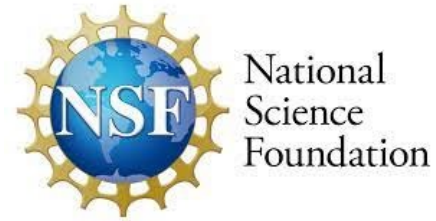


CCT Symposium 2024

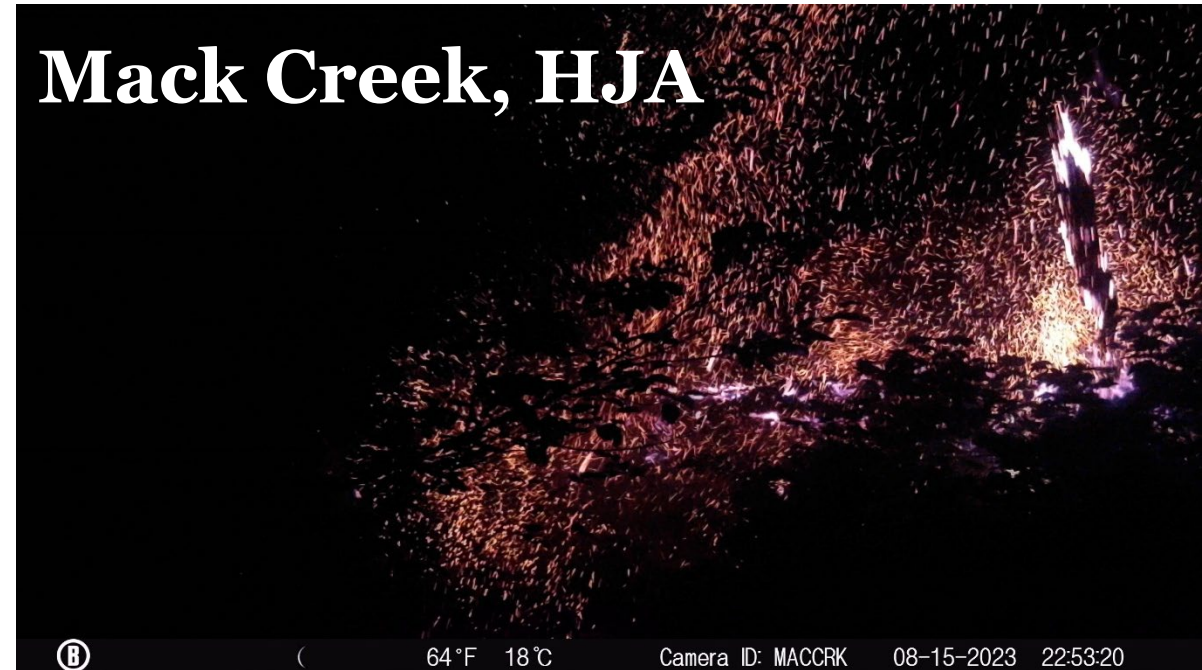
# Potential longitudinal shifts in density and size of Coastal Cutthroat Trout after the Lookout Creek wildfire, Oregon

Ivan Arismendi



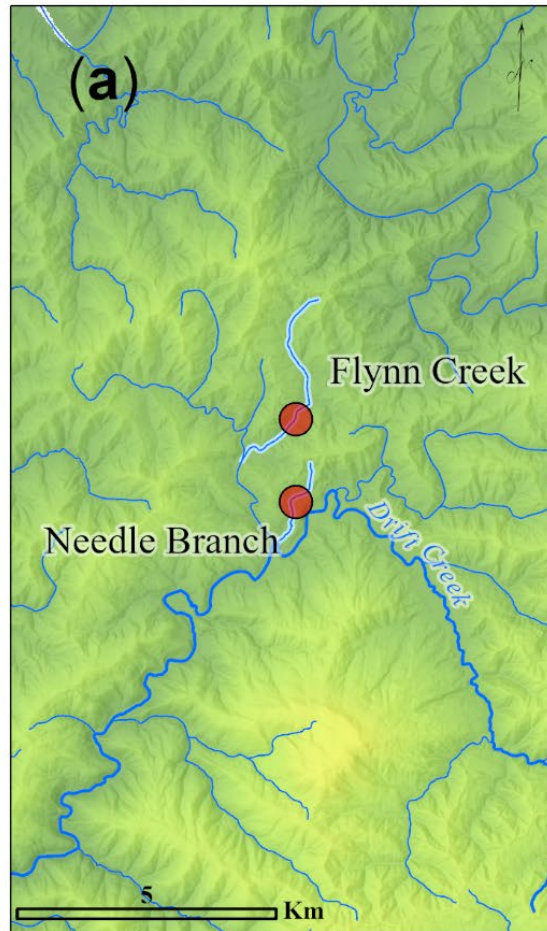
# Wildfires affect stream ecosystems

- Wildfire frequency and severity will increase in the American West
- Most research focused on physical changes of stream habitats
  - Warming of streams
  - Pulsed delivery of wood, sediments, and nutrients
- Ecosystem-level responses at broader spatial contexts are less explored

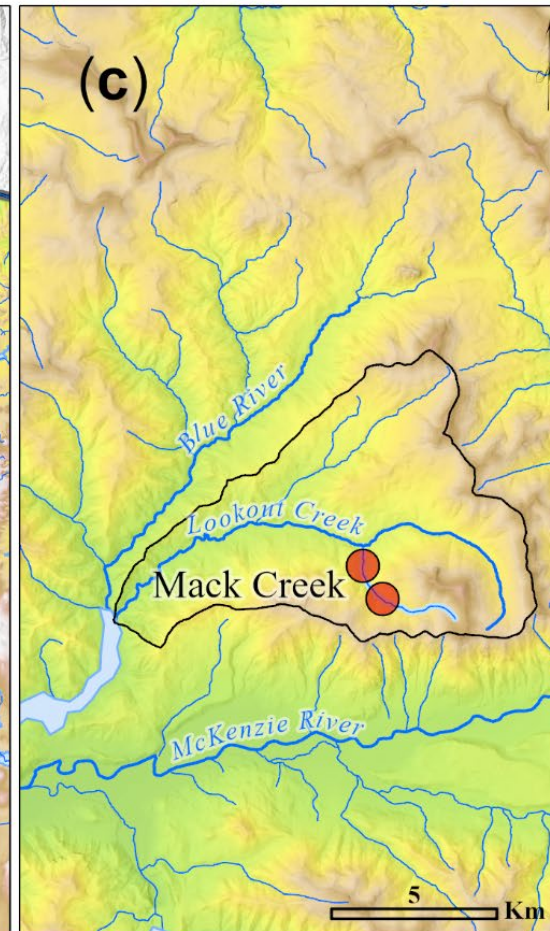
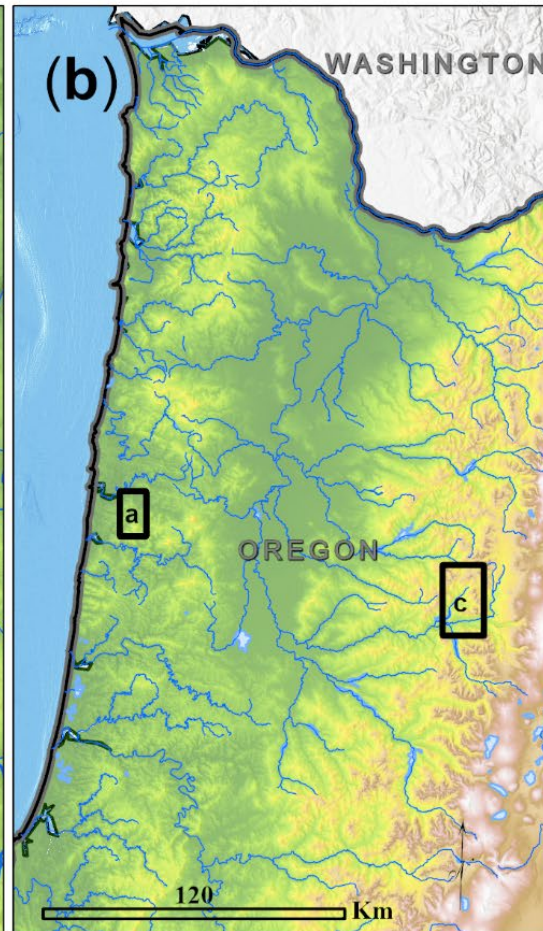


