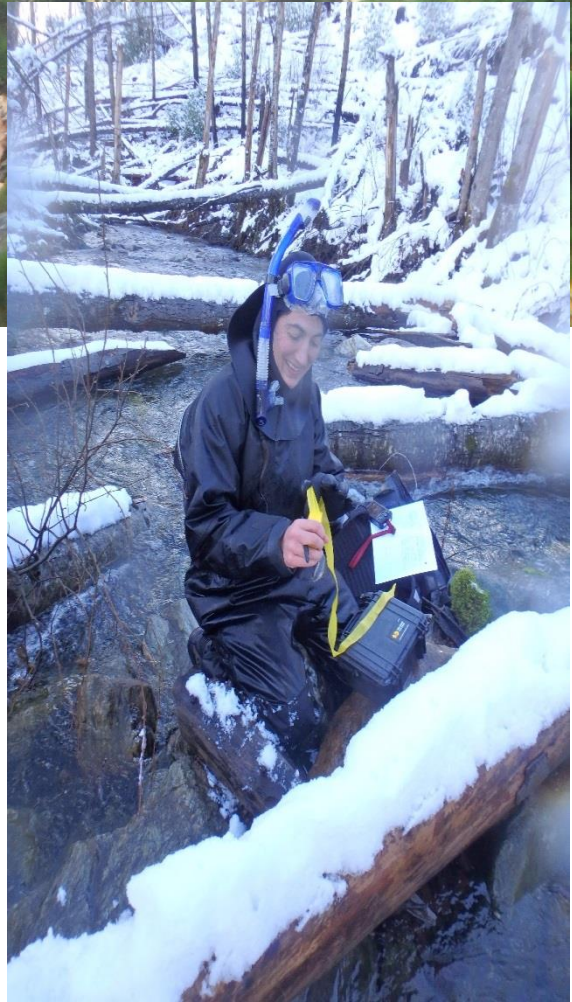


Pond thermal stability increases over time

Alexander Pond temps become less “fuzzy” over time as daily temperatures stabilize.



Annual Coho spawning survey



Horse Creek

- Coho spawning in close proximity to wood structures (12 wood structures installed in 2019)



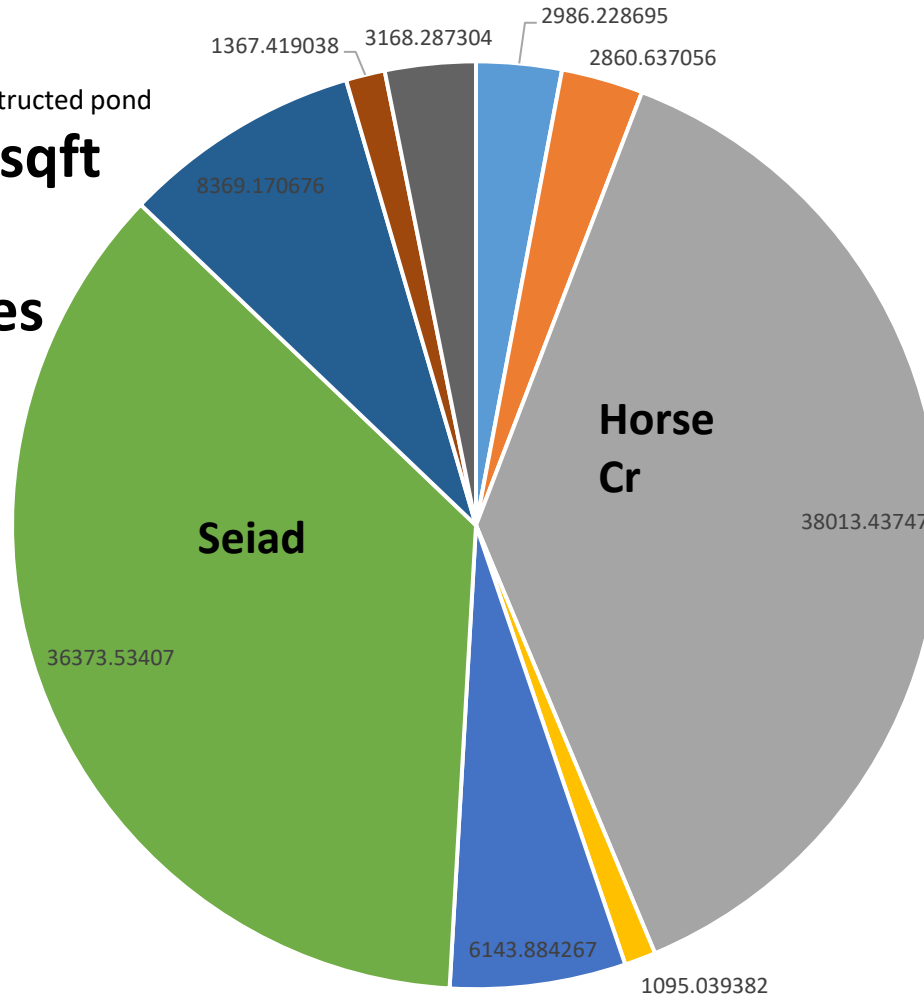
Square feet of constructed off-channel habitat by watershed

