
Amphibians and Streams
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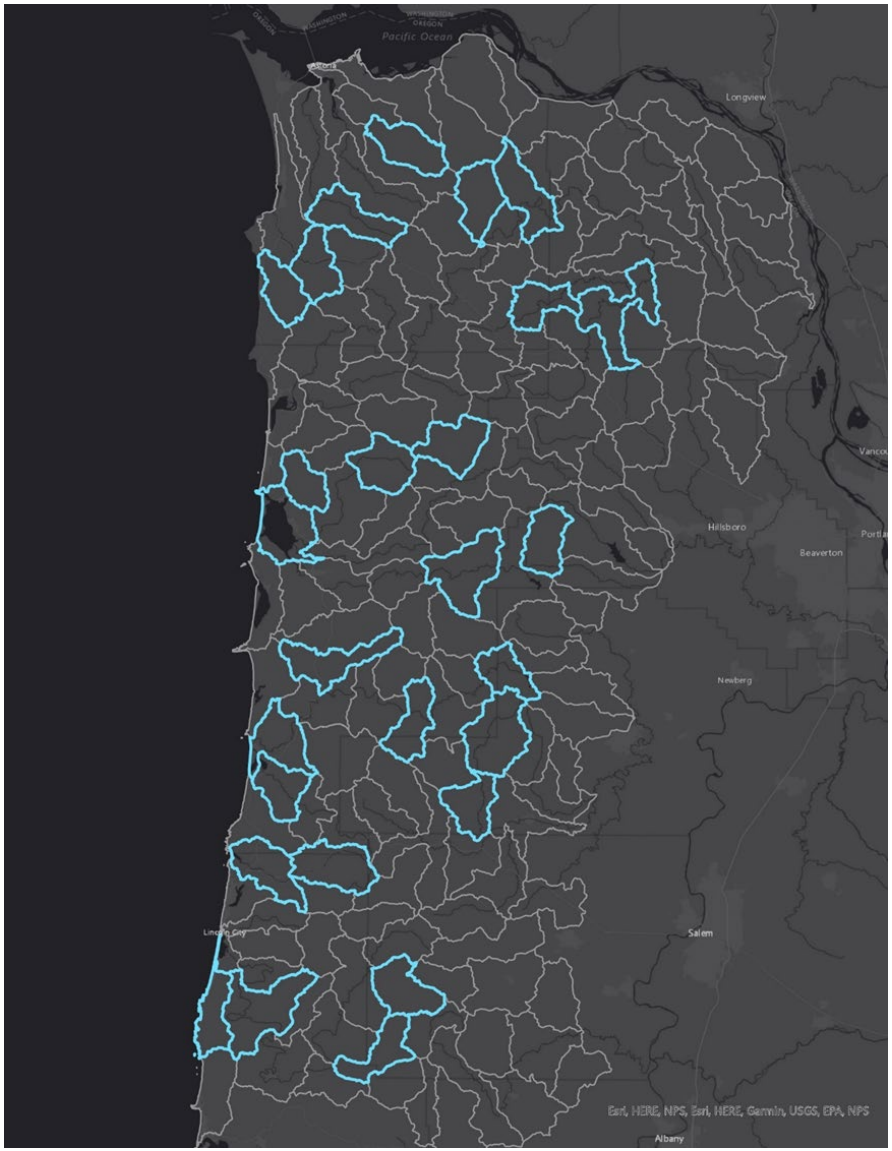
Amphibians in Oregon Forests

Management over Time



Management Approaches

Pacific Giant Salamanders (Coastal and Cope's):

- Bi-phasic
- Neotenic and terrestrial adult phases
- Top predators
- Require perennial streams or pools

Torrent Salamanders (Cascades, Columbia, Olympic, Southern):

- Bi-phasic
- Headwater obligates
- Occupy seasonal streams and hyporheic zones
- Conservation concern