# Long-term studies are critical to assess the effects of climate change in streams

**Alsea Watershed Study  
(1962–74, 1988–97, 2006–17)**



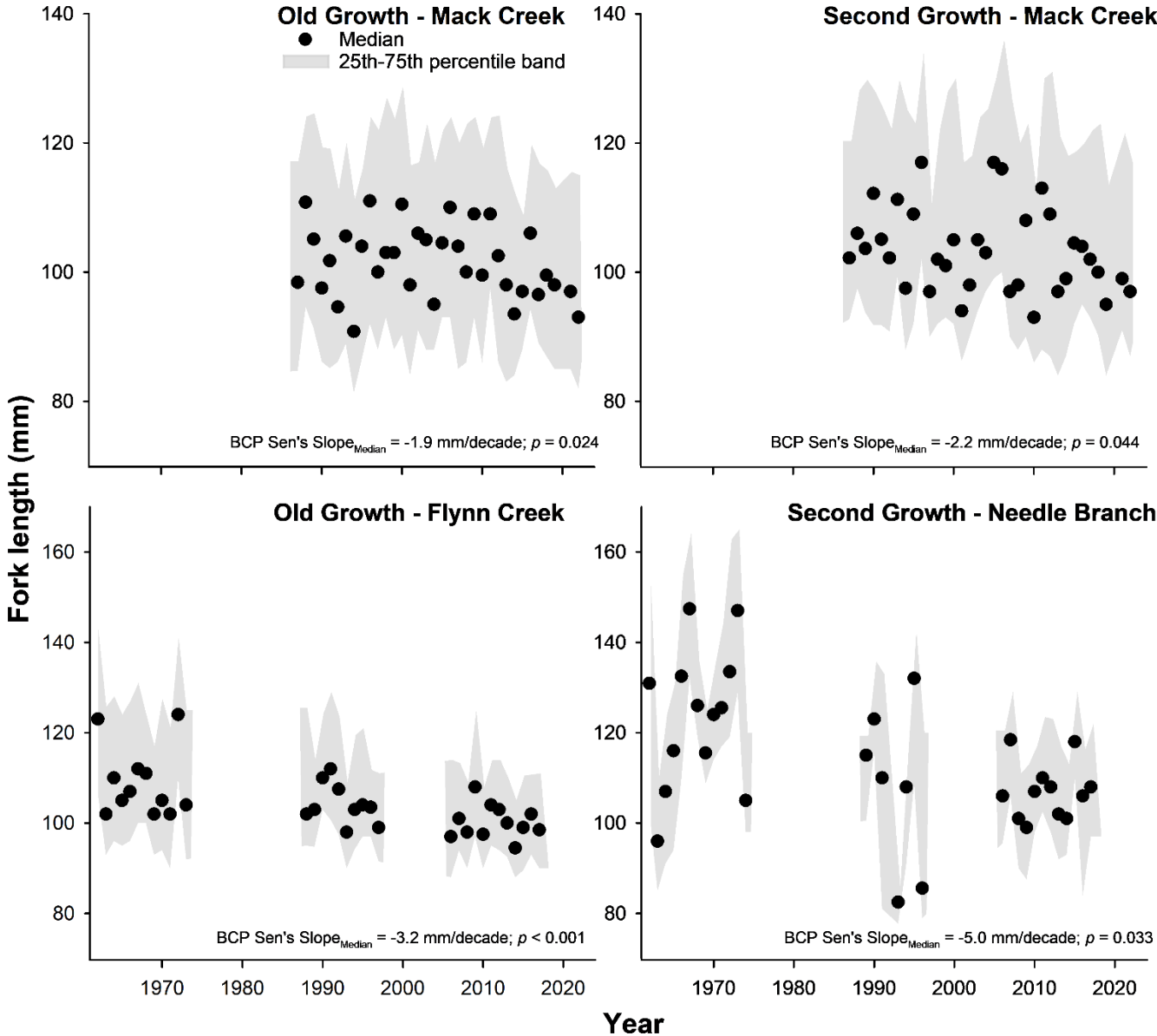
**H.J. Andrews Experimental  
Forest (1987–2022)**



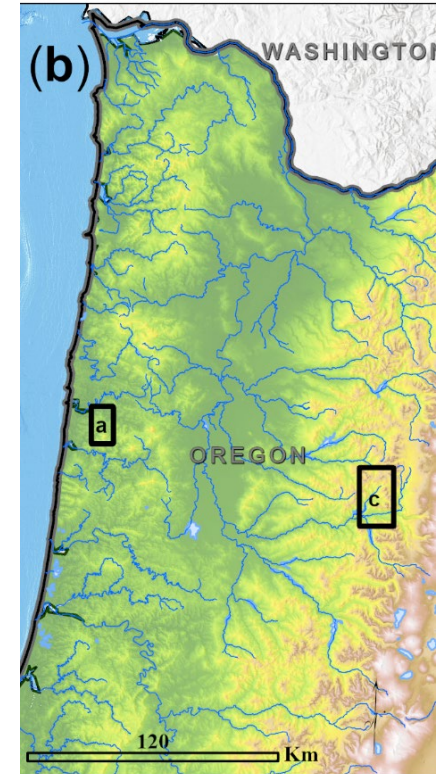
# Consistent declines in trout size over time



Data (n = 27,244)  
1962–2017 and 1987–2022)

