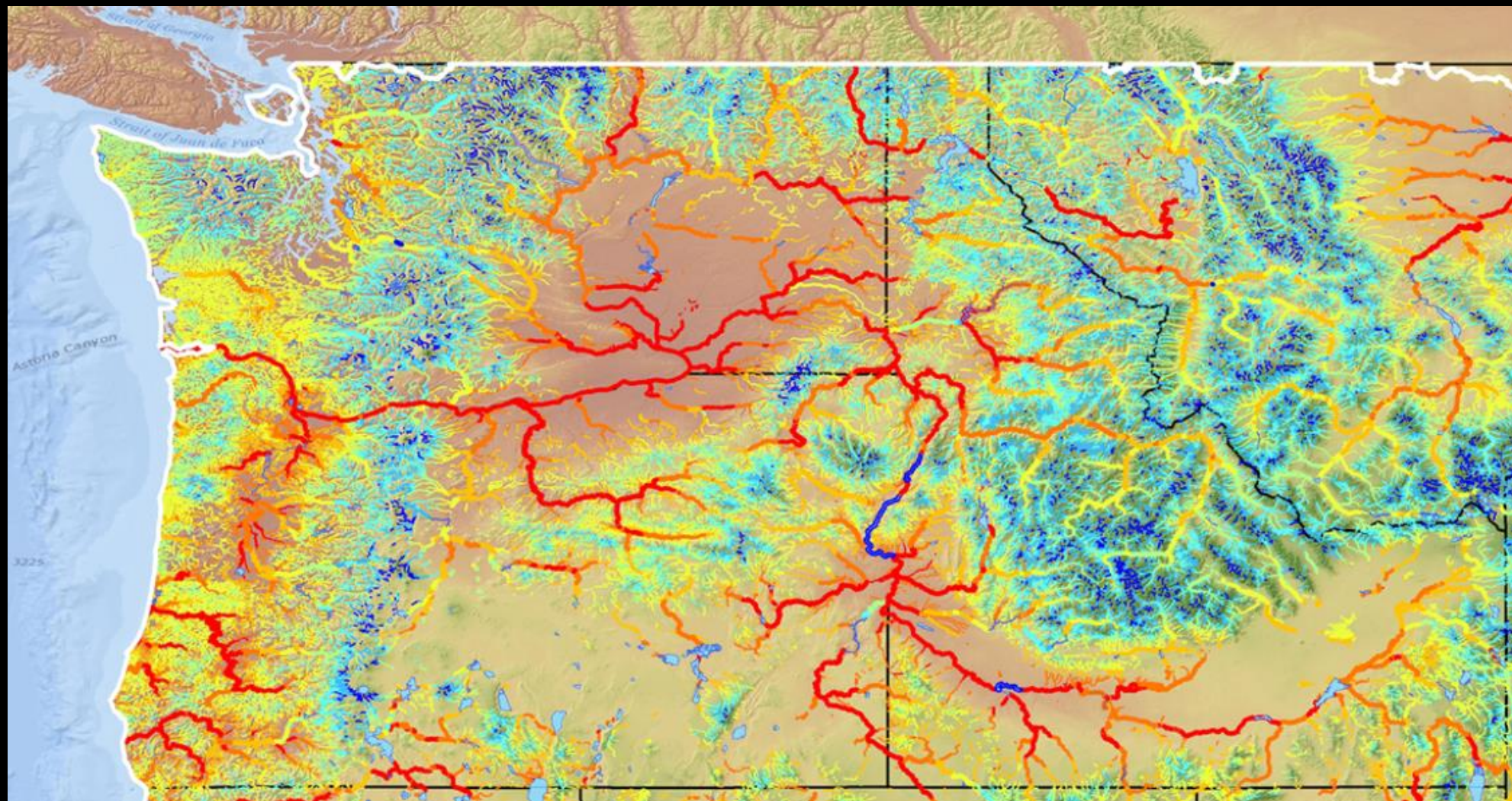
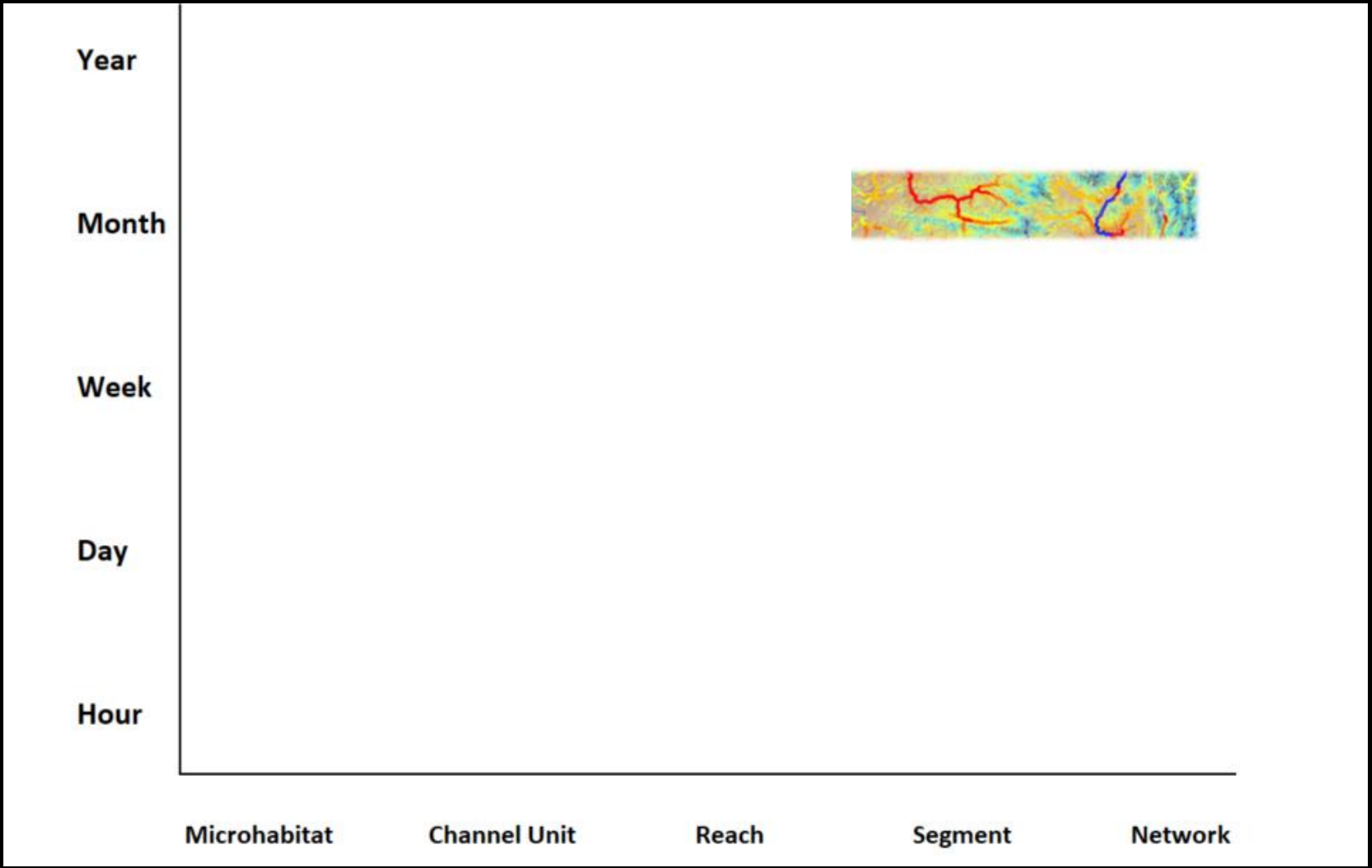


