

Amphibian Larval Partitioning Patterns in Response to Abiotic Gradients

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Background

While much is known about the ecology of adult stream-breeding amphibians and their eggs, little is known about how their larval form interact with their aquatic environment, particularly with regards to space, time, and competition from other cohabitating amphibian larvae.

How organisms self-sort in their environment is called partitioning. This study asks whether or not partitioning patterns might exist in association with abiotic gradients such as elevation, substrate size, canopy closure, in-stream vegetation, dissolved oxygen, water temperature & flow rate.



Sampling Methods

Depth	ES	bucket	kick Net	Snorkel	Boulder Flip	Go Pro	Litter Bag
<0.5m	X	X	X	X	X	X	X
0.5m-1m	X	X	X	X	X	X	X
>1m	X	X	X	X	X	X	X

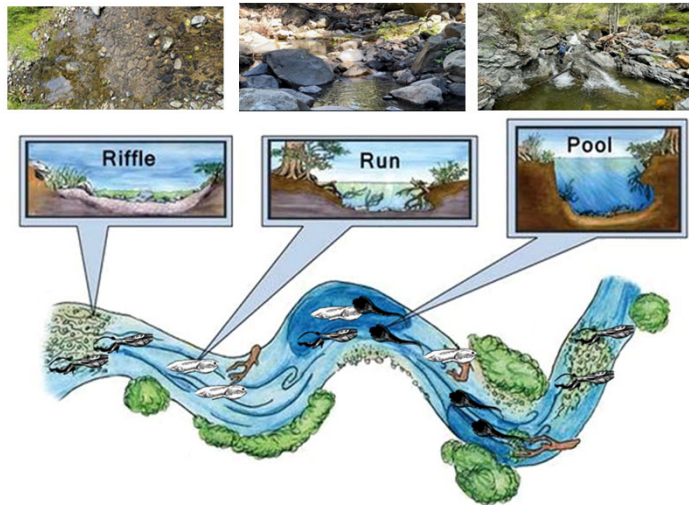
Methods

Survey methods reflect the diverse depths and habitat features of each mesohabitat. Due to this variation, a mixture of methods will be employed including:

- Visual Encounter
- Foam-lined bucket
- Kicknet samples
- GoPro video & photo
- Boulder overturning
- Snorkel Surveys
- Leaf Litter Bags

Research Questions

1. Does stream partitioning of amphibian larvae exist?
2. What abiotic factors drive mesohabitat sorting?
3. How might egg deposition location & age of larvae impact partitioning patterns?



Methods, continued

Mesohabitats will be preferentially selected based on egg presence and representative location along each length of stream. Stream sections will include low, medium, and high elevation zones, including some data on intermittent sections of stream at high elevations for comparison.

Mesohabitats will be sampled a total of 3 times: 1) egg deposition identification, 2) early larval stage, 3) late larval stage.

Data will be collected directly in the field using ArcGIS Field Maps, a smartphone app that allows for custom, offline data entry. Data can then be visualized using ArcGIS.

Analysis

Depending upon the hypothesis, data will be analyzed using ANOVA, Generalized Mixed Models, Linear Mixed Models, General Linear Model, and post-hoc analysis when necessary.

Study Sites

Three study sites have been selected in Sonoma County:

1. **Ingalls Creek**, Modini Mayacamas Preserve*
2. **Sonoma Creek**, Sugarloaf Ridge State Park^
3. **Stuart's Creek**, Bouverie Ecological Preserve*

*Audobon Canyon Ranch, ^ California State Parks

Discussion

The future of Northern California is predicted to be hotter and drier, coupled with unpredictable flood events^{1,2}. Mountain streams are the most susceptible to these climactic shifts³. If scientists and land managers want to know how best to support amphibian communities and riparian corridors in these sensitive regions, a baseline understanding of current distributions and potential abiotic and interspecific interactions are essential.

Work Cited

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