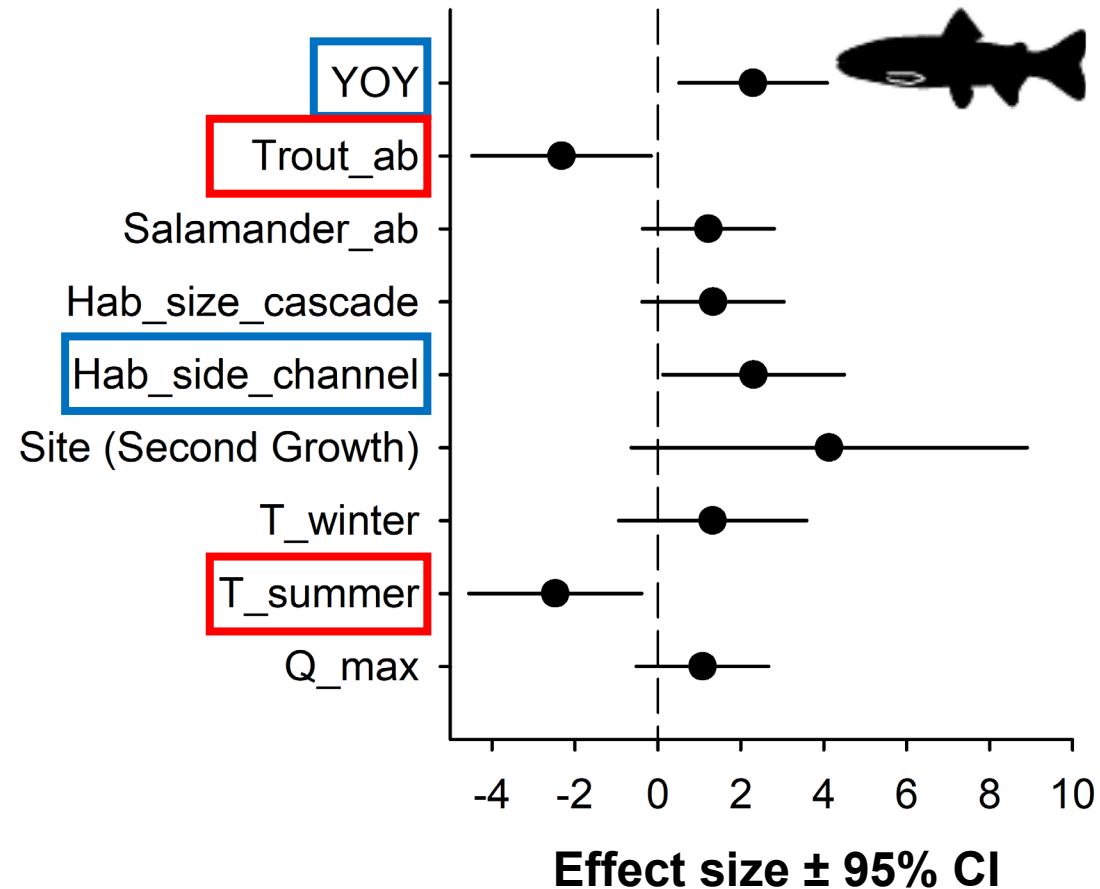


The magnitude of the decrease in trout length ranged between 6-15 mm during the last 30 years



Arismendi et al. (in review)

# Local contexts play an important role in explaining size of Coastal Cutthroat Trout

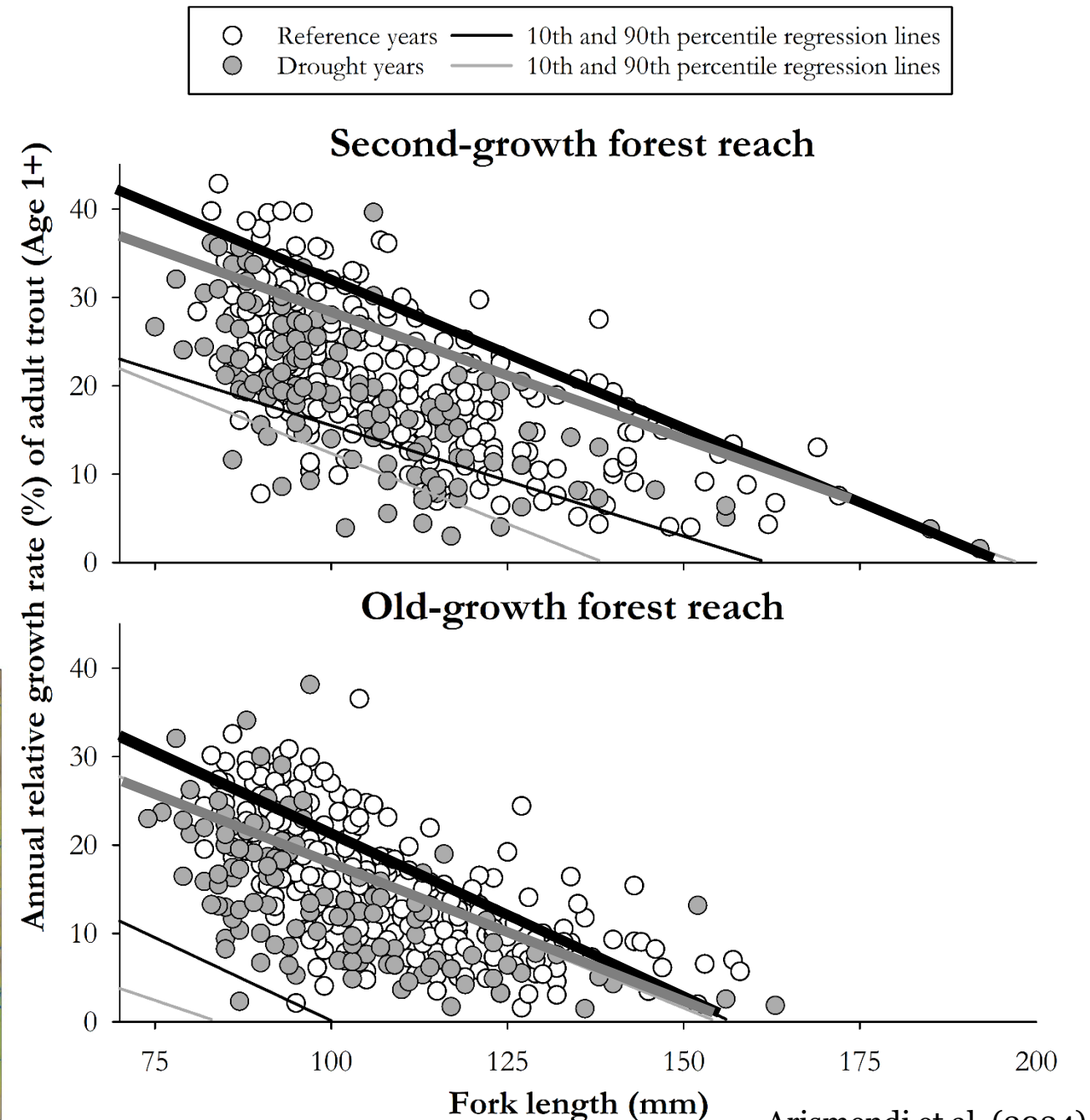
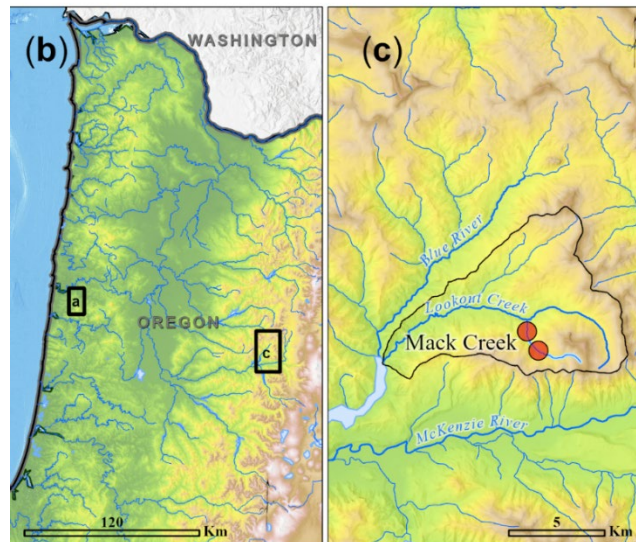


# Lower annual growth during drought

- Lower maximum scope of growth during drought compared to reference years
- Scope of growth during drought affected small trout more than large trout