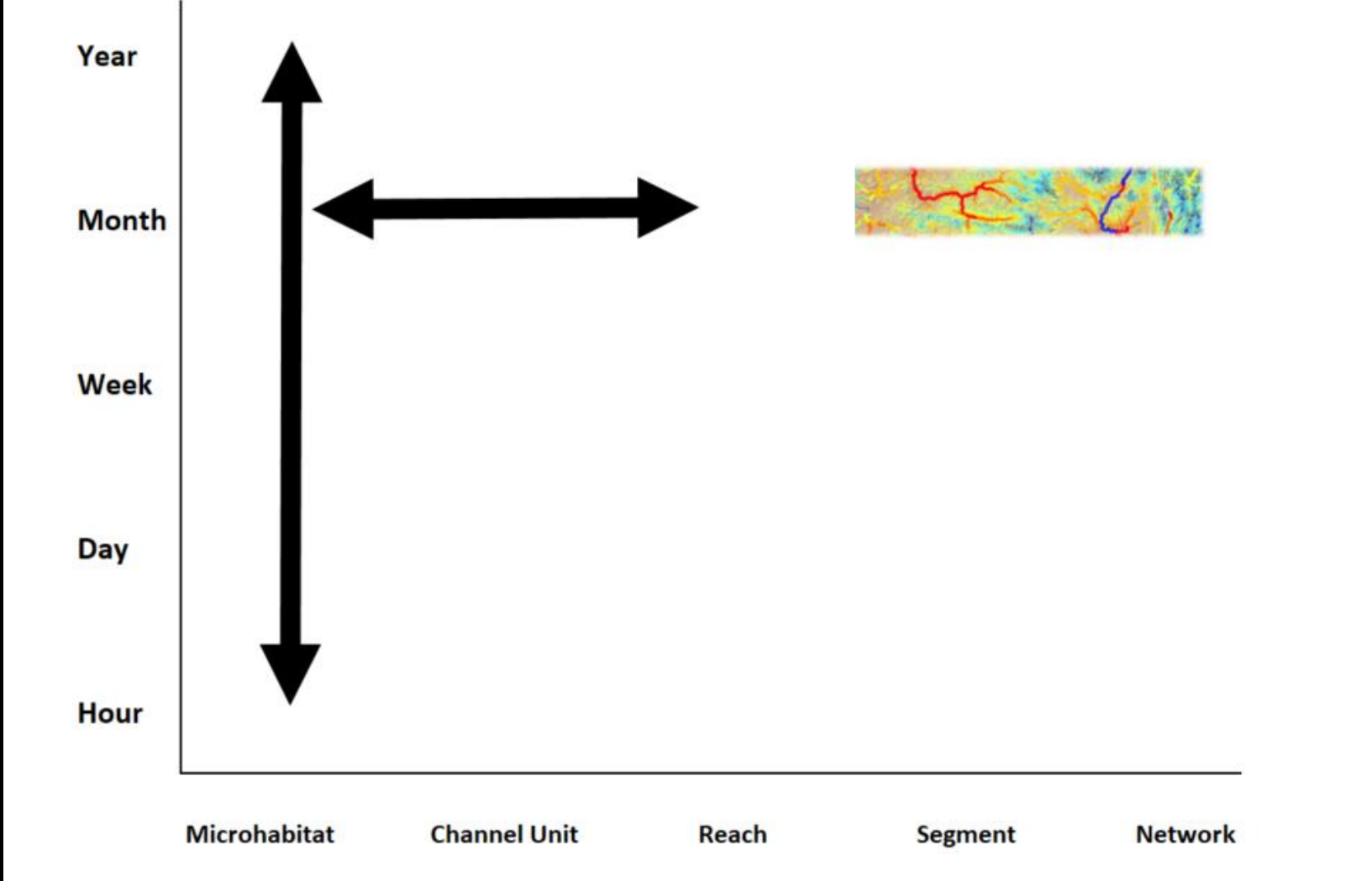
Investigating thermal refuge use by Willamette River coastal cutthroat trout

