

**DIVISION OF RESEARCH, INNOVATION & SYSTEM INFORMATION**  
**Research Initial Scope of Work**  
**SUBMITTAL FORM - FY 14/15**

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- I. Project Number: P927  
Project Title: *California Sensitive Amphibian and Reptile Highway Crossings*
- II. Task Number: 2666  
Task Title: *Develop roadway crossings for sensitive amphibians*
- III. Project Problem Statement:  
Caltrans' mission is to "provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability." This mission includes efficiently delivering quality transportation products and services while preserving and enhancing California's resources and assets. To achieve the mission as well as to meet legal requirements Caltrans is required to mitigate for adverse impacts arising from the construction, maintenance, and operation of the state transportation system to Endangered, Threatened, and other sensitive amphibians and reptiles including those impacts related to population connectivity and habitat fragmentation.

Several amphibian taxa breed and undergo larval development in aquatic habitats but spend parts of their adult lives in terrestrial habitats. Thus, in locations where these taxa exist they migrate as metamorphosed juveniles or adults into uplands and then as breeding adults back to the aquatic habitat. Easily traversable roadway wildlife passages may be needed to maintain the amphibian populations when roads divide necessary upland adult habitat from aquatic habitat. Also, some amphibian taxa that remain in or near aquatic habitats need to move along streams to find suitable conditions over time, thus requiring the ability to cross highway rights of way. Caltrans lacks the critical information and guidance necessary to plan, design, construct, and maintain cost effective wildlife passages for sensitive amphibians. Without appropriate guidance and designs for these passages, Caltrans is challenged to meet environmental obligations and obtain permits and agreements necessary to construct sustainable highway facilities within desired schedules.

- IV. Objective:  
This task will develop information and guidance for Caltrans practitioners for locating, designing, constructing, and maintaining cost effective roadway wildlife crossing structures for selected listed and sensitive amphibian taxa that breed in aquatic habitats and also utilize upland habitats, or which may need wildlife crossing structures as they move along streams to reach suitable habitats, or to maintain genetic diversity and population viability. In this call for submissions, wildlife crossing structure is defined as a box culvert, corrugated metal pipe, bridge, or other underpass structure that may be utilized by amphibians and other wildlife for movement under a roadway.

## V. Task Description of Work and Expected Deliverables:

The objective of this task will be met via the following:

- In consultation with Caltrans and regulatory agencies, develop a prioritized list of listed and sensitive California aquatic breeding amphibians that can be impacted by roads and which may need roadway wildlife crossing structures to maintain and enhance populations. Caltrans has a draft tentative list of amphibian taxa for potential consideration. This list includes: arroyo toad, western spadefoot, southern mountain yellow legged frog, Sierra Nevada yellow legged frog, northern red legged frog, California red legged frog, Pacific tailed frog, California tiger salamander, Santa Cruz long toed salamander, Coast Range newt, and red-bellied newt.
- Develop information for locating, designing, constructing, and maintaining roadway wildlife crossing structures for the selected sensitive California amphibian taxa. Specifics to be studied should include but are not limited to: crossing dimensions (height, width, and length), crossing shape, materials and spacing between structures; light, temperature, and humidity conditions within crossings; fence materials, mesh size and height; and the integration of wildlife fencing and crossing structures along roadways.
- Based on the information developed devise and field test amphibian crossing designs and materials for sensitive California taxa specifically considering fence and crossing details.
- In consultation with Caltrans and regulatory agencies, consider evaluating the effectiveness of amphibian passages on Caltrans District projects such as those in District 5 along SR 246.
- Study the effectiveness of median barriers designed with scuppers as a crossing feature for amphibians.
- Develop guidance materials such as a Best Practices Manual for locating, designing, constructing, and maintaining wildlife passages for the selected amphibians for use by Caltrans and other transportation practitioners.
- Develop a training session for Caltrans practitioners and other interested people detailing the results of the research and discussing how to use the guidance materials to design wildlife crossings for amphibians.

The expected deliverables for this task are:

- A prioritized list of sensitive aquatic breeding amphibians to be considered for amphibian crossing structures (developed in cooperation with Caltrans and regulatory agencies).
- A research report providing detailed information for locating, designing, constructing and maintaining wildlife crossing structures for the sensitive amphibians.
- A research report detailing the study design, methods, and results of data collection and monitoring of wildlife crossing designs for sensitive amphibians.
- Guidance materials that can be used by Caltrans practitioners for locating, designing, constructing and maintaining wildlife crossing structures for the sensitive aquatic breeding amphibians.

- A training session via the web to Caltrans practitioners and other interested people presenting the results of the research and how to use the guidance materials to locate, design construct, and maintain wildlife crossing structures for amphibians.

#### VI. Background:

Caltrans lacks the critical information necessary to plan, design and construct cost effective crossing structures for Endangered, Threatened, and other sensitive reptiles and amphibians. More than 25 amphibian and reptile species are listed as threatened or endangered in California. Additionally, many more taxa are considered to be sensitive by agencies such as the California Department of Fish and Wildlife, United States Bureau of Land Management, and the United States Forest Service. Roadways pose movement barriers for many of these taxa and are also a source of other negative impacts including habitat loss, soil and hydrological ground disturbance, mortality and pollutant runoff. As California's human population increases and climate changes, additional stress will be placed on existing amphibian and reptile populations. Without consensus on appropriate crossing structure guidance and designs for these taxa, Caltrans is challenged to meet environmental obligations and obtain permits and agreements necessary to construct sustainable highway projects within desired schedules. This project will develop information for Caltrans practitioners to locate, design, construct, and maintain cost effective highway crossings for these listed and sensitive animals that meet the requirements of regulatory agencies.

#### VII. Estimate of Duration:

Present to June 30, 2019

#### VIII. Related Research:

Caltrans has performed two Preliminary Investigations to provide a basic synthesis of the literature and the practice pertaining to amphibian and reptile wildlife crossing structures crossing roadways:

California Amphibian and Reptile Crossing Preliminary Investigation July 2013

[http://www.dot.ca.gov/research/researchreports/preliminary\\_investigations/docs/california\\_amphibian\\_reptile\\_crossing\\_preliminary\\_investigation.pdf](http://www.dot.ca.gov/research/researchreports/preliminary_investigations/docs/california_amphibian_reptile_crossing_preliminary_investigation.pdf)

Highway Crossings for Herptiles (Reptiles and Amphibians) November 2012

[http://www.dot.ca.gov/research/researchreports/preliminary\\_investigations/docs/herptile\\_highway\\_crossings\\_pi2012-11-2.pdf](http://www.dot.ca.gov/research/researchreports/preliminary_investigations/docs/herptile_highway_crossings_pi2012-11-2.pdf)

These Preliminary Investigations identified a number of nationally recognized highway issues relating to reptiles and amphibians and recognized that impacts and crossing requirements are often species or region specific. Several states particularly New York and Florida have performed research on amphibian and reptile crossings and much European work also exists. Additionally, the

investigations determined that for many sensitive California taxa sufficient information does not exist to properly construct highway crossings. Another task in this project is being done concurrently with this task. This additional task is: *Task 2700 Develop roadway crossings for sensitive reptiles*. Additionally, the Caltrans Division of Environmental Analysis is pursuing a contract to develop a list of standardize base plans and specifications for wildlife crossings that can later be tailored for region and species specific requirements.

IX. Deployment Potential:

This project is being managed by the Division of Research, Innovation, and System Information and is sponsored by the Caltrans Division of Environmental Analysis. The eventual deployable product is envisioned to be information and guidance that can be used to help locate, design, construct, operate, and maintain wildlife crossing structures for selected amphibians.

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