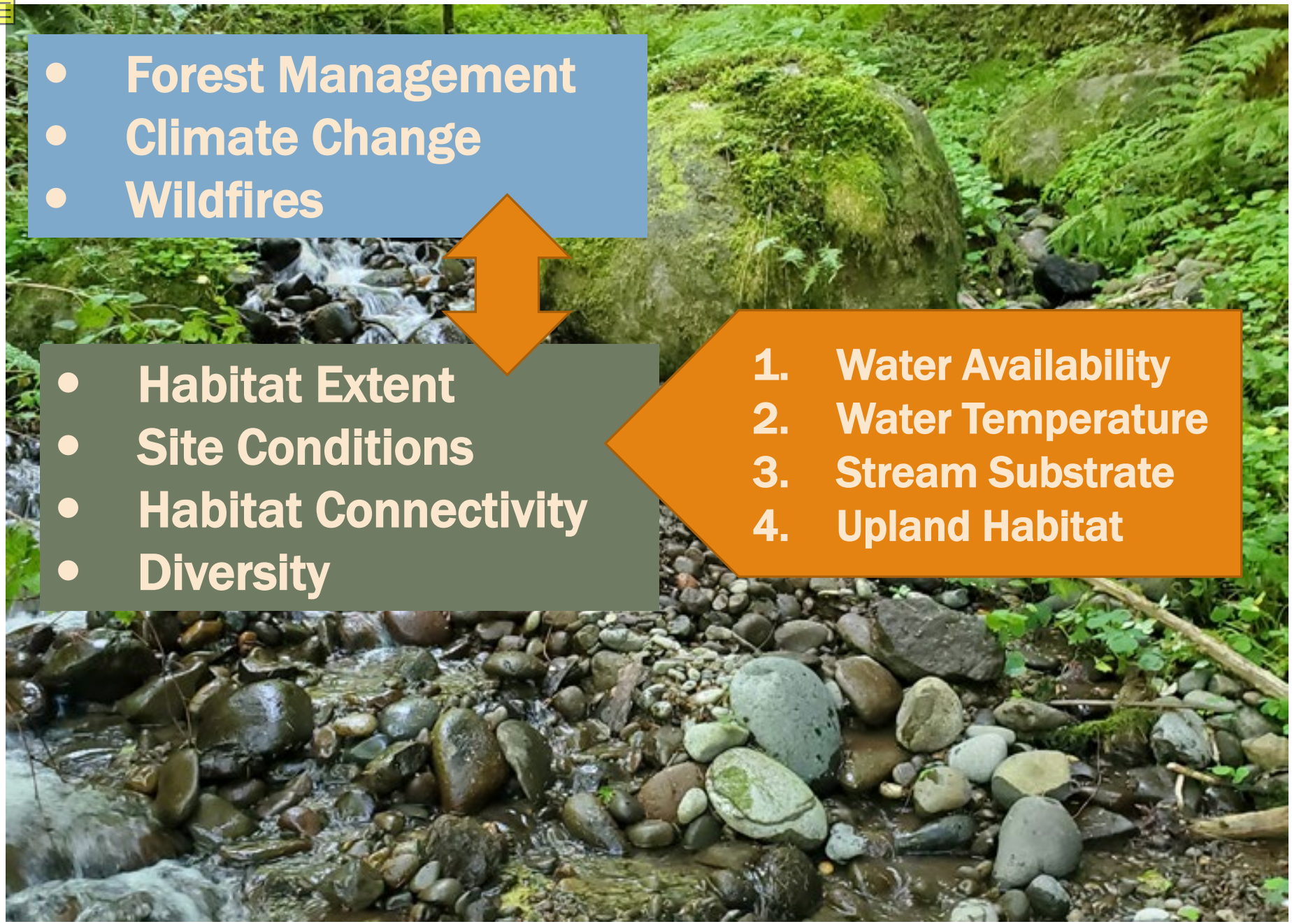
Tailed Frog (Coastal):