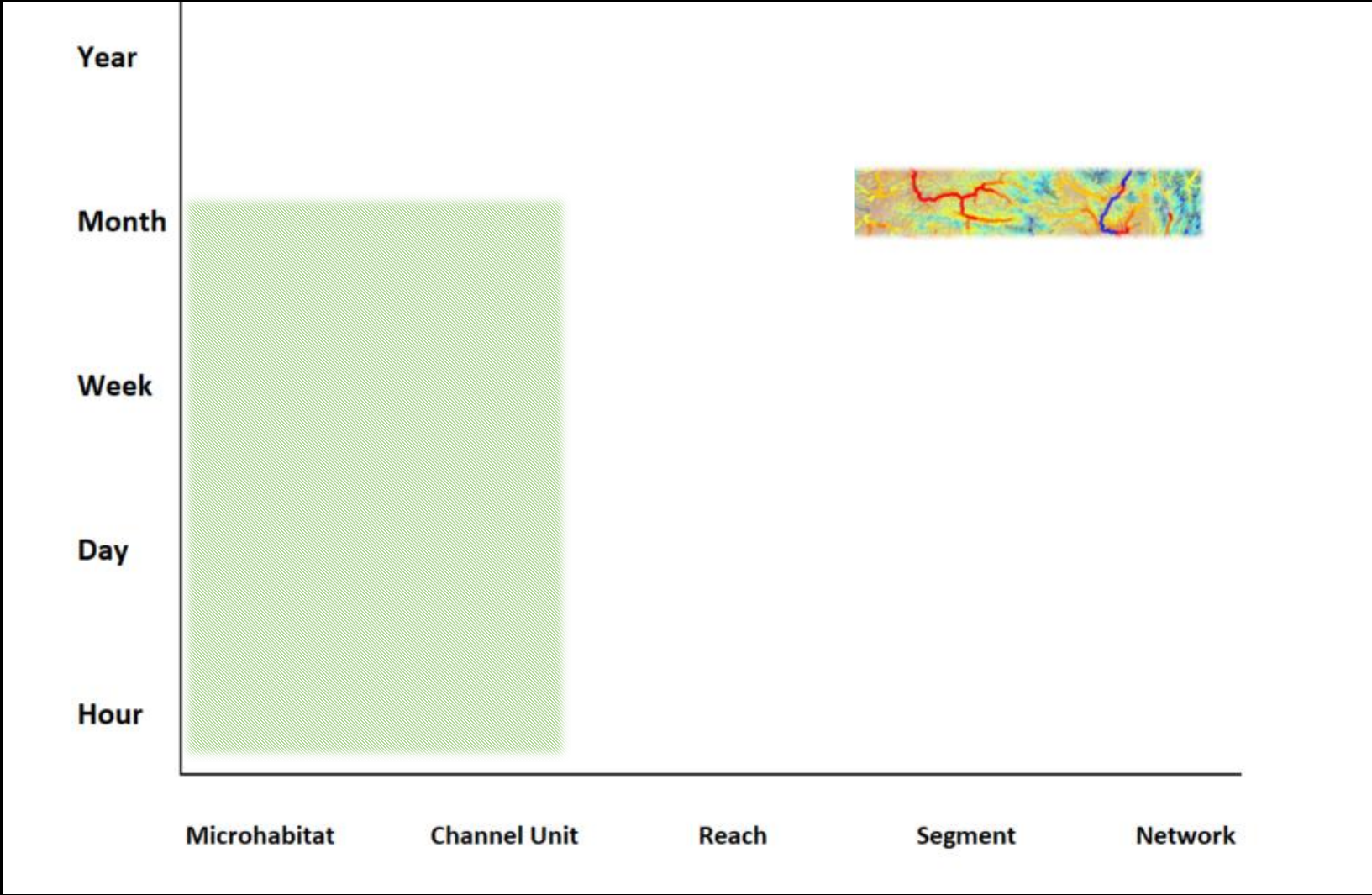
Photo by
Jonathan Armstrong

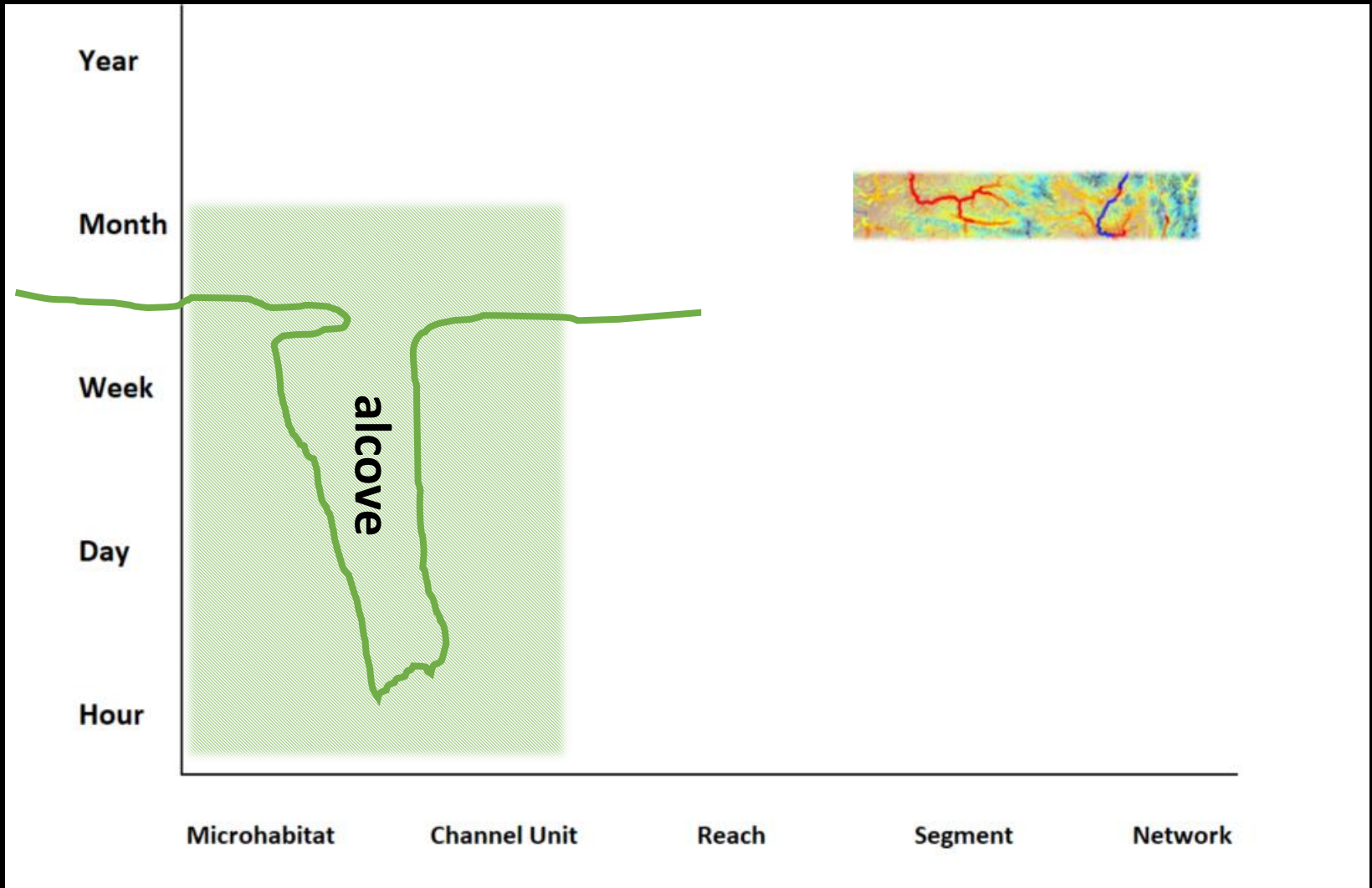
Hannah Barrett, OSU Dept of Fisheries and Wildlife



