



SAVING THE YOSEMITE TOAD

HEALTHY ECOSYSTEMS DEPEND ON HEALTHY TOADS

BY HEATHER McKENNY, AQUATIC ECOLOGIST

ABOVE A female Yosemite toad in its natural high-elevation aquatic habitat.

Sitting quietly in the warm, springtime sun in one of Yosemite's picturesque meadows, you may be fortunate enough to experience the rare joy of hearing the Yosemite toad's musical call. Visitors have described the toad's call as a strikingly clear, high-pitched trill with its mellow notes being a "pleasing addition to the chorus of bird songs just after the snow leaves". In fact, the toad's scientific name "canorus" means "tuneful" in Latin, referring to the male's melodious call to attract mates during the early-spring breeding season.

Hearing the Yosemite toad's chorus was once a common pleasure for spring visitors to the High Sierra. Sadly, Yosemite's meadows are much quieter today due to substantial population declines. Scientists estimate that we have lost between 47 percent and 79 percent of our Yosemite toad populations, and that the species no longer occurs in as much as a third of its historic range. Because of the declines, the U.S. Fish and Wildlife Service considers the species a candidate for listing under the Endangered Species Act. Chytridiomycosis, a disease caused by the non-native amphibian chytrid fungus, recreational use such as pack stock grazing, climate change, and air pollution are among the factors implicated in the species decline. Scientific studies determining the importance of these and other threats are currently underway.

The Yosemite toad, found only in the Sierra Nevada was a historically abundant species, occurring primarily in high-elevation wet meadows above 6,400 feet in elevation. Because of this abundance, the species was an important part of energy and nutrient cycling within these high-elevation aquatic ecosystems. The decline of the Yosemite toad is likely affecting the health of these ecosystems and also reduces the chances for park visitors to experience a natural landscape with a full complement of native biodiversity. For those fortunate enough to encounter the toad while hiking in the park, its unique dimorphic coloration (males look very different from females), musical call, and stately toad behavior is a treat.

“My favorite experience from the week was on the last surveying day; my group found hundreds of yellow-legged frogs and tadpoles in a pool and some Yosemite toad tadpoles....The experience really made me appreciate the beauty of Yosemite and the importance of preserving it.”

—Seven Hills School Student



LEFT This Seven Hills School student engages in a survey that will teach her about conservation, while also contributing important data to the Yosemite toad project. **RIGHT** Students from Seven Hills School in Walnut Creek, Calif. survey a high-elevation meadow in Lyell Canyon for Yosemite toads and other amphibians.

The Conservancy is funding a three-year project to conduct the first-ever park-wide survey of suitable habitat for Yosemite toads. Our primary goal is to survey as many of the 2,304 wet meadows above 6,400 feet as possible so that we have a better understanding of where Yosemite toads are found today and how their distribution has changed over time. We also want to improve our knowledge about what habitat qualities influence the chances of toads occurring in a meadow and what factors may be affecting the distribution of Yosemite toads in the park.

Between 2010 and 2012 we surveyed 1,032 meadows and found toads in 126. As part of the survey, we collect information on whether toads (eggs, tadpoles, juveniles, or adults) are present in the meadow or not, relevant habitat information, and any signs of human use. The habitat and species-presence information is being integrated with data from prior surveys, visitor use information, pack stock grazing, and “remotely sensed” information, or habitat qualities of each meadow as “seen” from satellites, aircraft and field sensors. Remotely-sensed information includes elevation and the amount of precipitation and length of snow pack coverage over multiple years.

As a result of data collected from this Conservancy-funded project, we have developed a model that predicts the likelihood that a given meadow will contain Yosemite toads. The data are also helping identify populations that may be vulnerable due to habitat changes or isolation from other populations. A peer-reviewed scientific paper describing the results of this model is in preparation. We are also conducting a more detailed habitat and threat assessment together with a conservation genetics study to determine how landscape and land use affects the distribution of Yosemite toads.

All of this information is helping us better understand what makes a “good” toad meadow, what stressors are affecting Yosemite toads, and what toad populations or toad meadows may be vulnerable and in need of help, such as habitat restoration. We are using the information gained through these projects to develop a conservation strategy for restoring and protecting the Yosemite toad. The conservation strategy will include targeting locations for habitat restoration, and making science-based decisions about managing threats, such as human use. Our objectives are to have an analysis of park-wide survey results completed by the end of March 2013, and the conservation strategy completed by the end of 2014.



TOP Seven Hills School science week program participants (students, chaperones, and teachers) and NPS staff pose for a group shot during their 2009 survey.



BOTTOM Yosemite toads are sexually dimorphic, as shown by this male toad whose coloring varies greatly from that of the coloring of the more distinctive female of the species.

In addition to gaining crucial information that will help save the Yosemite toad, this project is enabling us to provide unique educational opportunities to an amazing group of children between the ages of 13-17. For the past four years, children from Seven Hills School in Walnut Creek, Calif. have participated in a week-long summer science program in Yosemite. During the school year they learn about amphibian conservation and the work we are doing in Yosemite. During the summer, they work side-by-side with our biological science technicians learning wilderness survival skills and ethics, and helping with surveys for Yosemite toads, Sierra Nevada yellow-legged frogs, and other amphibians and reptiles. They are even helping us find populations of Yosemite toads that have not been previously documented. These young people are showing exceptional enthusiasm for their work and dedication in the face of harsh conditions. They make participation in this project a joy for all who work with them. The experience has been life-changing for many of the students and has helped them appreciate the importance of conservation as illustrated by the following quote. "My favorite experience from the week was on the last surveying day; my group found hundreds of yellow-legged frogs and tadpoles in a pool and some Yosemite toad tadpoles....The experience really made me appreciate the beauty of Yosemite and the importance of preserving it."



HEATHER MCKENNY is an aquatic ecologist at Yosemite National Park, where she has been overseeing the Aquatic Ecology Program since 2008. She graduated from the University of Vermont with a B.S. in biology and an M.S. in forestry. Saving the Yosemite toad and the Sierra Nevada yellow-legged frog from extinction is the most important part of her job. She hopes that one day these formerly abundant species will be restored throughout Yosemite National Park and the Sierra Nevada.

Saving the Yosemite toad from extinction is crucial for restoring a healthy ecosystem in Yosemite's high country and for ensuring future generations of park visitors can experience the joy of hearing the toad's tuneful call ringing across mountain meadows in the spring. ■

YOSEMITE CONSERVANCY has provided a three-year grant to fund a survey of the Yosemite toad and its high-elevation meadow habitat. Data collected will help park scientists determine the current status and distribution of the species, as well as factors associated with species decline, such as climate change and visitor-use activities. The goal of the project is the development and implementation of a more informed conservation plan to protect and preserve this unique species.

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