10 years of annual growth

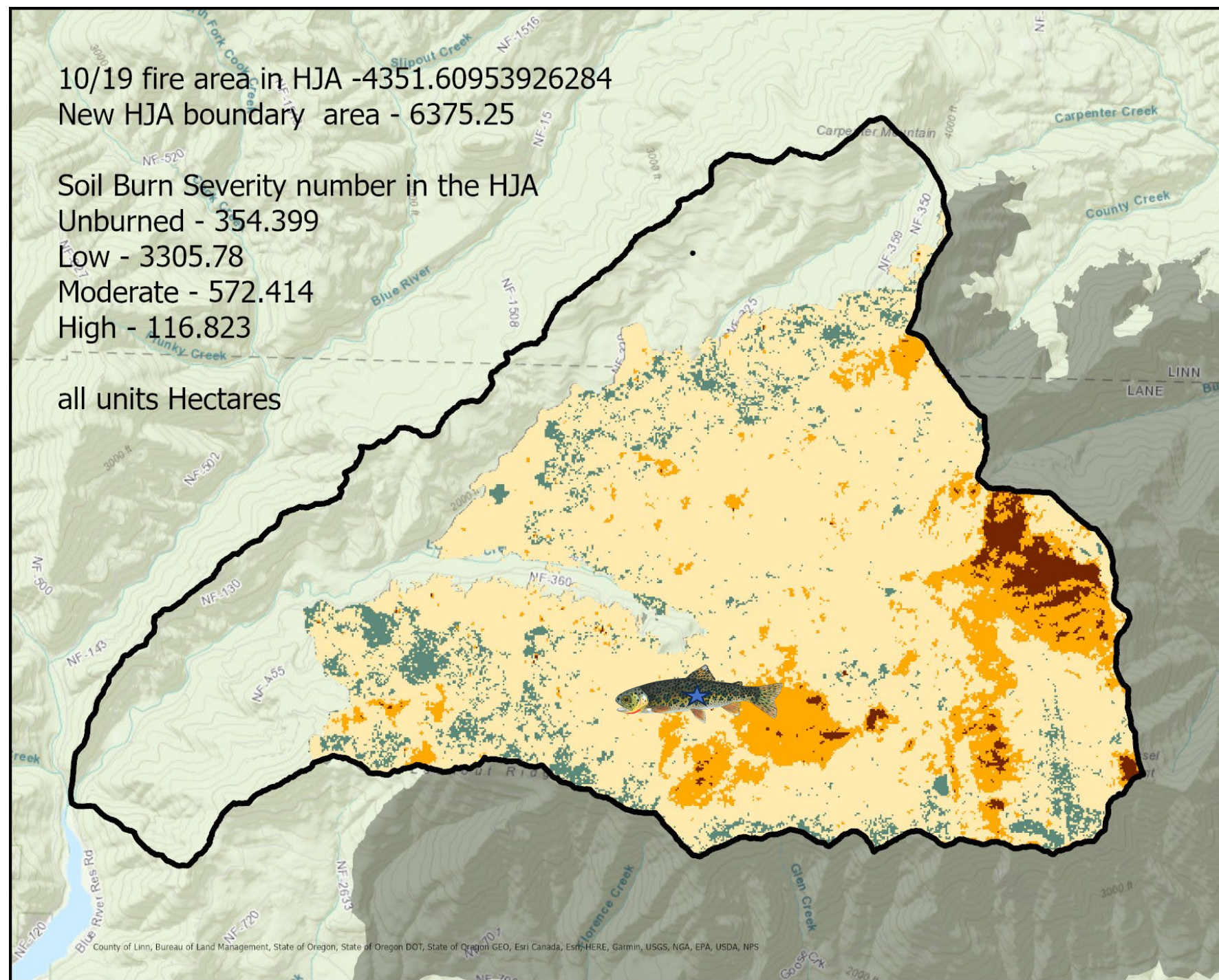


# **Research opportunities arise after the Lookout Creek Fire at the H.J. Andrews**

How spatial patterns of trout density and size vary in response to fire along several kilometers of the mainstem of Lookout Creek, OR?

- The Lookout Fire (Aug 5<sup>th</sup>-Oct 19<sup>th</sup>, 2023) impacted over 100 km<sup>2</sup> of forested watersheds

- 70% of the H.J. Andrews Experimental Forest, HJA





# **Stream ecology in the context of wildfires**

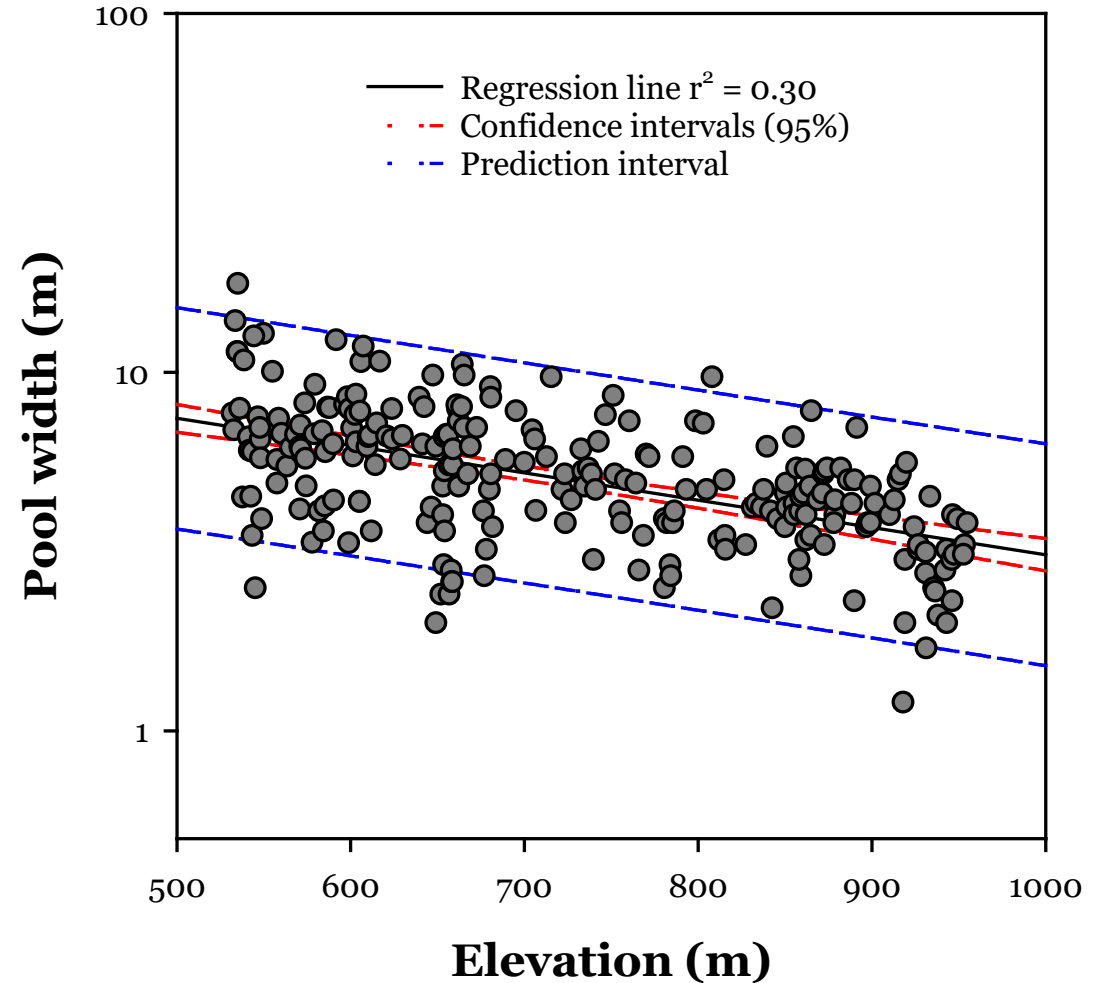
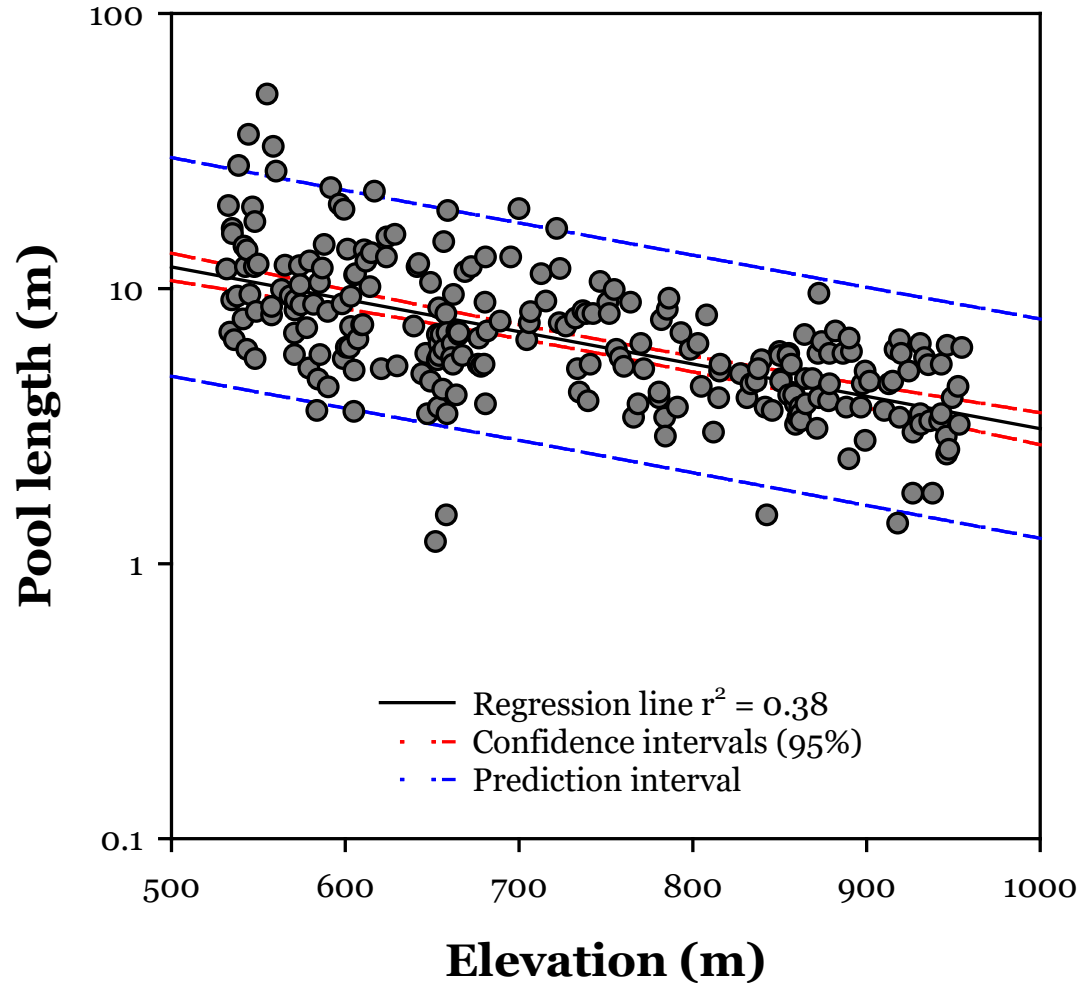
- Communities and riparian areas are linked and predictable from headwaters downstream
- Habitat patchiness and heterogeneity set the context for local ecological processes
- Watershed and landscape-level processes interact with channel geomorphology affecting habitat quality and thus, regulate aquatic communities