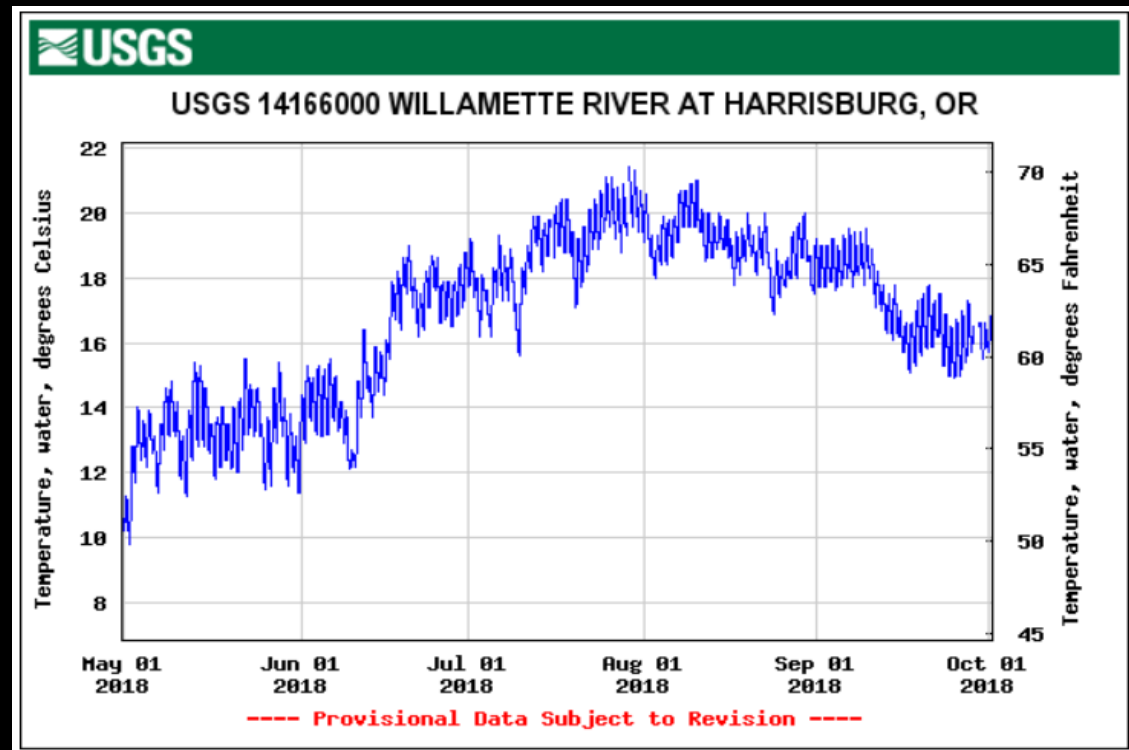




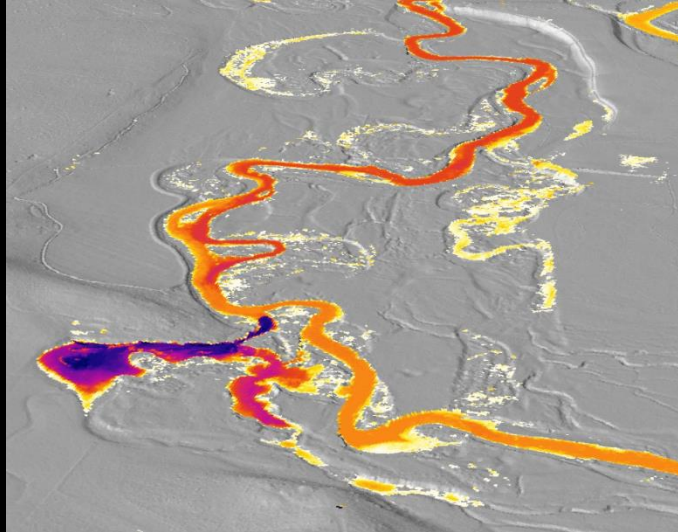




- Mainstem Willamette River temperatures exceed 20°C during summer
 - Stressful conditions

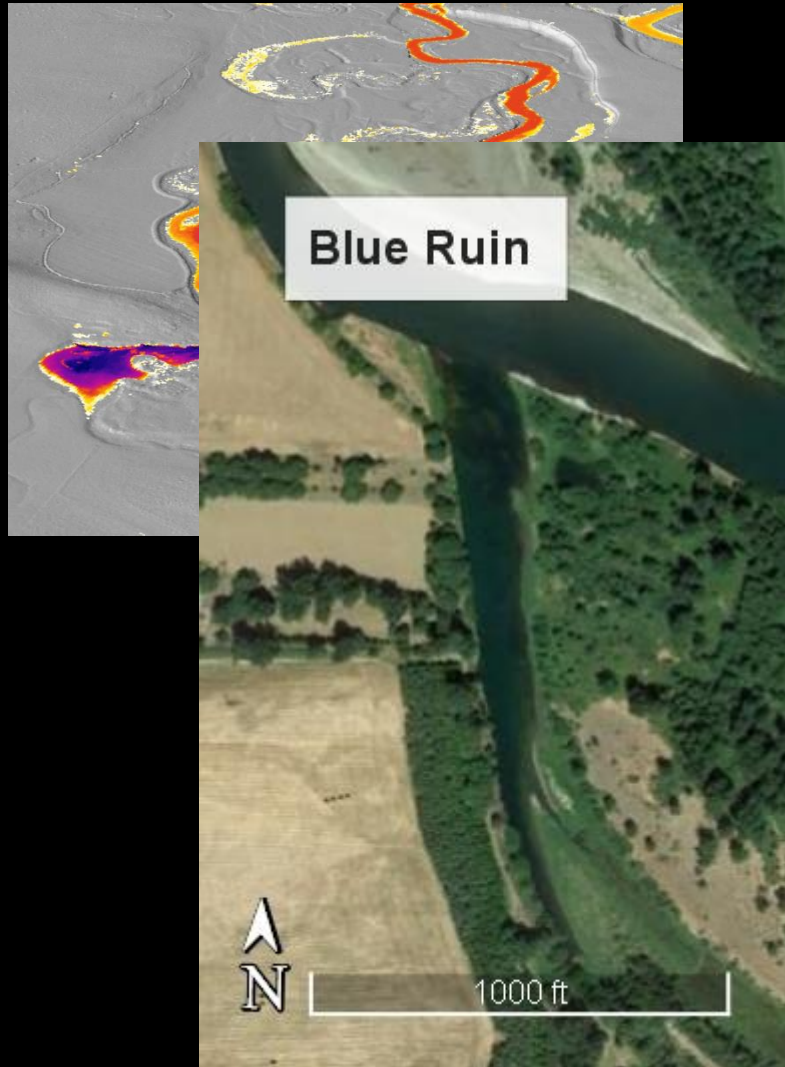


Floodplain thermal refugia: cold water alcoves



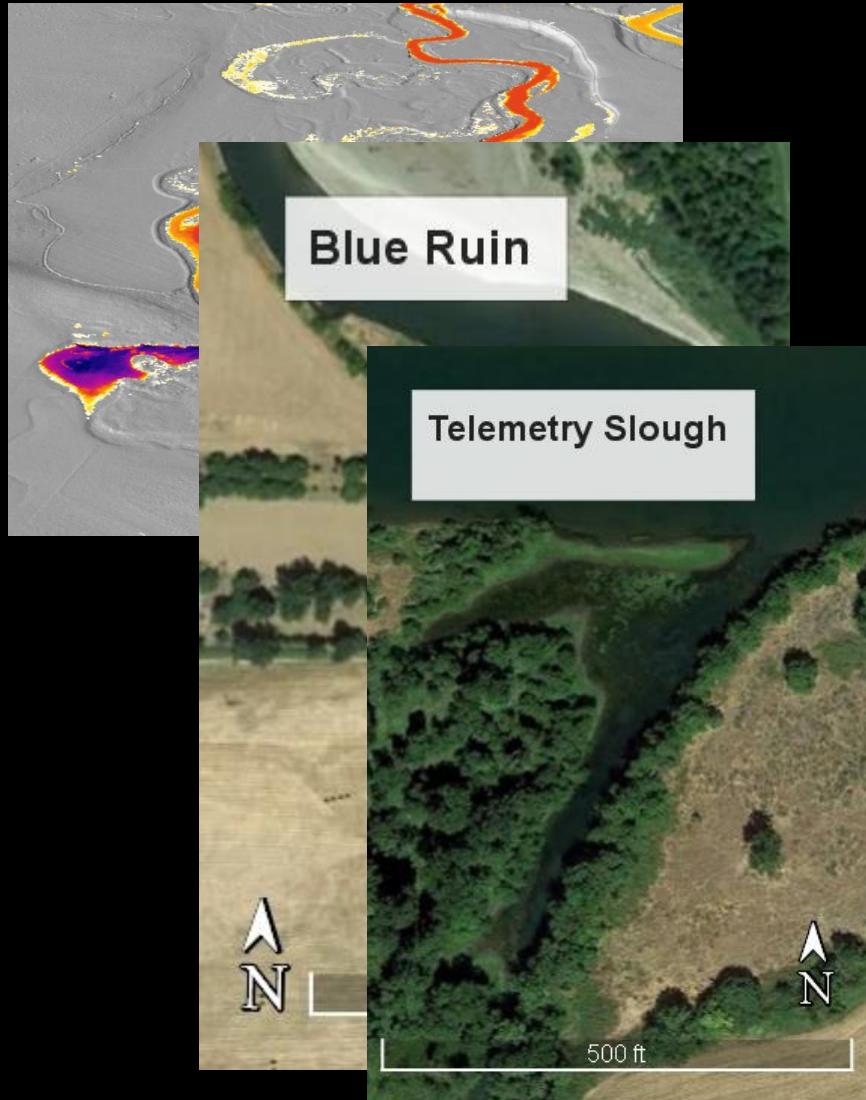
- Seasonally warm areas can support fish populations when they have thermal refuges.
- Fine scale features that stay cool during summer and can allow fish to survive over summer maximum temperatures/thermal stress.