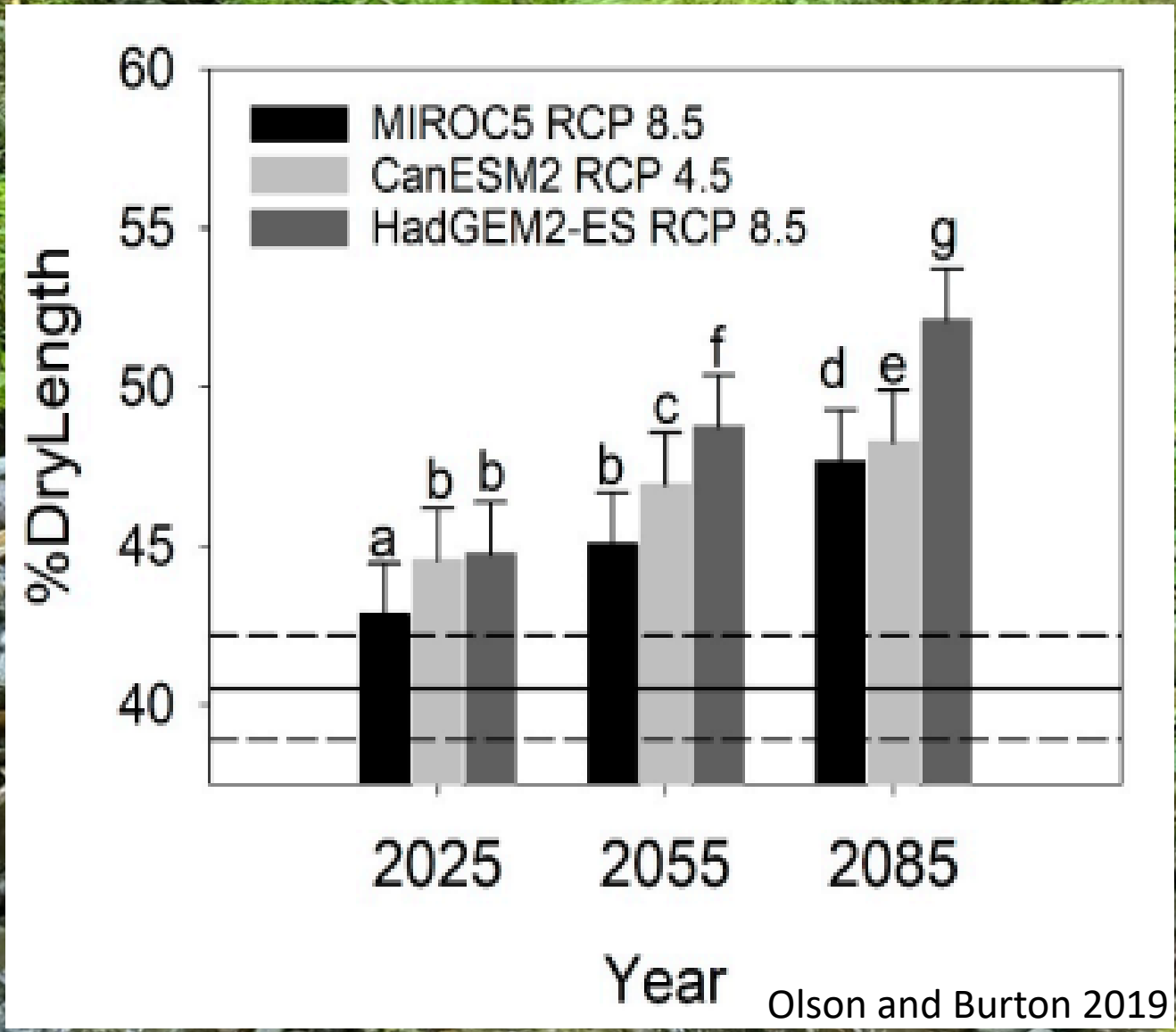
- Bi-phasic
- Riffle microhabitats in headwaters
- Size specific movement across stream orders
- Temperature change intolerant

Management Focus

Dunn's Salamander

Western Red-backed Salamander


Forest Management
Climate Change
Wildfires
Habitat Extent
Site Conditions
Habitat Connectivity
Diversity
1. Water Availability
2. Water Temperature
3. Stream Substrate
4. Upland Habitat



Olson and Burton 2019

Olson & Burton 2019

Habitat Extent

	Water Avail.	Water Temp.	Substrate	Upland Habitat	Dispersal Corridors	References
Torrent Salamanders	✓	✓	✓		✓	Thurman et al. 2024 Bury 2008 Emel et al. 2019 Olson et al. 2009
Tailed Frogs		✓	✓		✓	Macedo et al 2023 Aguilar et al. 2013 Spear and Storfer 2008 Wahbe et al. 2003
Pacific Giant Salamanders			✓	✓	✓	Grant et al. 2010 Garcia et al. in prep Curtis and Taylor 2004 Parker 1991
Redbacked Salamanders				✓	✓	Olson and Kluber 2014 Kluber et al. 2008 Rundio and Olson 2007 Wilk et al. 2014
Dunns Salamanders				✓	✓	Olson and Kluber 2014 Wilkins and Peterson 2000 Kroll et al 2010 Vesely and McComb 2002

