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Plethodontid Salamander Proximity to Surface Water Relative to Ocean Distance

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Background

- The lungless salamander family (Plethodontidae), require a moist & humid environment to survive because they utilize cutaneous respiration
- Studies have shown that airborne salinity can impact health and survival responses of plethodontid salamanders
- Distance from the ocean may determine the proximity of salamanders to a freshwater surface water source
- I hypothesized that when distance from the ocean increases there would be an increase in distance of salamanders to surface freshwater

Methods

- The first study site was a drainage in the Arcata Community Forest
- The second study site was a drainage on the bluffs above College Cove Beach in Trinidad
- Quadrat plots were placed systematically along a line transect extended from a drainage (surface water source) at each study site
- I used a Poisson regression analysis (a generalized linear model)



Study Sites

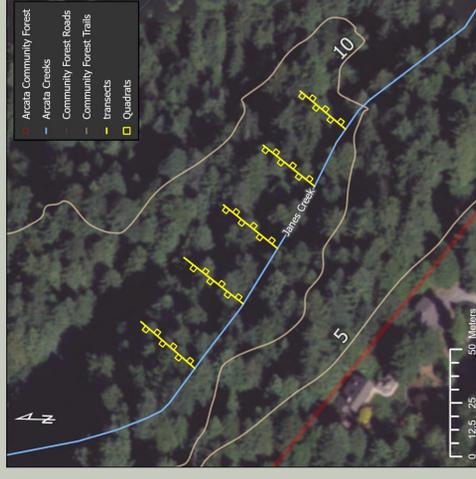
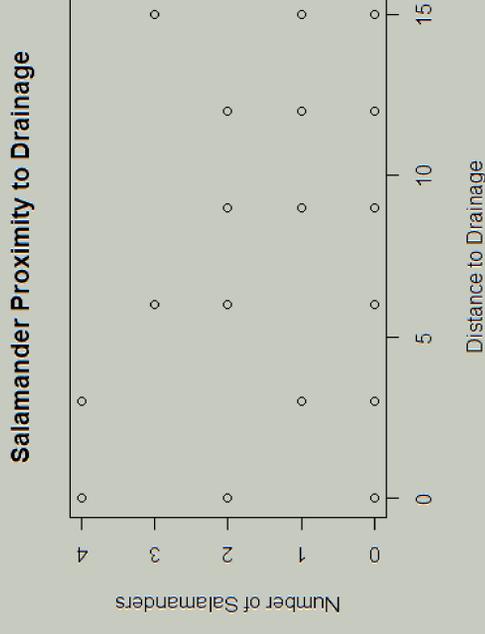


Figure 1. Arcata Community Forest in Arcata, California on trail 10 along the James Creek watershed, distance to ocean is 7.14 km, February – April 2022



Figure 2. Mill Creek in Trinidad, California, distance to ocean is 0.23 km, 30 quadrats sampled, February – April 2022

Figure 3



Discussion

- This study shows that ocean distance is not a factor in proximity to surface freshwater
- However, a study site with an increased distance from the ocean, may yield different results
- Elevation and slope were not measured in this study and could be a factor in proximity to surface water
- Canopy cover could also be measured to see its effects on proximity to surface water
- Weather was included on some data collection days which could be tested to further this research

Management Implications

- My results can be used to explain physiological advances, showing airborne salinity not affecting cutaneous respiration in salamanders
- My results also show that there may be a developed tolerance for a more elevated salinity in coastal environments
- This information would give managers insights on how distance from the ocean can affect salamanders' locations in forests

Results

- My hypothesis, if distance increases then proximity of salamanders to surface water will decrease did not show statistical significance
- The Poisson regression analysis did not show statistical significance for distance to surface water ($P=0.219$)
- There was no statistical significance for distance from ocean ($P=0.322$)

Table 1. Results from Poisson regression analysis on plethodontid salamander proximity to surface water in relation to distance from the ocean in Trinidad (n=30 sites), California, and the Arcata Community Forest (n= 30 sites) in Arcata, California, February – April 2022.

	Estimate	Standard Error	P-value
Intercept	0.216406	0.336467	0.5201
Distance from Ocean	-0.127480	0.081364	0.1172
Distance to Drainage	-0.078152	0.045248	0.0841
Distance from Ocean: Distance to Drainage	0.012047	0.009583	0.2087

Acknowledgments

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