Floodplain thermal refugia: cold water alcoves

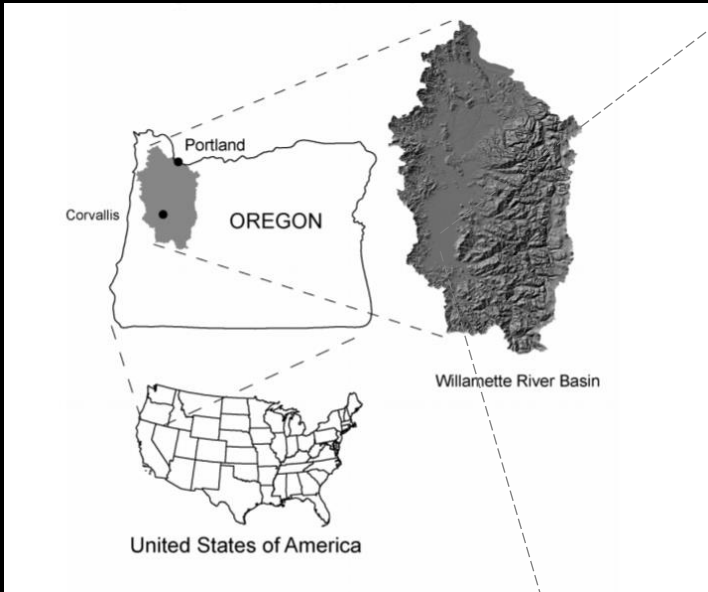


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Floodplain thermal refugia: cold water alcoves



- Seasonally warm areas can support fish populations when they have thermal refuges.
- Fine scale features that stay cool during summer and can allow fish to survive over summer maximum temperatures/thermal stress.



Our study hopes inform

- Timing of movement onto refuge, feeding and growth
- Oxygen-Temperature tradeoff
- How refuges combine with non-refuge habitats to support fish
 - Within a season as well as seasonally - synergy between habitats

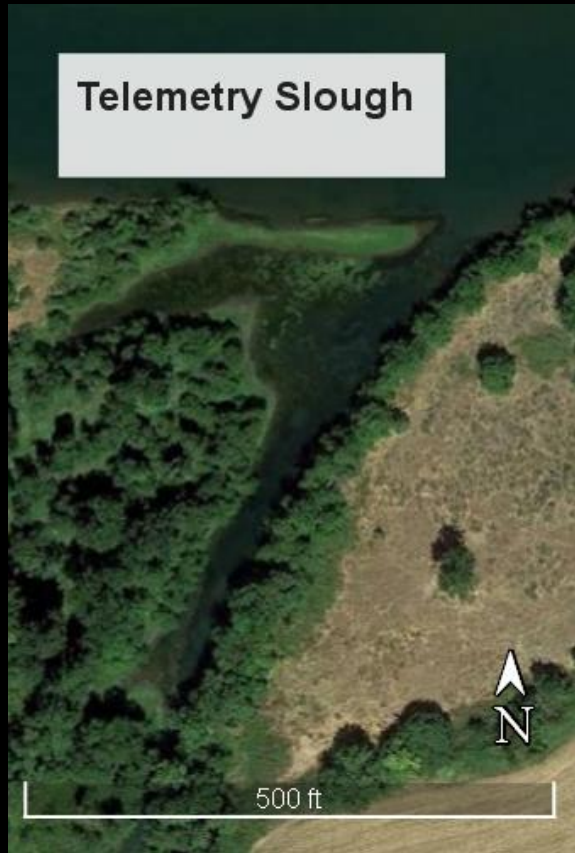


Diet and condition

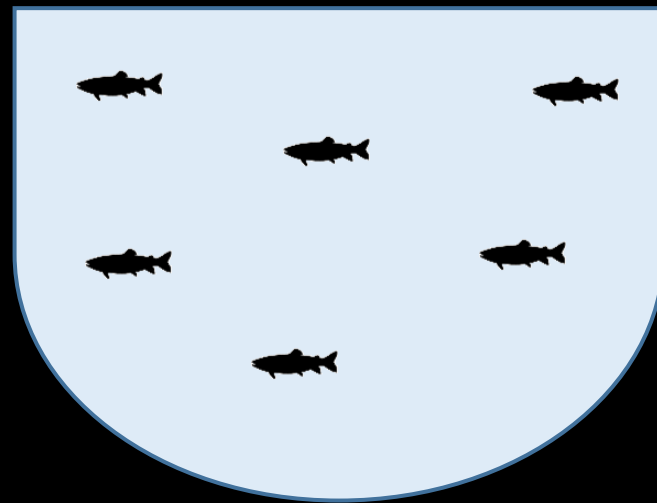
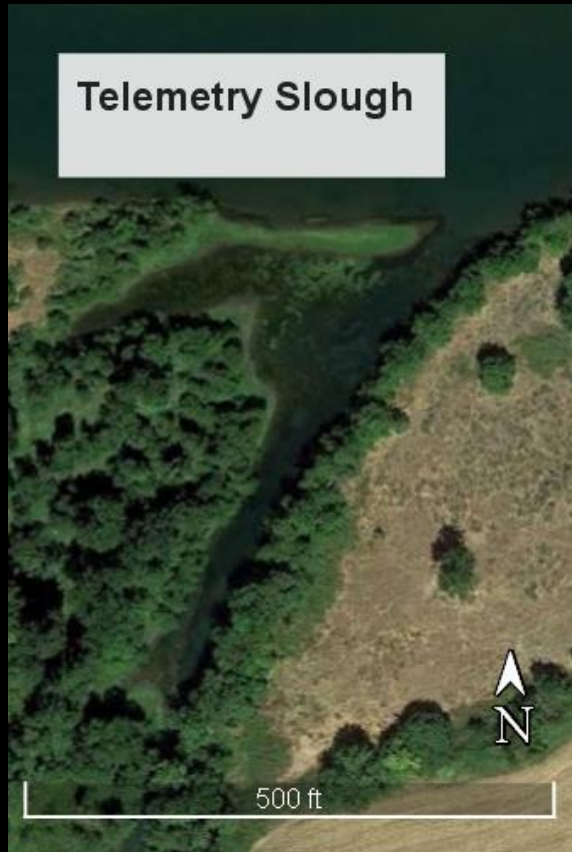
- Different foodweb – smaller ration sizes comprised of less energetic food resources.
- Fish in mainstem river may have higher metabolic demands but also eat more energetic prey resources
- Overall condition of fish in CWA habitats appear to be similar to those who remain in the mainstem