# Pre-fire synoptic sampling along 9 km of Lookout Creek

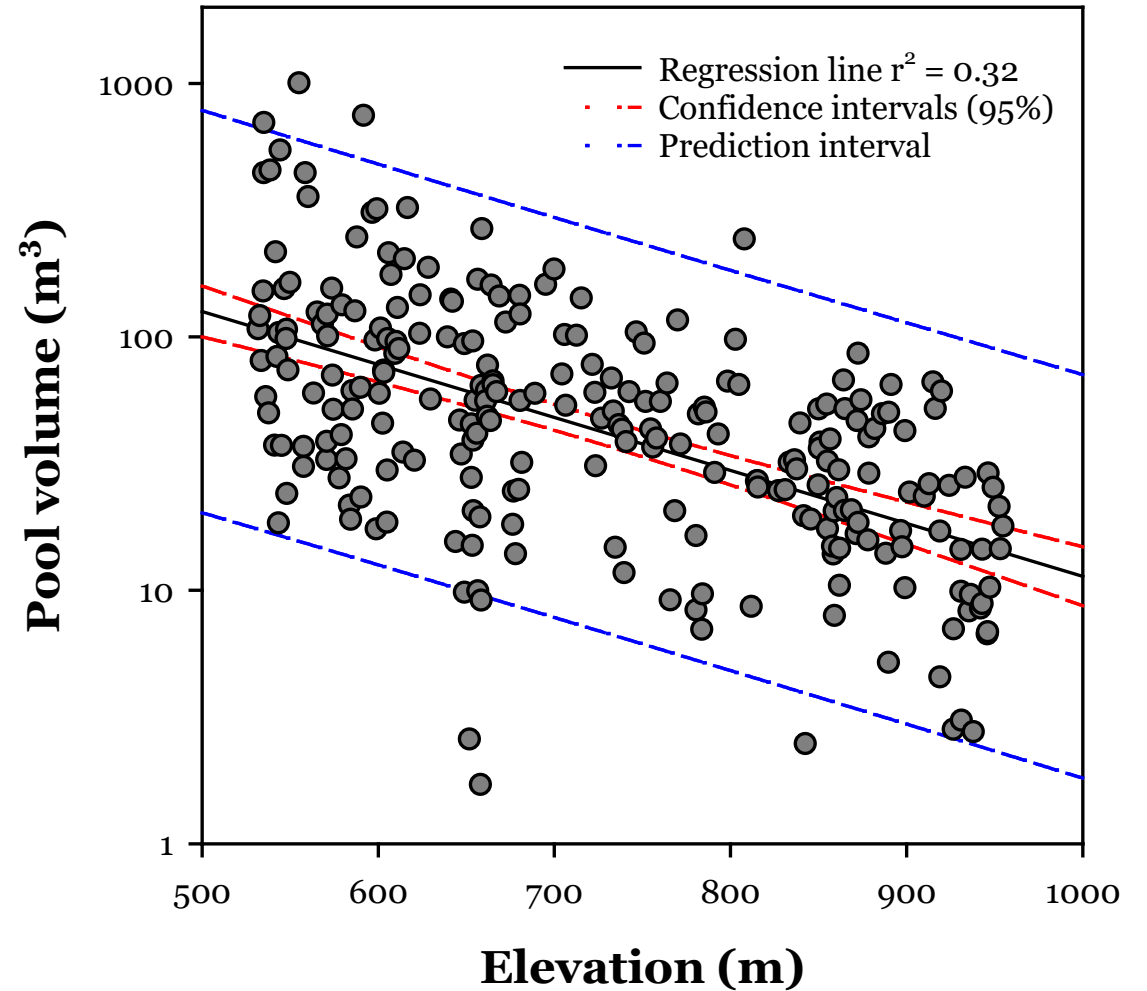
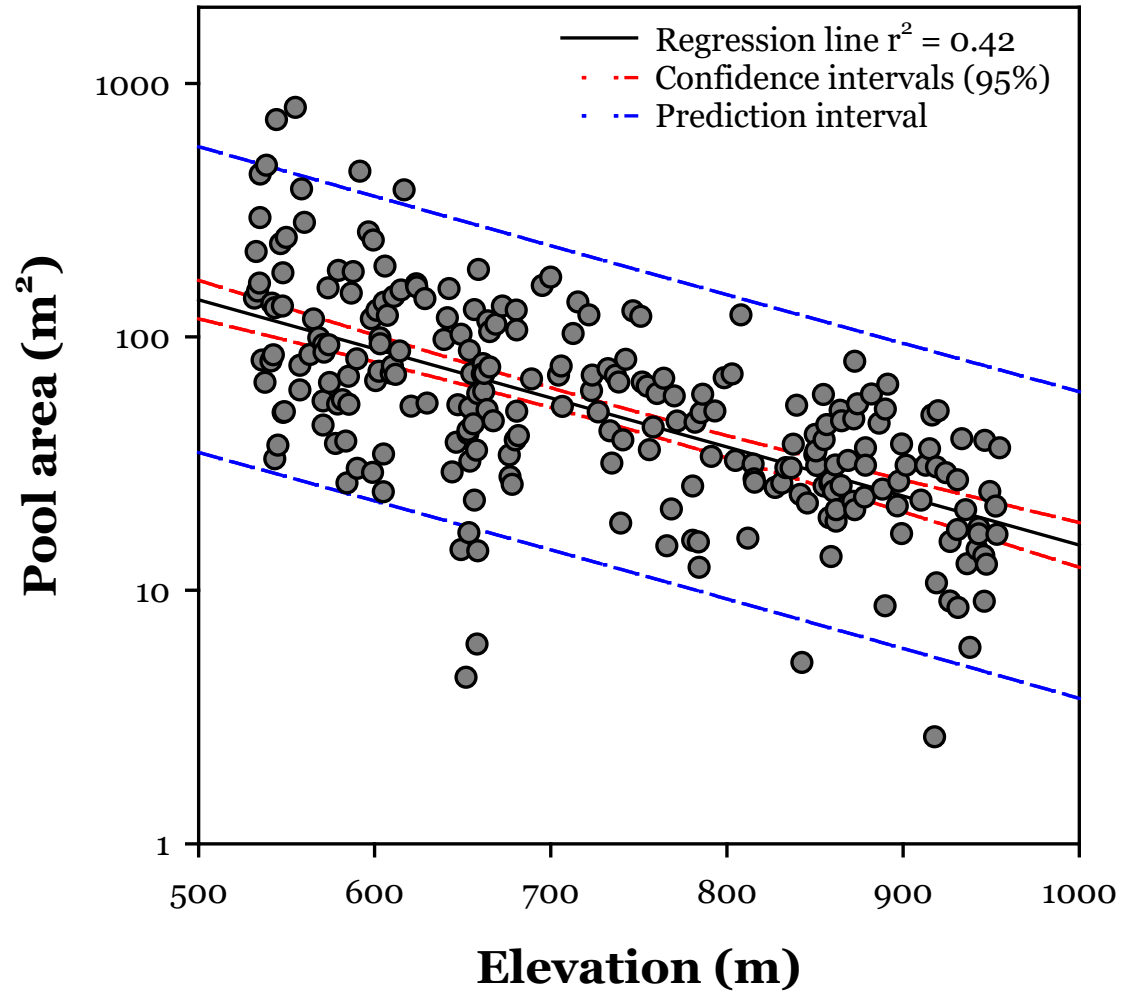
The color scale represents trout densities from low (blue) to high (red)



