



# The Effects Of Elevation And Drainage On Tiger Salamander Breeding Pools

Jonathan Edwards, August Stadtfeld, Derek Girman, Dave Cook  
Department of Biology • Sonoma State University  
edwardjo@sonoma.edu, stadtfel@sonoma.edu, girman@sonoma.edu, salamanderdave@sbcglobal.net



## Background

-In 2003 the California Tiger Salamander distinct population segment in Sonoma County was listed as endangered.

-Ecosystem health can be indicated by the bio-indicative nature of the California Tiger Salamander

-The California Tiger Salamander's reproductive success is heavily influenced by the condition of vernal breeding pools.

-Prior to 2003, vernal pool construction designs were focused on maximizing habitat exclusively for endangered and/or rare flora species.

-The breeding and survival capabilities of the California Tiger Salamander is dependent on a narrow range of suitable vernal pool habitats.

-A variety of factors affect the viability of vernal breeding pools.

## Research Question

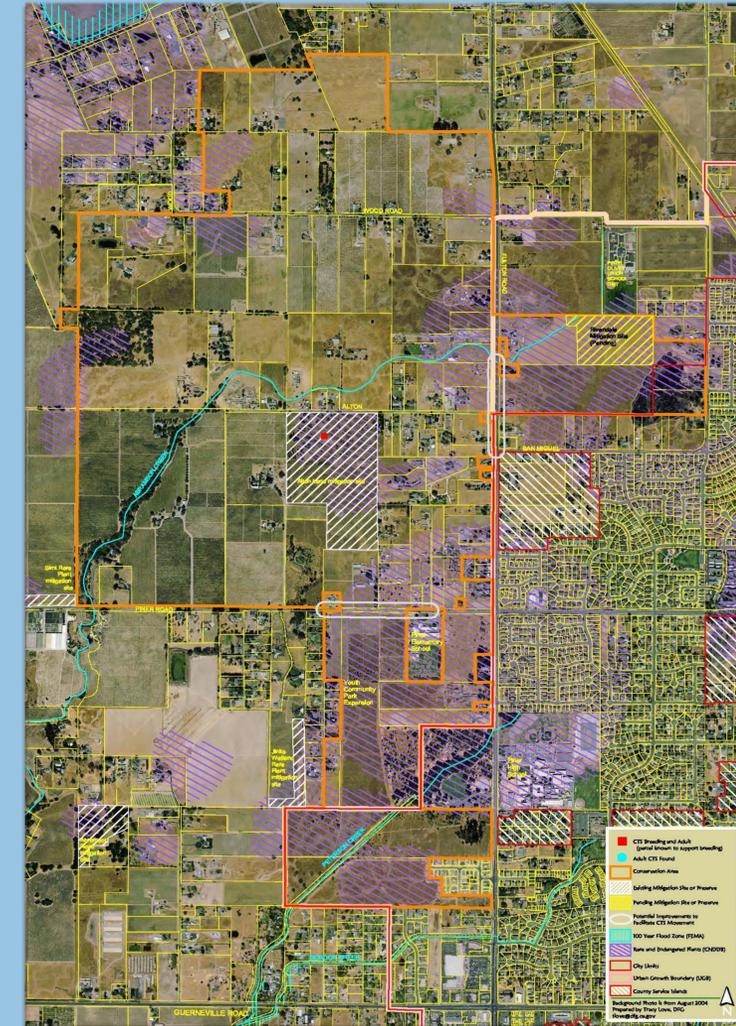
How could vernal pool elevation and drainage rates be affecting the reproduction of California Tiger Salamanders?

## Methods

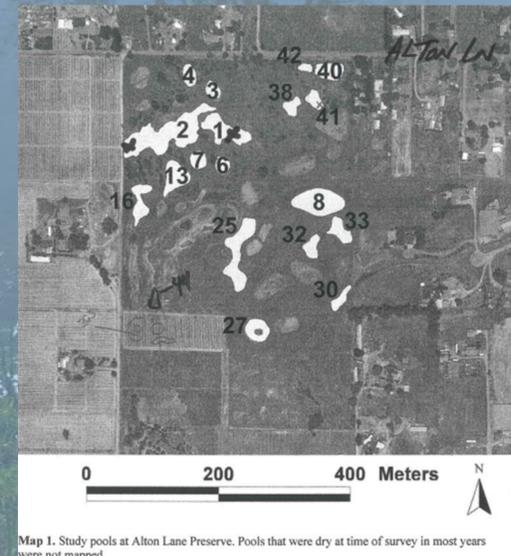
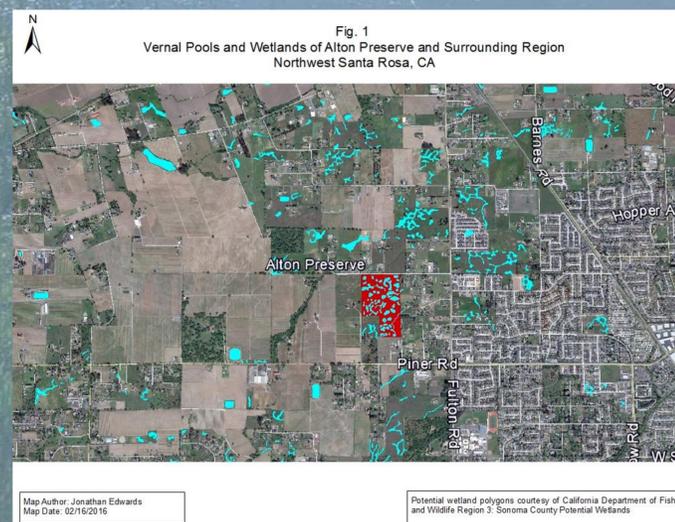
- A Johnson Laser Leveler was used to assess the elevation of vernal breeding pools relative to each other at Alton Preserve, Santa Rosa. The elevation of the preserve was also measured as a baseline.
- Odyssey depth loggers were placed in the vernal pools to record the changes in water depth, in addition to recording temperatures.
- Water depth changes will be monitored on a regular basis.

## Discussion

- We aim to understand what effects elevation and vernal breeding pool drainage rates could have on CTS metamorphosis
- Continuous monitoring of drainage rates will let us monitor changes due to rainfall and flooding.
- Seeing how elevation and pool drainage rates affect CTS metamorphosis could be used in future construction of artificial CTS vernal breeding pools to create a more favorable environment and restore the population.



Background map: U.S. Fish and Wildlife Service. 2005. Santa Rosa Conservation Strategy. U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. Final version.



Map 1. Study pools at Alton Lane Preserve. Pools that were dry at time of survey in most years were not mapped.



## References

- 1) DeWeese, J. 1996. An evaluation of selected wetland creation projects authorized through the Corps of Engineers section 404 program. Pages 58-63 in: D.M. Kent, J.J. Zentner and K.D. Whitney (Editors). Selected Proceedings of the 1994 Conference of the American Society of Wetland Scientist, Western Chapter. University of California at Berkeley. Berkeley, CA.
- 2) Welsh H. Jr., Ollivier L.M. 1998. Stream amphibians as indicators of ecosystem stress: a case study from California's redwoods. Ecol. Appl. 8:1118-31.
- 3) Simon TP, Jankowski R, Morris C. 2000. Modification of an index of biotic integrity for assessing vernal ponds and small palustrine wetlands using fish, crayfish, and amphibian assemblages along southern Lake Michigan. Aquat. Ecosys. Health Manag. 3:407-18