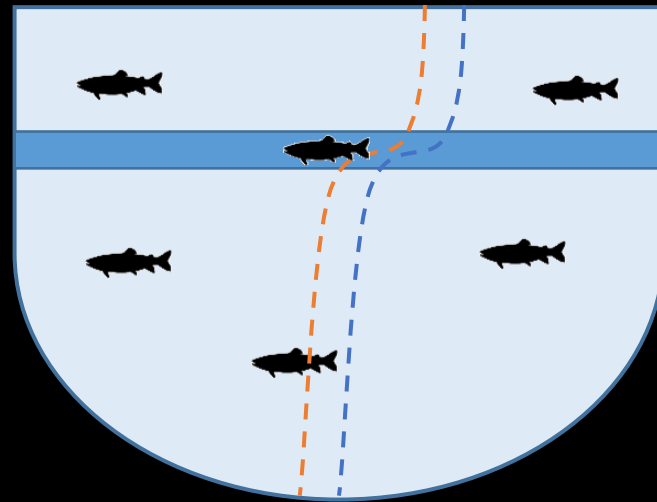
Temperature oxygen tradeoff



Temperature oxygen tradeoff



Temperature oxygen tradeoff

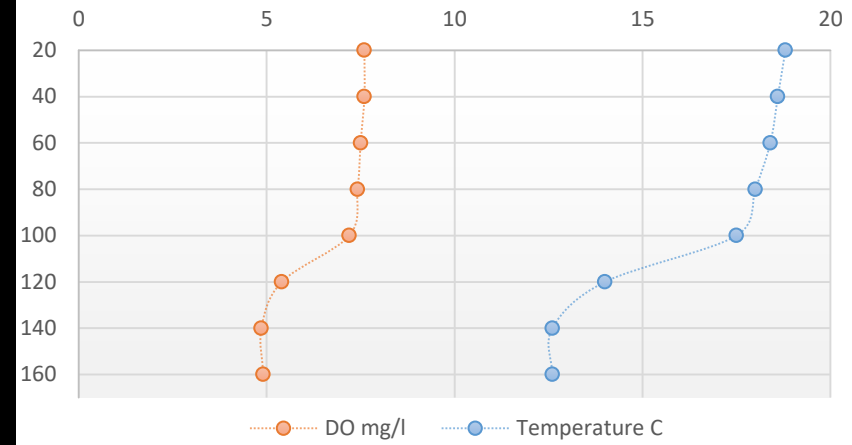


Telemetry Slough 2018

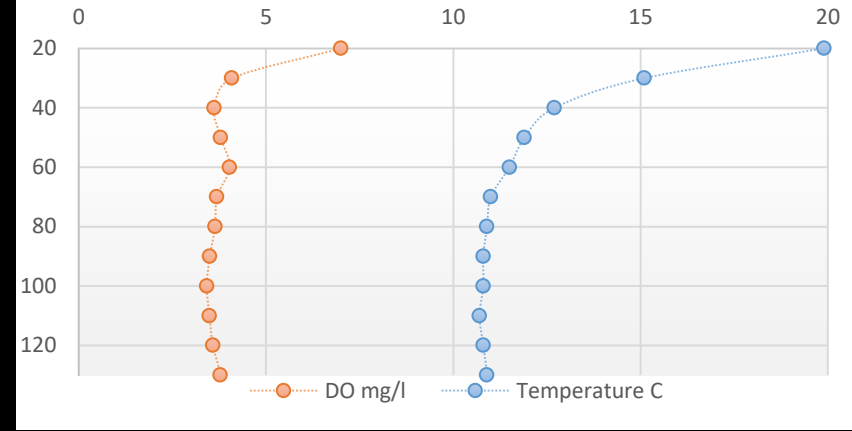
44°23'2.94"N
123°14'12.79"W



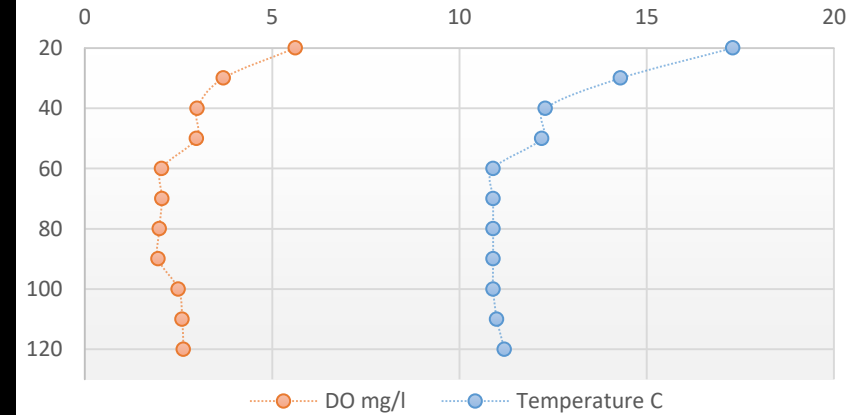
Depth (cm)