# Pools are longer and wider downstream

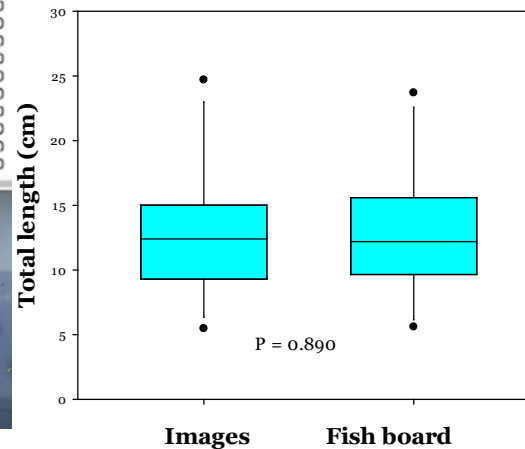
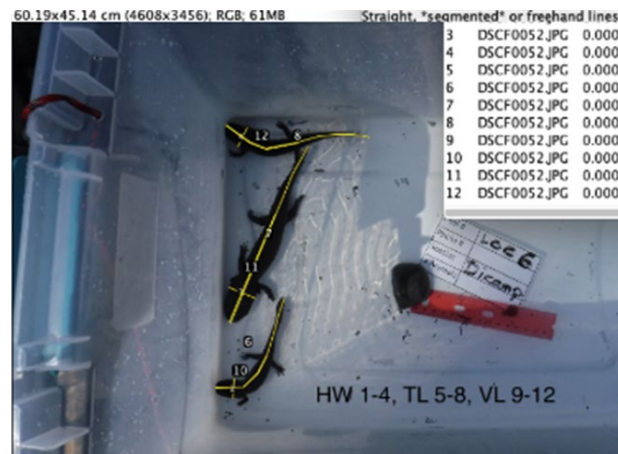


