



## THREATENED AND ENDANGERED AMPHIBIANS STUDIES

Populations of many amphibian species have recently declined at alarming rates; a trend noted worldwide as well as across the western U.S. Although disease is often a contributing factor, habitat alteration remains the most prominent cause of these widespread amphibian declines. As a result, project proponents often have to address concerns about potential effects on sensitive frog and salamander species.



### Areas of Expertise

Amphibians are often secretive and difficult to observe, and require specialized knowledge to survey and study them. **Hamer Environmental** has the expertise necessary to meet our clients' needs regarding:

- **Habitat assessment and modeling** - Amphibians use their habitat in complex ways, for example some species breed in very specific aquatic environments but spend substantial time on land during other stages of their life-cycle. Determining habitat suitability requires a detailed understanding of the breadth of habitat requirements for these animals.
- **Survey and monitoring design** - We have extensive field experience with the wide variety of methods available to survey for frogs and salamanders in both aquatic and terrestrial portions of their habitats. Our expertise includes the ability to design monitoring protocols that balance cost and data quality, while recognizing the unique challenges that the amphibian life history presents.



- **Mitigation/Compensation** - At times compensation for impacts to species may be required as part of a project. Our detailed understanding of amphibian biology and extensive experience working closely with government agencies will help you negotiate mutually desirable solutions.
- **Research Studies** - Projects often benefit from research to fill in gaps in knowledge about a specific species or site. Hamer Environmental is knowledgeable on a wide range of issues concerning salamanders and frogs and has published papers on habitat use, determining population sizes, and modeling population viability.



## California Tiger Salamander



As a federally listed species, any take of the California Tiger Salamander must be permitted by the U.S. Fish and Wildlife Service. Our amphibian expert, Peter C. Trenham, PhD. has 15+ years of research and management experience with the federally protected California Tiger Salamander, whose range spans from Santa Barbara to Santa Rosa California.

We can assist with any issues related to this species; from simple habitat assessments and regulatory requirements to more complex research incorporating radio telemetry studies (we hold the required state and federal permits to study this species).



## Survey Techniques

**Radio Telemetry** – The terrestrial habitat of this salamander is not well understood. The potential effects of many projects could be more accurately assessed if site-specific studies of upland habitat were available. To date, Peter has conducted and published the only radio tracking studies of this species.

**Habitat Assessments** – Hamer Environmental has a detailed understanding of the geographic range over which this species occurs and the types of habitats where it has (and has not) been observed.

**Survey/Monitoring** – Because this species spends >95% of its life underground, away from breeding ponds, it presents a special challenge when determining its presence at a site and in monitoring its status over time. Hamer Environmental is very familiar with the government agency survey guidelines and can design and implement cost-effective survey and monitoring strategies for the California Tiger Salamander.

**Project Construction Monitoring** – Some projects are required to have biological monitors present to minimize the potential for take. We are qualified to design project monitoring protocols, conduct monitoring and train our client's staff as monitors.

**Research Studies** – Many aspects of the biology and management of this species remain poorly understood (e.g., the effectiveness of road crossing tunnels; habitat parameters for constructing breeding ponds). Hamer Environmental is interested in working with clients to investigate innovative approaches to management.



## Contact Us

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