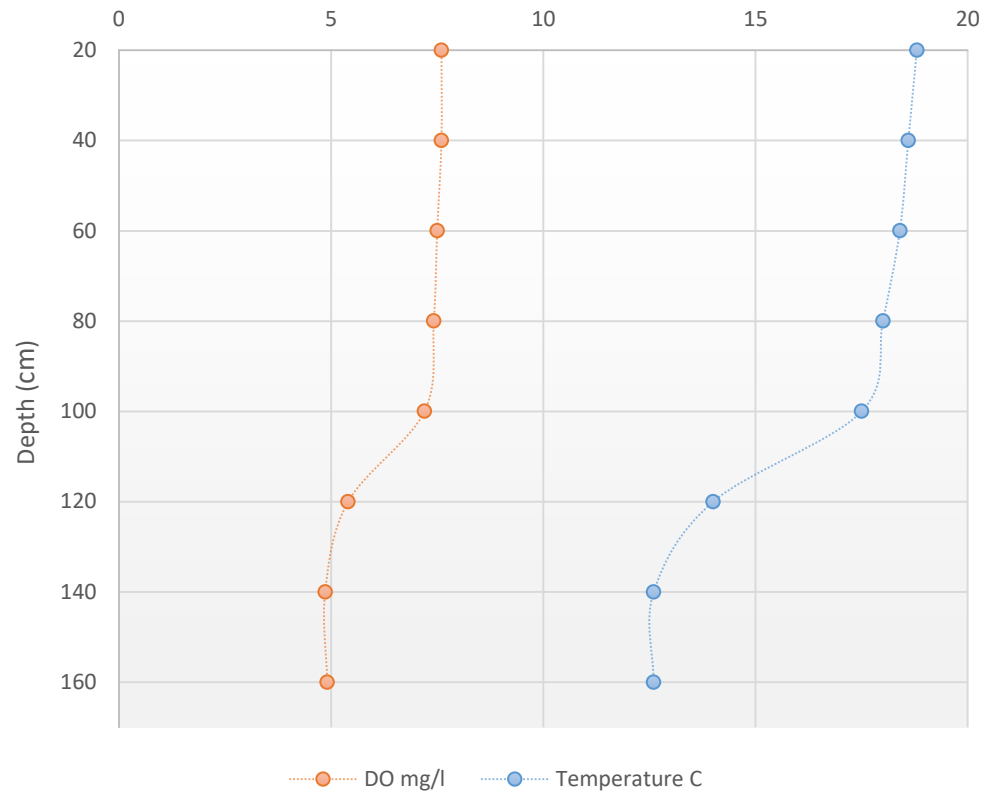


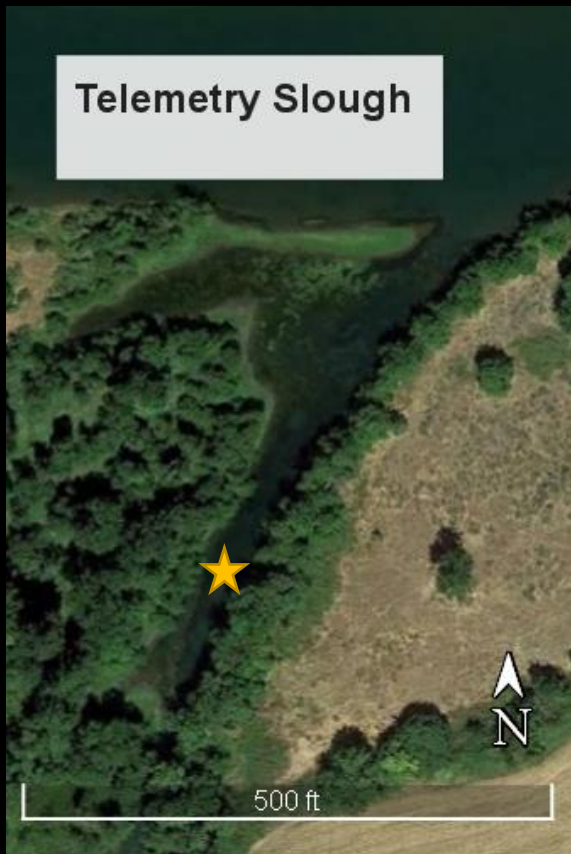
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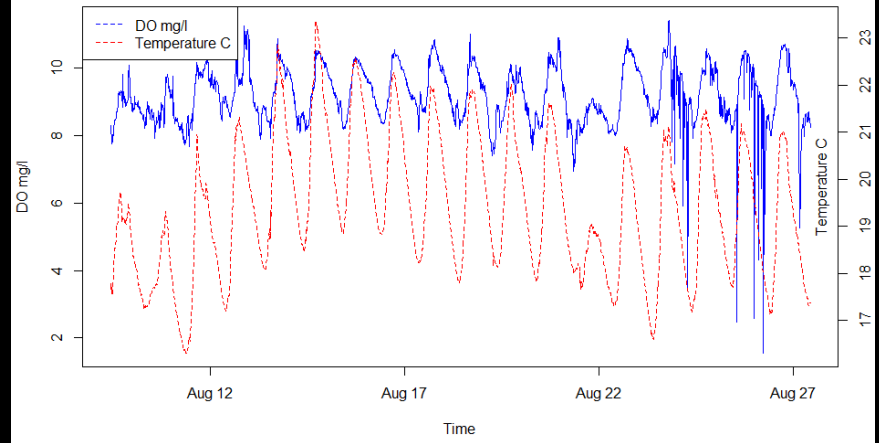
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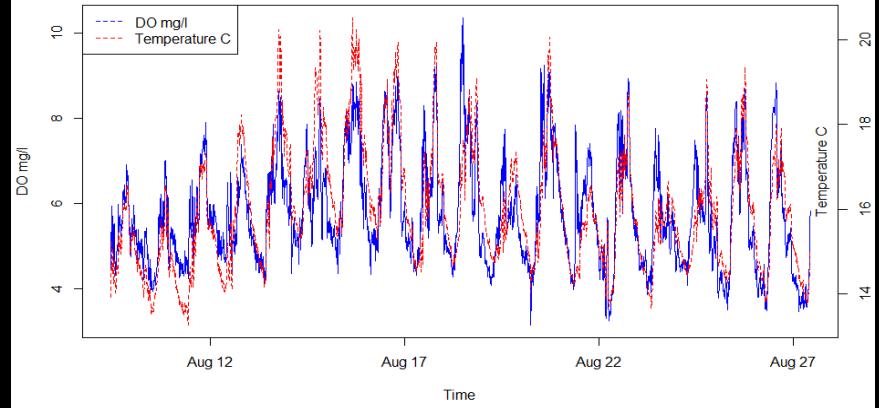




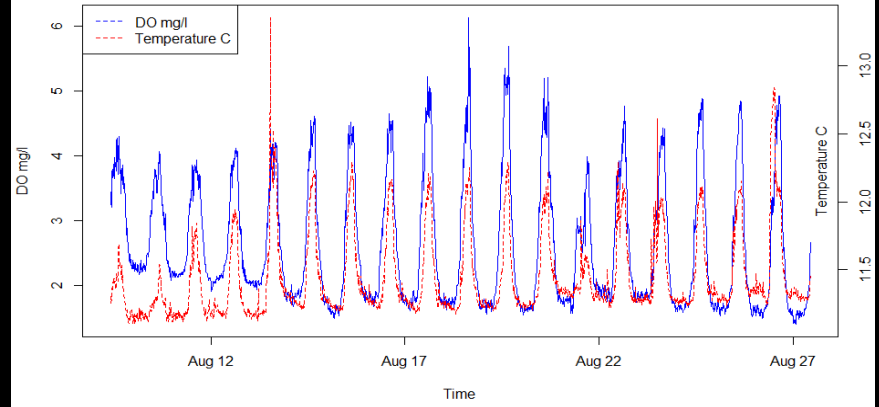
surface DO (mg/l) and temperature (C)



mid DO (mg/l) and temperature (C)

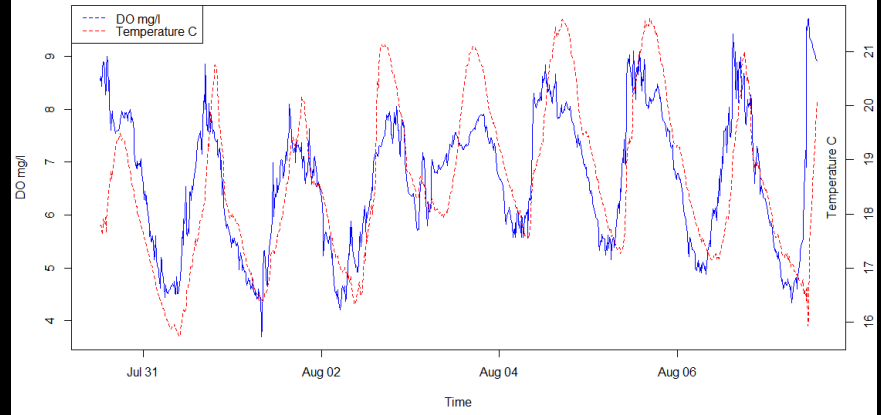


bottom DO (mg/l) and temperature (C)