# Pools are larger downstream

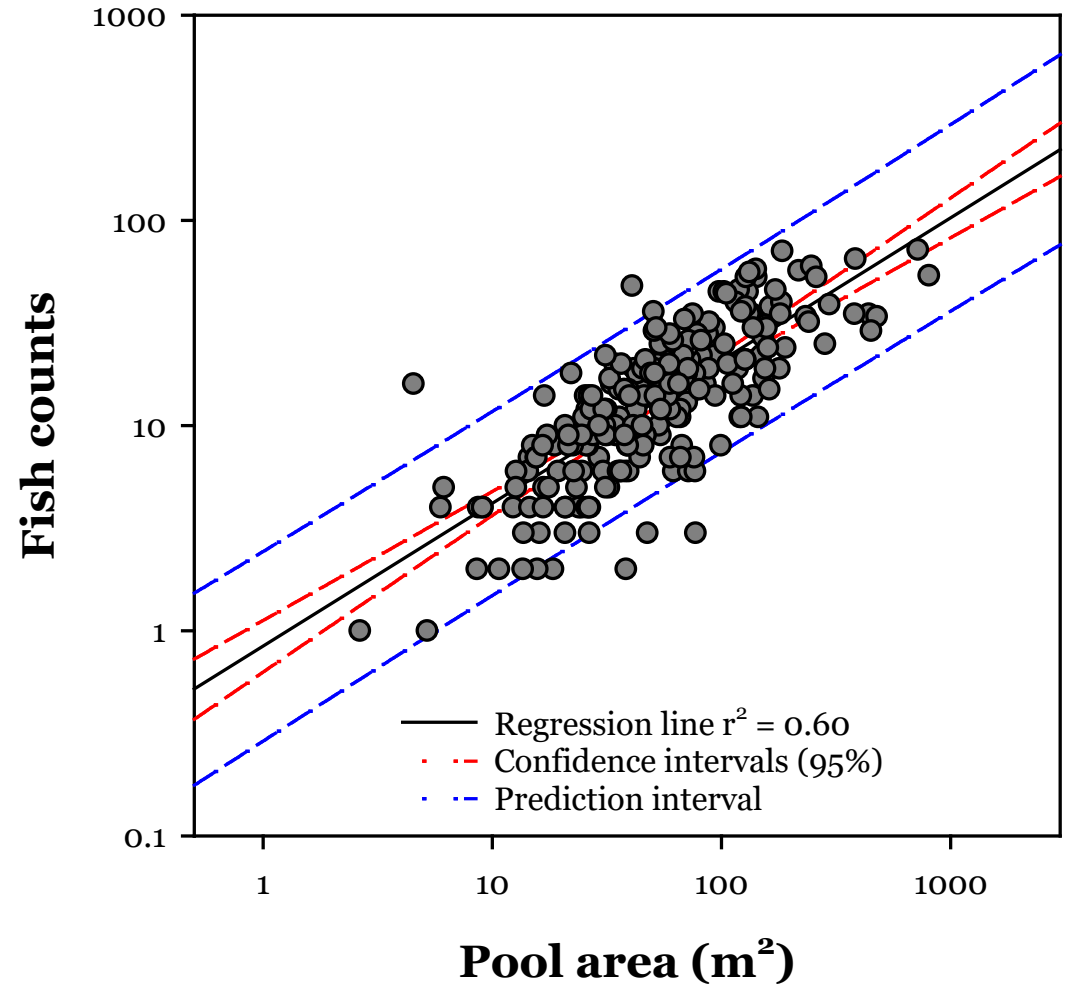
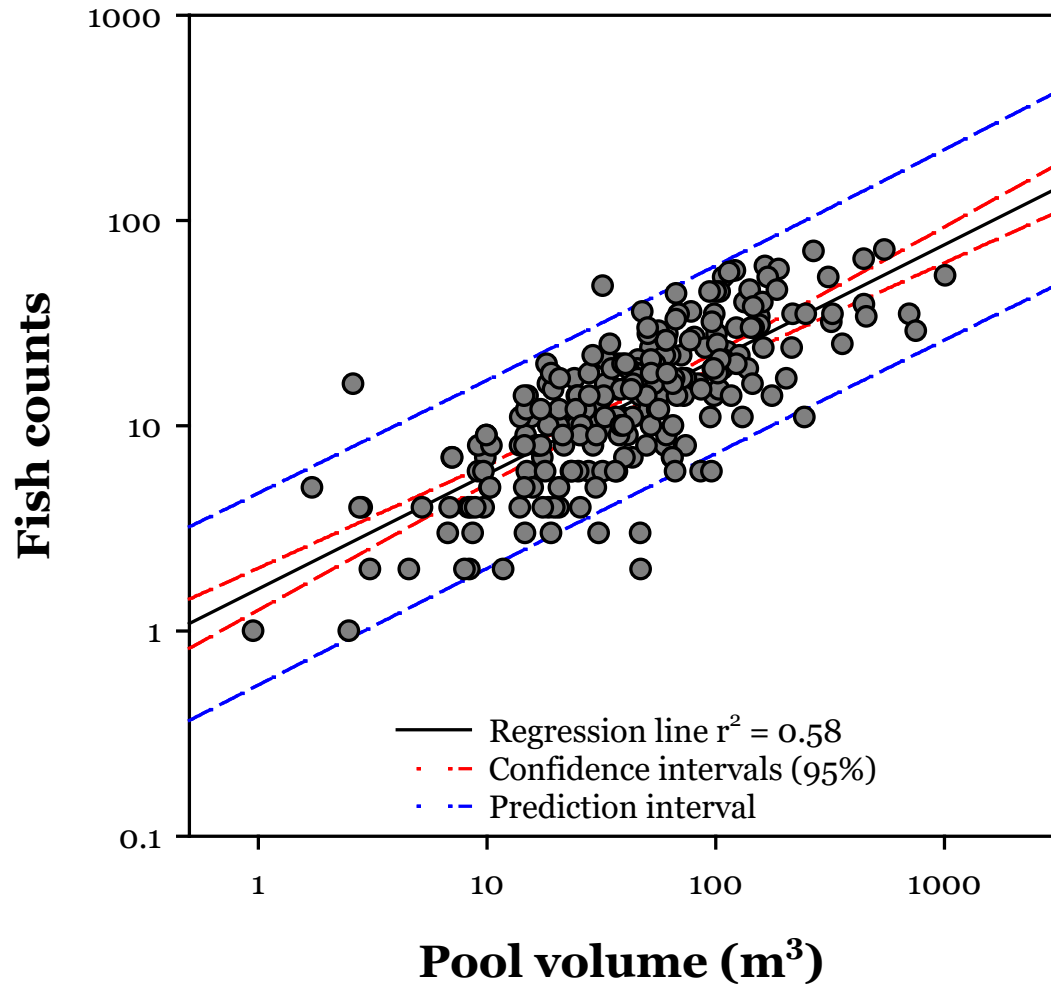


