Factors Affecting Productivity of the Endangered California Tiger Salamander on the Santa Rosa Plain

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Questions

- Do constructed vernal pool habitats support greater breeding and survivorship of the endangered California Tiger Salamander?
- What are the biotic and abiotic drivers of CTS breeding and survivorship?

Background

Adult and Larval CTS

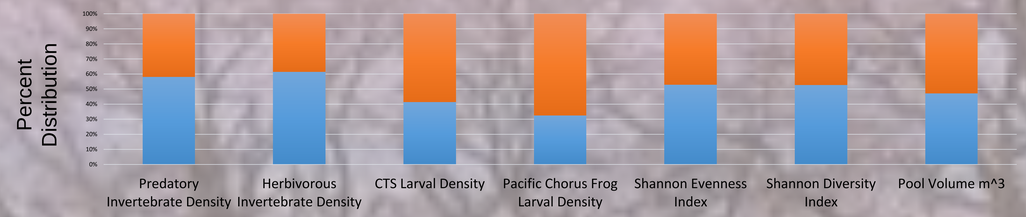
- Habitat loss mitigation through construction of vernal pools has occurred in the Santa Rosa Plain since 1996.
- The California Tiger Salamander distinct population segment of Sonoma County was not listed as endangered until 2003.
- Vernal pool construction designs prior to 2003 focused on maximizing habitat for rare and endangered plant species.
- Breeding and survival of the California Tiger Salamander is dependent on a narrow range of suitable vernal pool habitats.
- The California Tiger Salamander is bio-indicative of ecosystem health.[1,2,3,4,5]

Obligate Carnivory of a CTS Larva

Predacious Diving Beetle Larva Feeding on CTS Larva

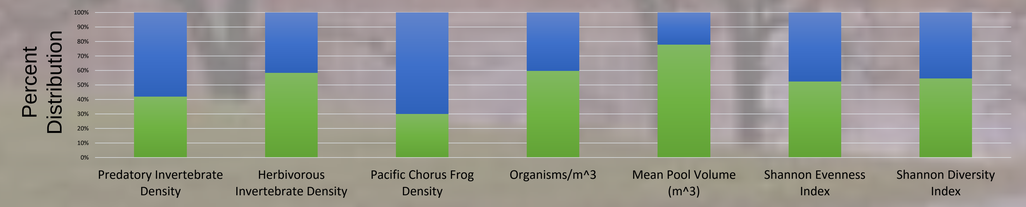
Preliminary Results

Characteristics of Natural and Constructed Vernal Pools



Percent distribution of organism density, diversity, and pool characteristics by pool volume between natural and constructed pools at three Santa Rosa preserves in March 2015. No significant differences by pool type (one-way ANOVA $p>0.05$, constructed n=7, natural n=5)

Characteristics of Vernal Pools with and without California Tiger Salamander larvae



Percent distributions of mean abundances and mean pool characteristics for vernal pools with and without CTS larvae in three Santa Rosa preserves in March 2015. No significant differences by CTS presence (one-way ANOVA $p>0.05$, with CTS n=10, without CTS n=3)

Methods

March 2015 Boxplot Surveys, Santa Rosa Ca.

- $1m^2$ open bottom boxes were placed at set intervals along randomly selected transects.
- Two pairs of individuals used dipnets to sample the boxplot three times for a total of twelve samples per box plot.
- CTS larvae from each sample sweep were counted and removed from the sample box.
- Invertebrates from each sample were collected and preserved for quantification and identification to genus and family levels.
- 10-15% of the area of each pool was sampled.

Preliminary Results

- CTS breeding and/or survivorship is greater in constructed vernal pools, though results were not statistically significant and there was limited sample size.
- There is no significant difference in other measures of metazoan (invertebrate) diversity between natural and constructed pools.
- Natural and constructed pools have very similar hydrologic characteristics.
- CTS larval abundance is inverse to Pacific Chorus Frog larval abundance, suggesting a primary food source for CTS larvae.

Conclusions

- Construction of vernal pools within the Santa Rosa Plain provides suitable habitat for the breeding and survival of CTS, though characteristics such as pool volume or Pacific Chorus Frog larval abundance may have strong effects on CTS breeding and/or survivorship.
- This 2015 pilot study is currently being expanded to improve data robustness and further explore observed variance in CTS breeding and survivorship.

Ongoing Research

- The hydrologic characteristics of 58 vernal pools are being studied in conjunction with CTS breeding efforts observed through egg mass deposition surveys as well as monitoring the rates of larval development and survival to successful metamorphosis.
- Does the timing of CTS egg deposition affect trophic interactions between CTS larvae and predatory invertebrates?

References

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