Site Condition

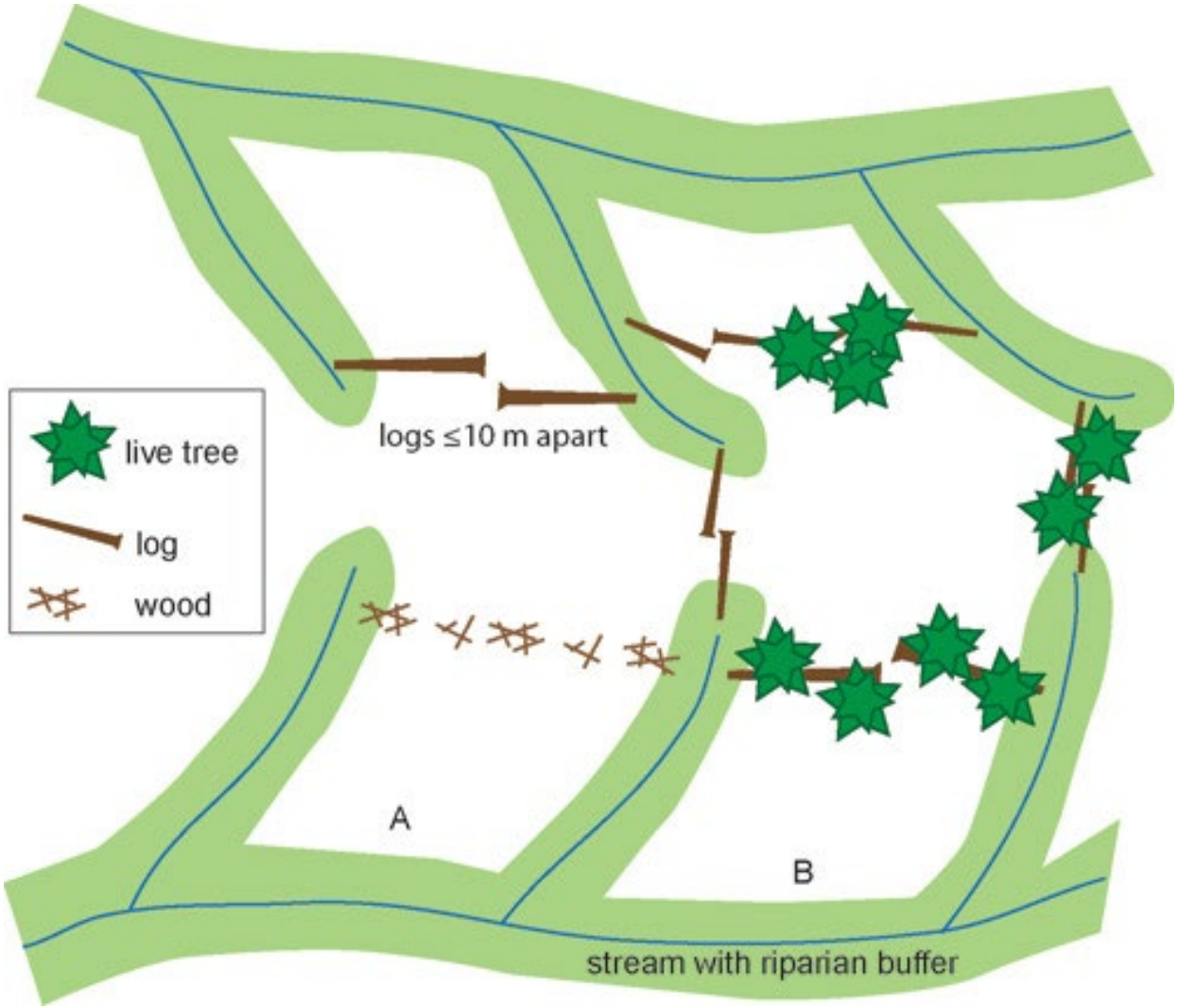