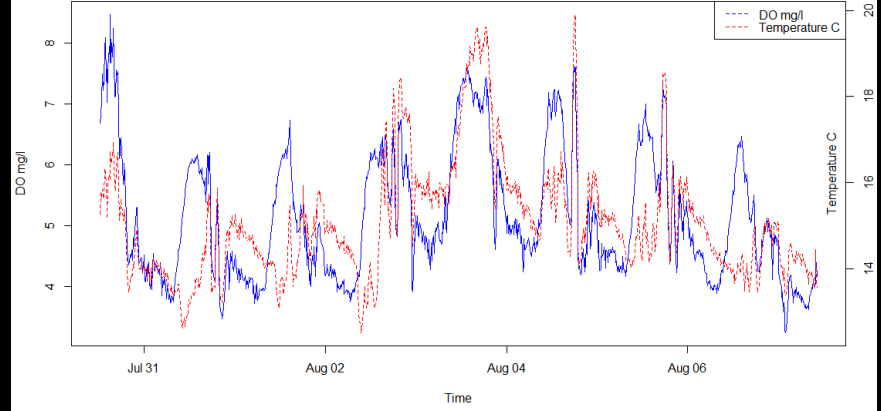




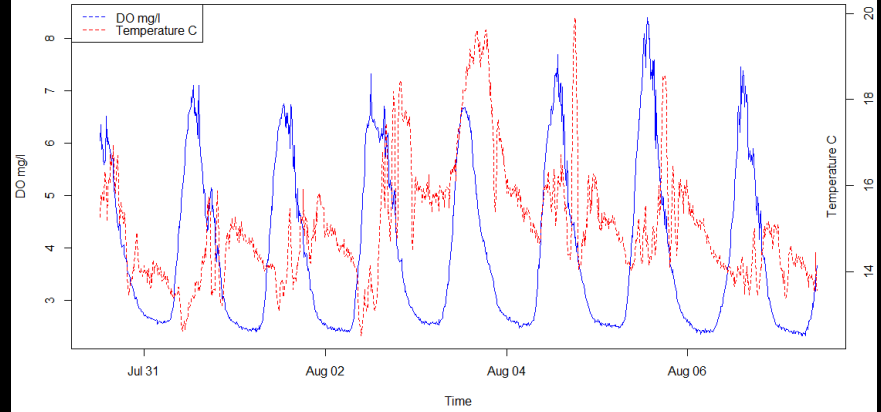
surface DO (mg/l) and temperature (C)

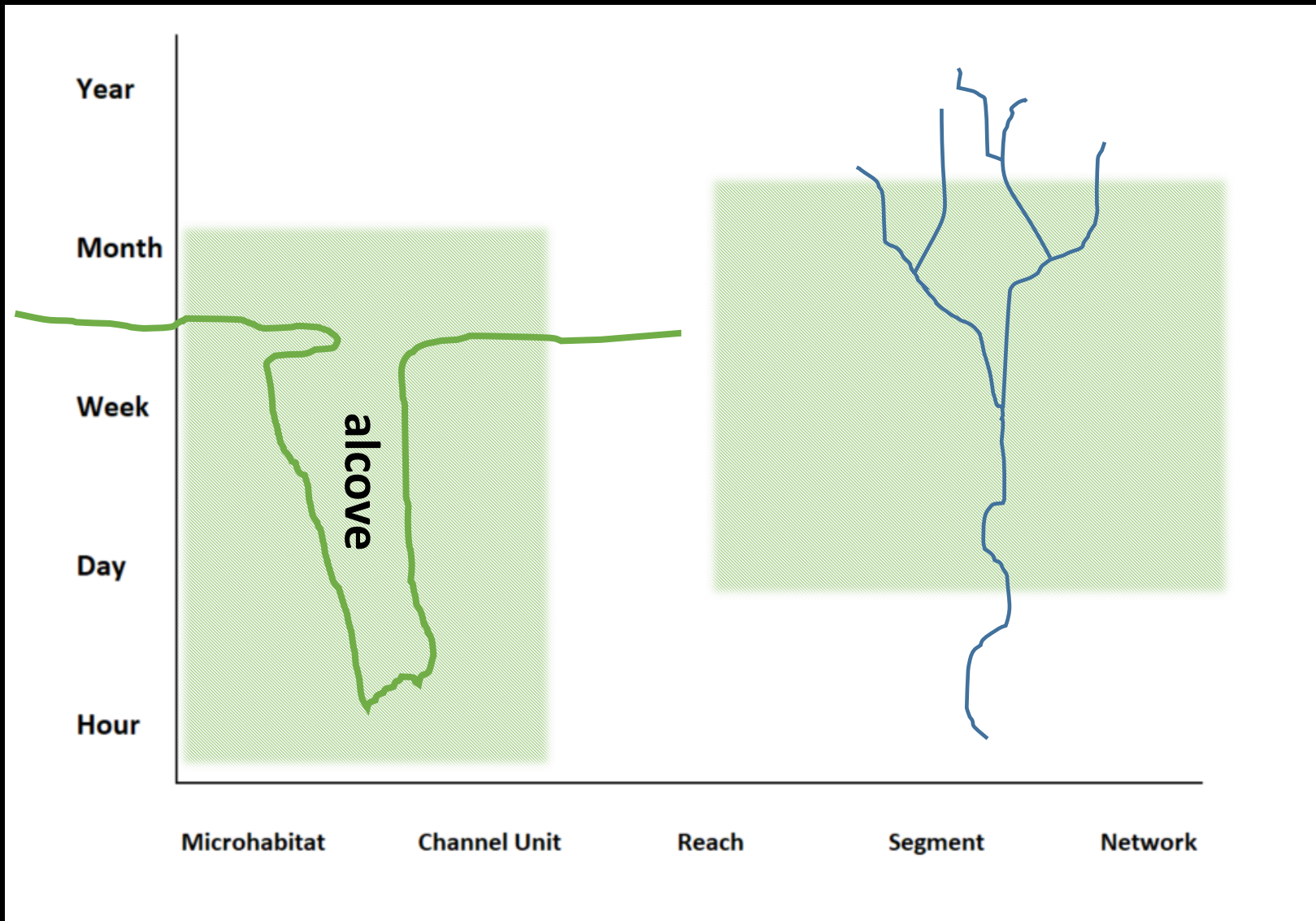


mid DO (mg/l) and temperature (C)



bottom DO (mg/l) and temperature (C)





Radio Telemetry

- ~100 cutthroat Albany to McKenzie river junction tagged early May with motion/temperature/mortality transmitting tags
- Mobile telemetry 1 x week May-Sept/Oct



Radio Telemetry

- Understanding how configuration of temperature matters – to what extent do fish move across landscape, and what is the comparison between fish using small cool refuges (alcoves) to large cool areas (McKenzie), or no refuge use (mainstem Willamette).
- Timing and extent of refuge use





#willamettecutthroat



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Tobias Felbeck
Aleah Dew

Nick Sotiropoulos
Alex Kaste
Dave Roon
Logan Breshears



Confederated Tribes
of *Grand Ronde*