# Patterns of density and size of consumers

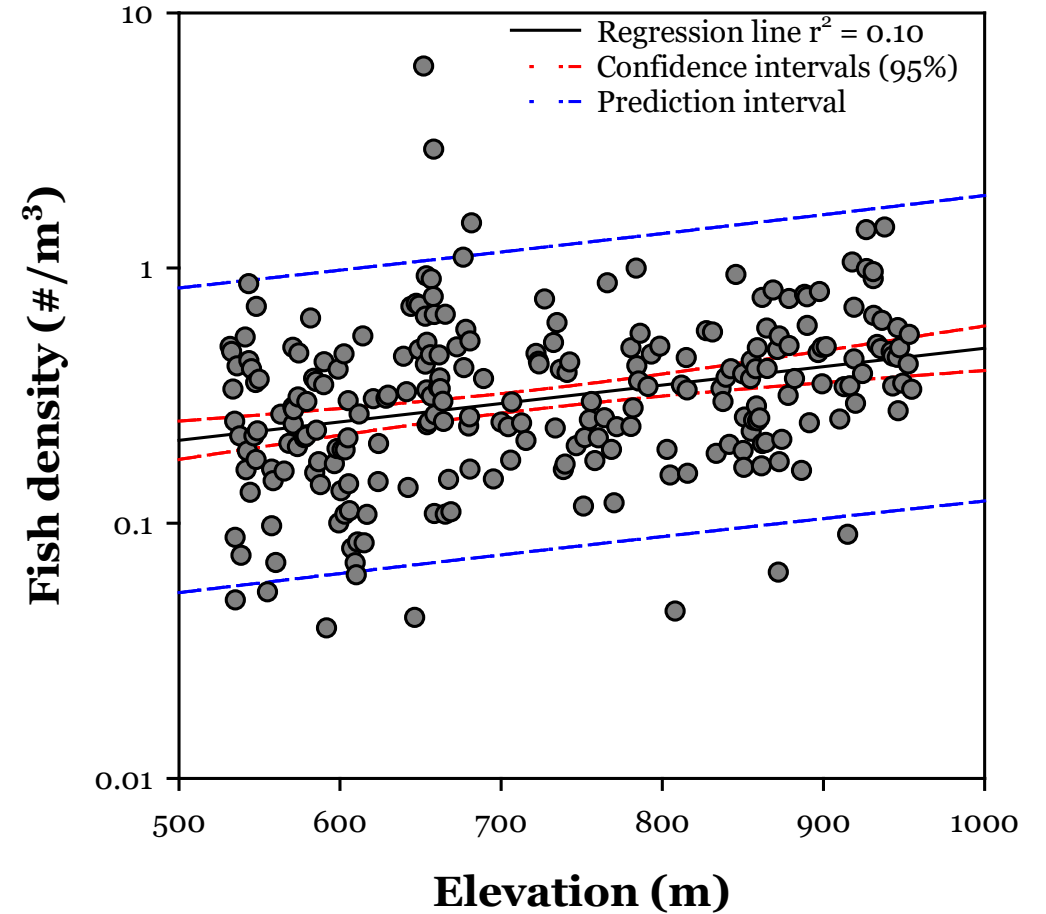
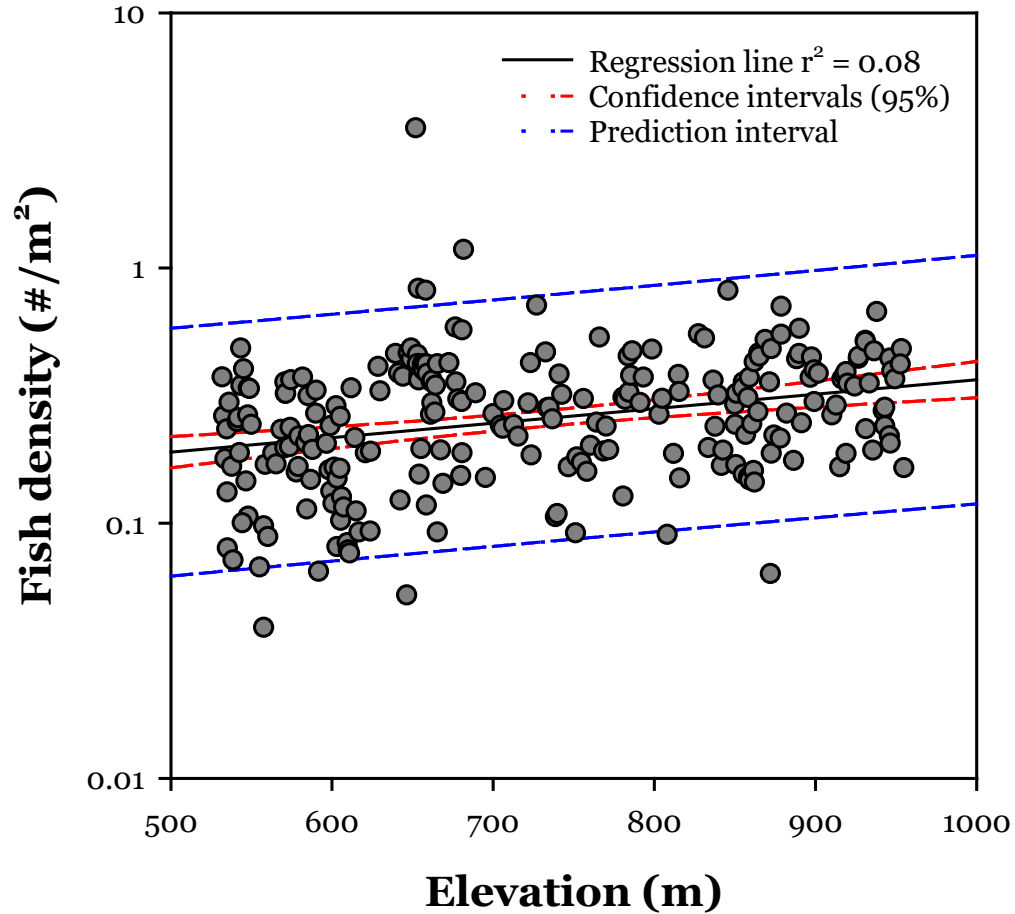
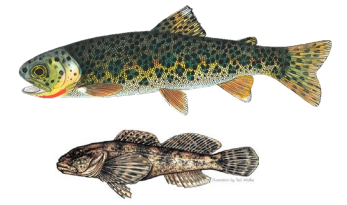
247 pools along 9.6 km of the river; n = 5,236 animals



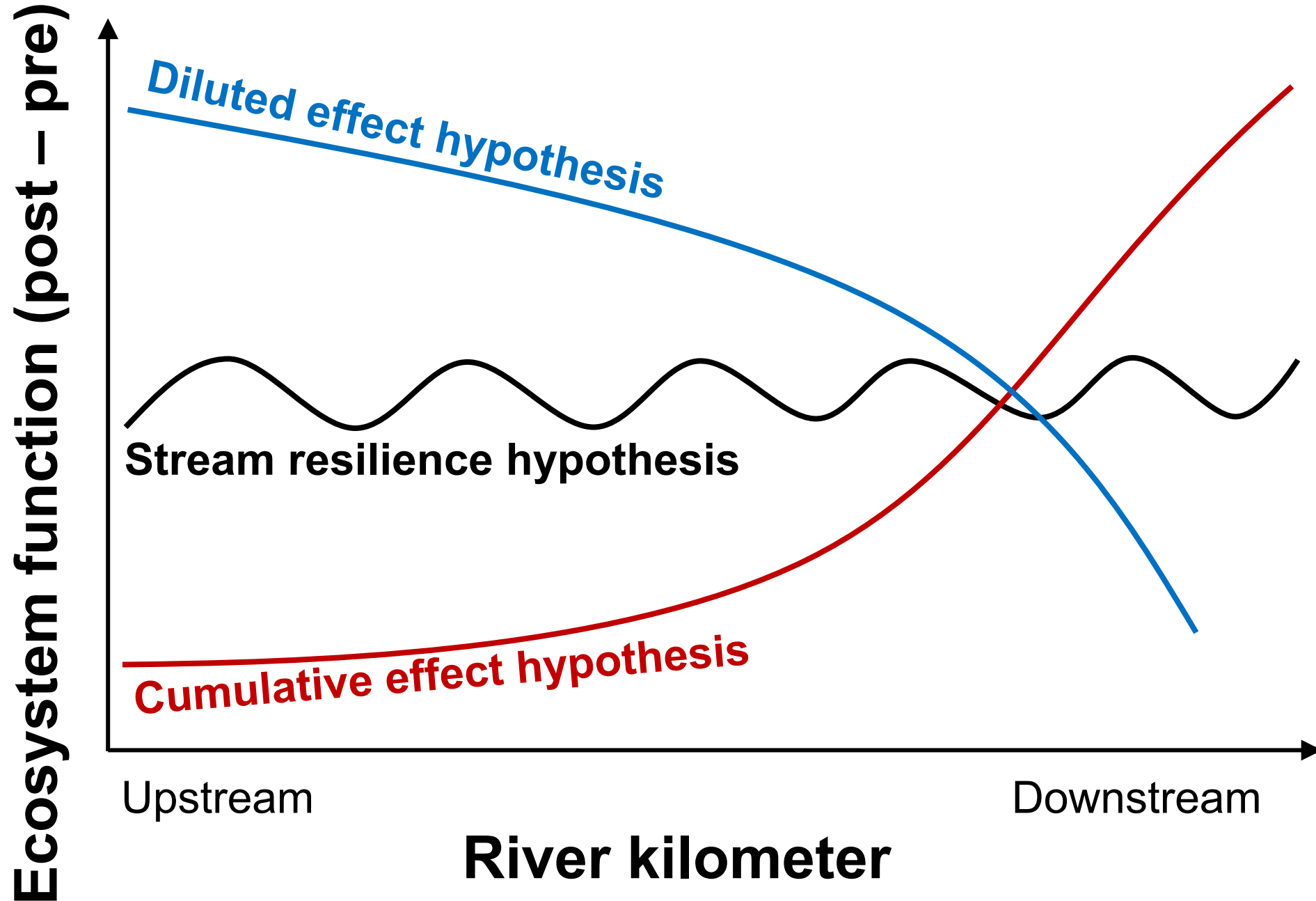
# Larger pools hold more fish



# Higher fish densities upstream



# Pre vs post fire potential responses





# Future steps

- Secure funds to conduct synoptic sampling post-fire starting this spring-summer (first year post-fire)
- Continue long-term sampling at Mack Creek
- Finish analyses of longitudinal patterns pre-fire
- Explore additional research related to pre-post fire responses (e.g., insect dispersion, macroinvertebrate communities, food-webs)



Questions?