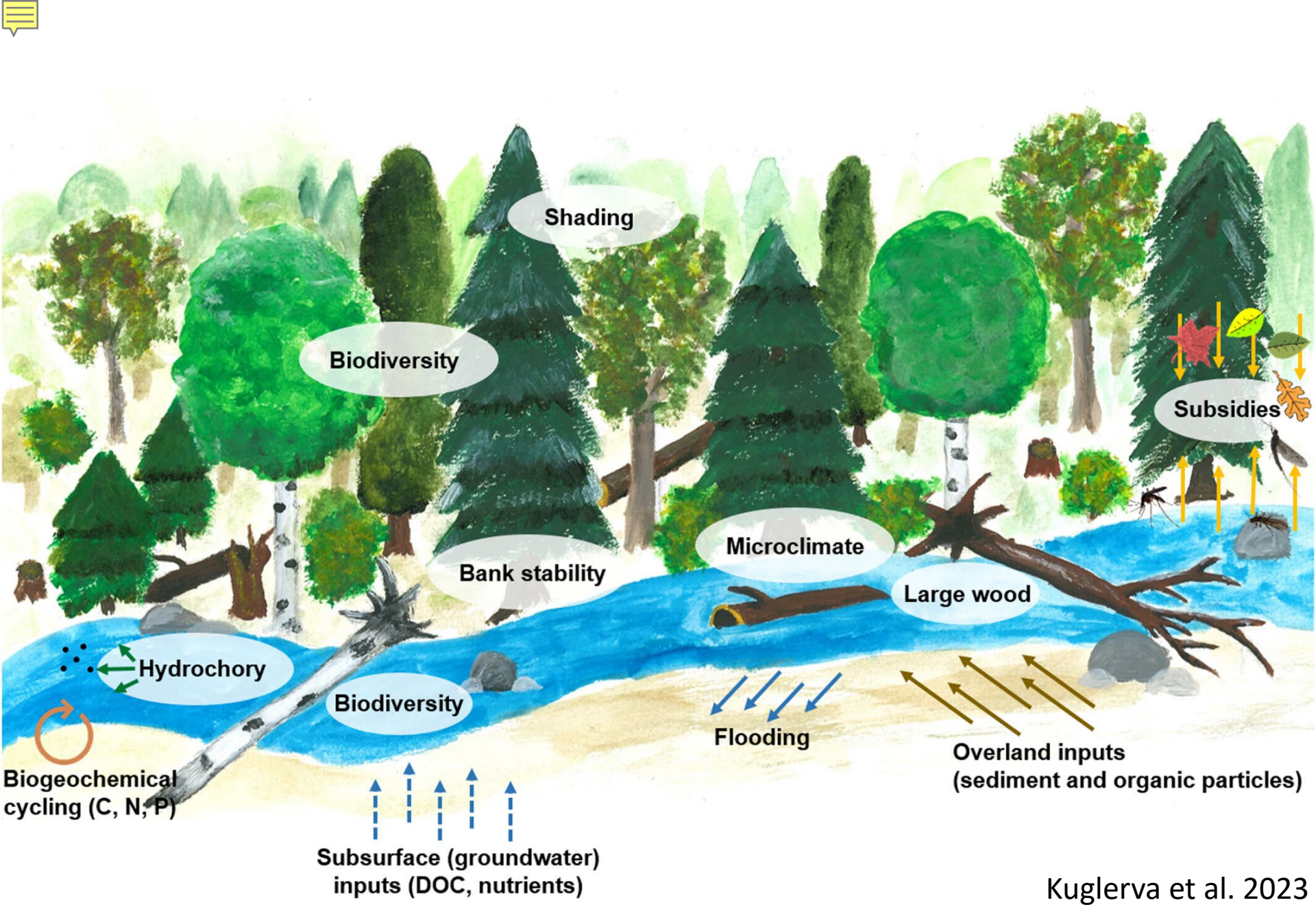