Total square feet of constructed pond

= **100,377 sqft**

or

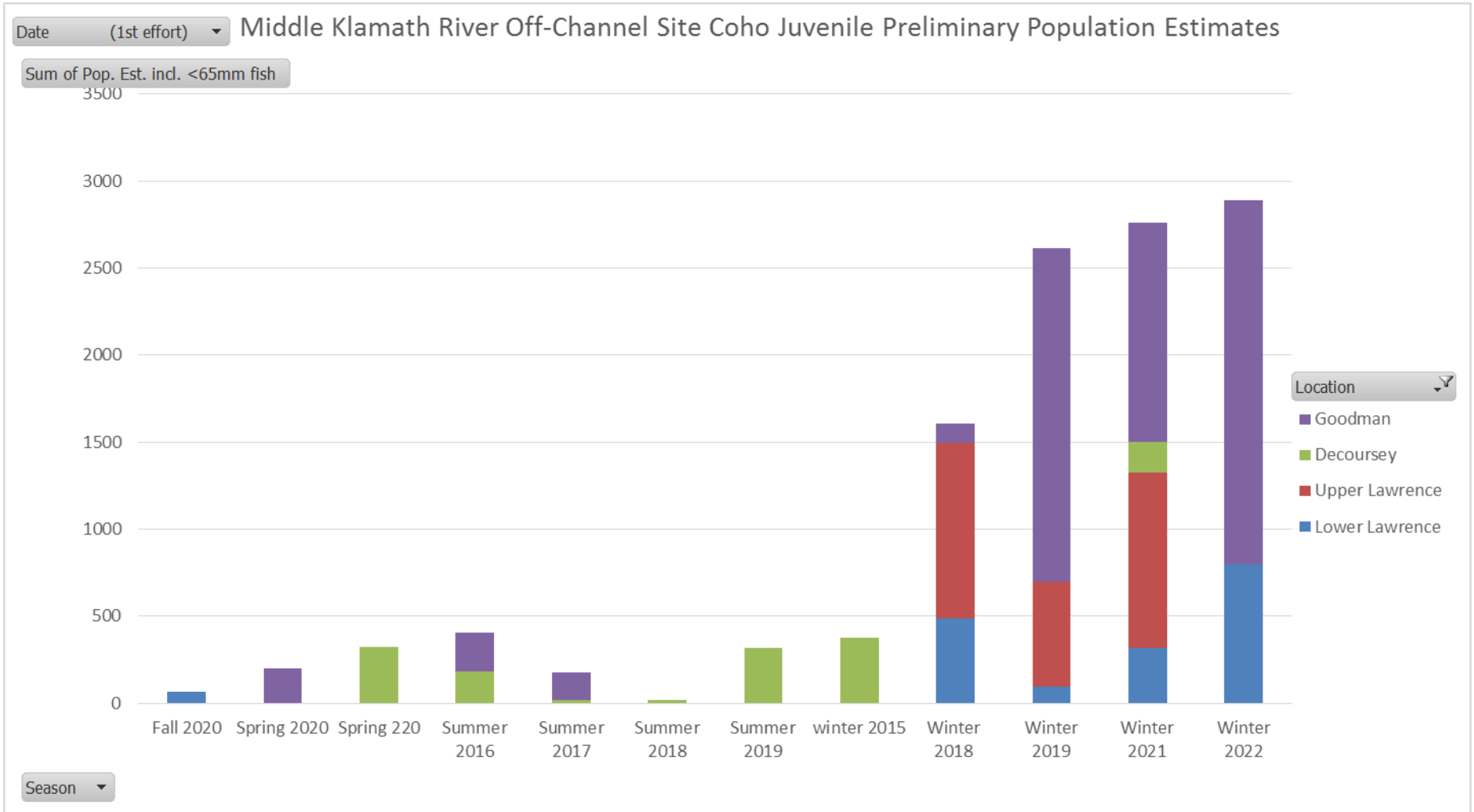
2.3 acres



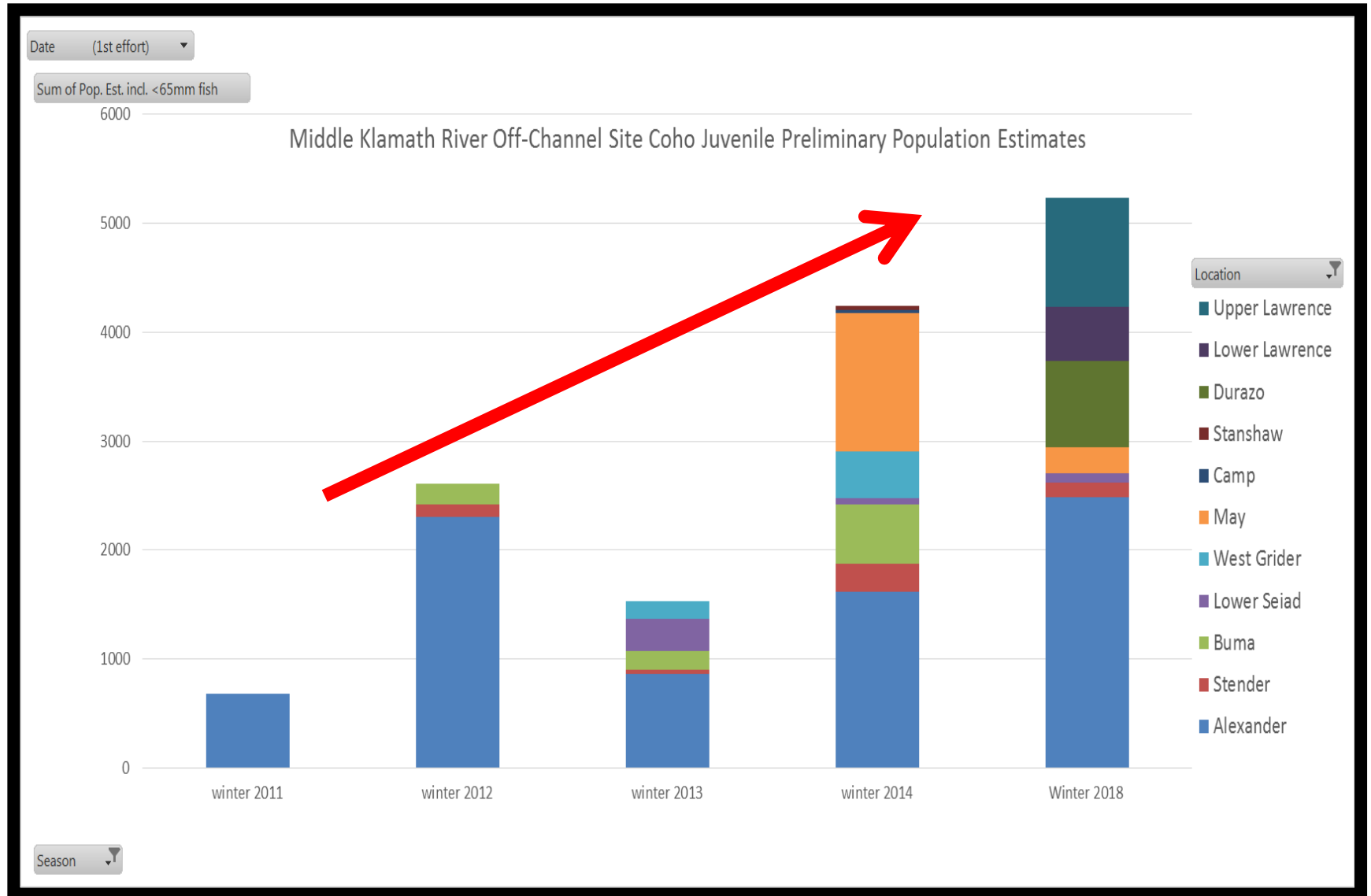
- Camp
- China
- Horse
- Little Horse
- Oneil
- Seiad
- Stanshaw
- Tom Martin
- West Grider

Horse Creek Ponds Seasonal Population Estimates

*Data is preliminary



More Sites=More Fish



Summary

- “If you build it they will come”.
- Both summer and winter utilization, but highest in winter.
- Summer utilization is high at sites with groundwater cooling influence and close proximity to the Klamath River
- Population size in part is a function of the fishes ability to find the site.
- Sites with strong groundwater influence saw higher growth rates
- Sites function during drought cycles.
- More lessons to learn from monitoring

Acknowledgement's

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- Jessie Moravek, UC Berkeley PhD Student

QUESTIONS