Figure: USDA Forest Service graphic by K. Ronnenberg
https://research.fs.usda.gov/pnw/projects/riparian-buffers#research

Connectivity- within watershed

Photo credit: Klamath-Siskiyou Wildlands Center

Connectivity- between watersheds



Kuglerva et al. 2023

Diversity

Pacific Giant Salamanders (Coastal and Cope's):

Objective: Perennial waterways and pools

Action:
- Side-channels and In-stream structure
- Culvert replacement
- Road removal

Torrent Salamanders (Cascades, Columbia, Olympic, Southern):

Objective: Cold, consistent baseflows

Action:
- Riparian buffers
- Canopy complexity
- Road removal

Tailed Frog (Coastal):

Objective: Sedimentation control

Action:
- Upslope and riparian vegetation
- Bank stabilization
- Culvert replacement
- Debris flow mitigation

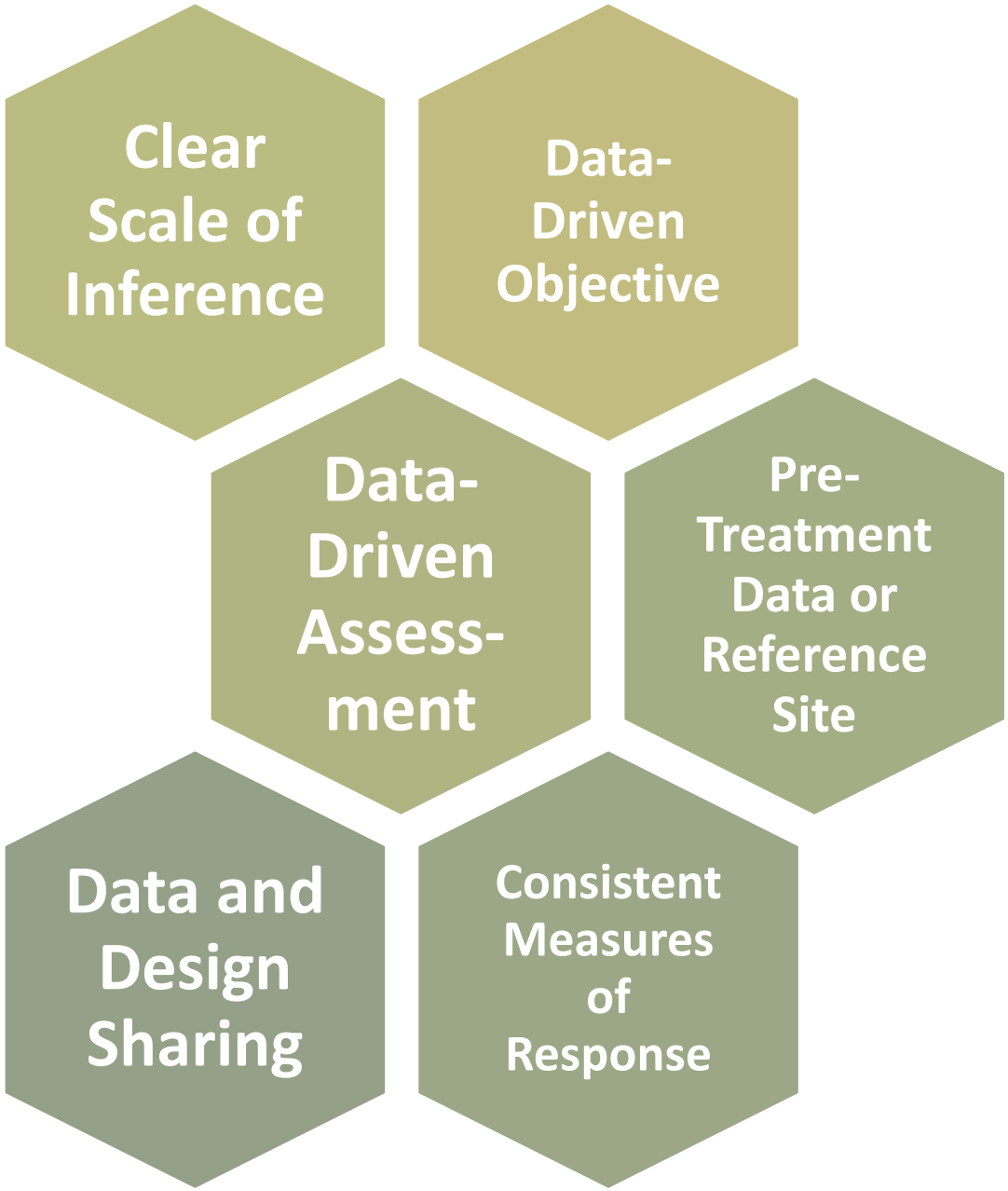
Amphibian Restoration

Culvert: Little Eagle Creek Culvert Removal Project
https://clackamasriver.org/little-eagle-creek-culvert-removal/

Riparian habitat: Oregon Conservation Strategy
https://www.oregonconservationstrategy.org/strategy-habitat/riparian-habitats-and-flowing-water/

Large wood: Camp Creek Headwaters Restoration Project

Amphibian Restoration



Project Effectiveness Evaluation

Pre-Treatment Data or Reference Site

Consistent Measures of Response

Amphibian Response Variables:

- Presence/Absence
- Density (life stage dependent)
- Occupancy Probability
- Development and Growth
- Movement/Dispersal

Site/Time Comparison:

- BACI (Before/After, Control/Impact)
- Treatment vs. Reference Conditions

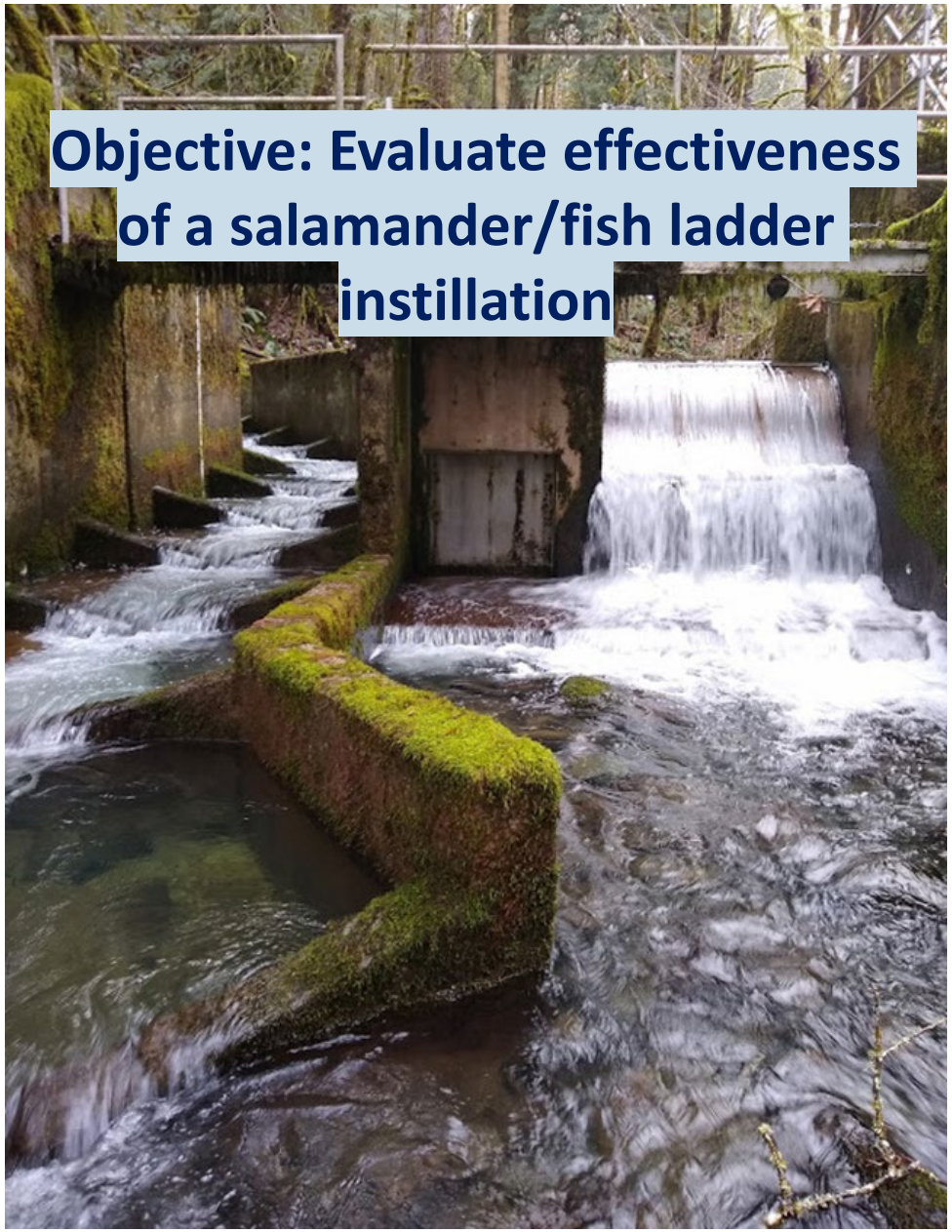


Photo Credit: Jordan Eaton

Project Effectiveness Evaluation: Case Study

Response Variables:

- Monthly assessments of fish and salamander densities above and below structure
- Body size range

Paired site design:

- Same reach length
- Similar vertebrate densities
- Similar stream types

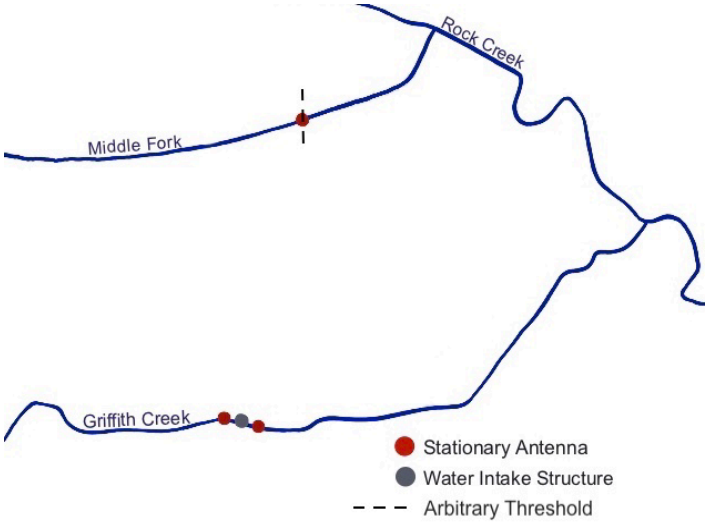


Photo Credit: Jordan Eaton

Project Effectiveness Evaluation: Case Study

Project Constraints

Context Dependencies

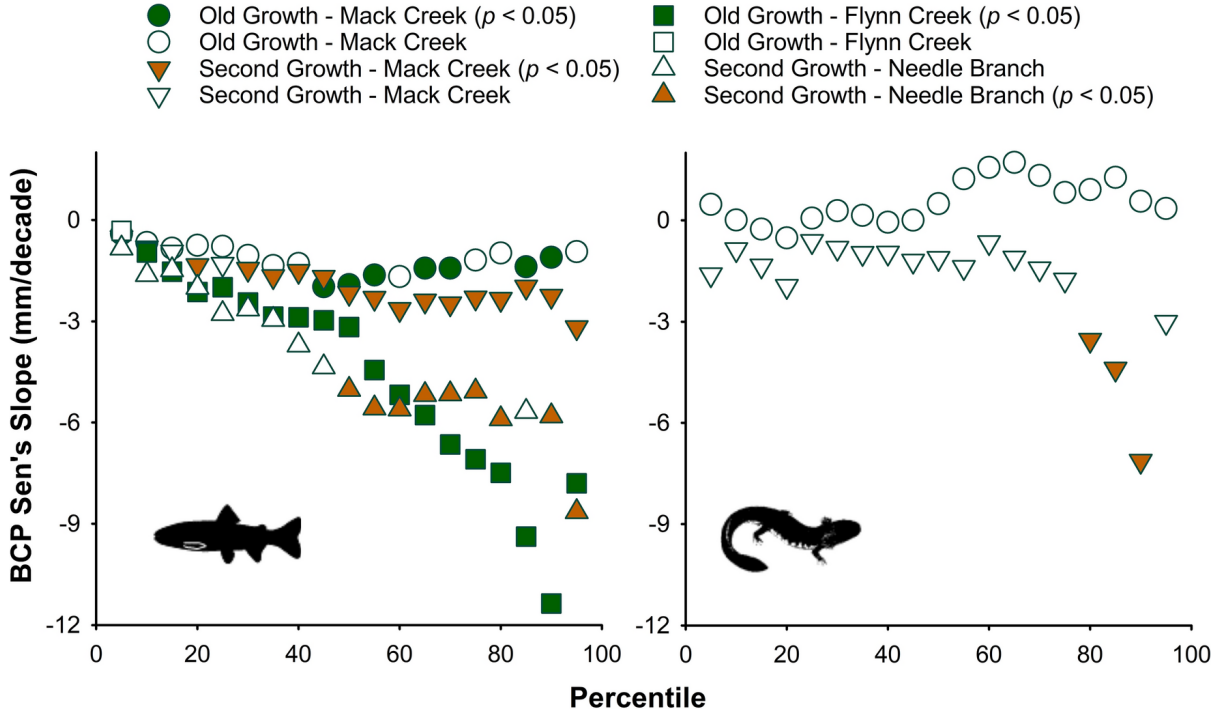
- Responses should be associated with past, as well as current, management actions (Kroll 2009)

Photo credit: Oregon State Archives

Project Constraints

Context Dependencies

- Time scales of response may exceed project timelines (Arismendi et al. 2024)



Project Constraints

Context Dependencies

- Datagaps exist, thus there will be uncertainty in responses.

Photo credit: USA Today; https://www.usatoday.com/story/news/nation/2024/06/26/oregon-wildfires-map-darlene-3-fire/74223655007/

Questions