

Status of Amphibians in California and Arizona

Recent declines in amphibian populations have been confirmed in many areas around the world, including California and Arizona. Data from California clearly document not just a decline in anuran (frog and toad) populations, but extirpation of certain species throughout significant portions of their range. For example, the mountain yellow-legged frog, once abundant throughout much of the Sierra Nevada, is now entirely gone from five adjacent river drainages in the vicinity of Sequoia and Kings Canyon National Parks. Some of the greatest declines in amphibians in the country are currently taking place in southern California, especially in areas of urbanization and habitat fragmentation.

In Arizona, all native species in the genus *Rana* (six leopard frogs and the Tarahumara frog) have experienced significant reductions in their natural ranges. The Tarahumara frog no longer occurs in the United States; the last known population declined from an estimated 700 frogs in 1978 to zero in 1983.

Causes of Decline

Habitat loss, fragmentation, and degradation are responsible for many observed declines. Over 90 percent of aquatic habitats have been destroyed in southern California and Arizona. Introduced nonnative fish (trout, bass, sunfish, and others), frogs (bullfrog and



Mountain yellow-legged frog, one of the most rapidly declining amphibians in California's Sierra Nevada. Photo: G. Fellers, USGS.

Research needs:

- Specific causes of recent declines and ways to reverse them
- Effects of disease on amphibian populations
- Methods to monitor temporary-pond breeding amphibians
- Methods to control amphibious predators

African clawed frog), and crayfish have eliminated many amphibian populations in California, Arizona, and elsewhere in the United States. These nonnative predators have contributed directly to declines, and, perhaps even more significantly, to the elimination of dispersal corridors for native amphibians. Recently, airborne contaminants were implicated in declines throughout much of California.

Suspected human and natural factors affecting populations include air pollution, acid precipitation, increases in ultraviolet light, long-term fire suppression, water diversion, extended drought, severe freezes, recreational mining, grazing, parasites, and disease.

Disease

Diseases have been associated with die-offs of frog populations in both California and Arizona. Of particular interest is the chytrid fungus, which has been linked to amphibian population crashes—even the extinction of entire species. The role of chytrid fungus in Southwestern amphibian declines is not completely understood. In the field it is not possible to confirm the presence of chytrid fungus in adult frogs. However, signs of infection by chytrids can often be detected in anuran larvae by examination of the back tooth rows with a 10x hand lens (see photo). We are examining tadpoles of all species of anurans for the presence of chytrid fungus. Infected tadpoles and sick frogs are sent to the National Wildlife Health Center in Madison, Wisconsin, for identification of pathogens.

Monitoring

To detect changes in status of populations or species, we are using standardized, systematic monitoring methods whenever possible. We are currently developing methods for monitoring amphibians that breed in temporary pools, which includes most desert anurans. Desert anurans, a primary focus in southern California and Arizona, pose several problems with respect to monitoring, the most prominent of which is the brief and erratic timing of standing water used as breeding habitats. Other impediments to a standardized monitoring program for these species include large roadless areas that make access difficult, lower density of amphibian populations (i.e., populations are more scattered), unpredictability of breeding choruses, the very local and asynchronous nature of desert anuran breeding, and the high number of species in need of study (up to six species may breed at the same pond).

Introduced Predators

We are developing and evaluating methods to control or remove nonnative predators from native amphibian habitats. This is especially difficult for amphibious predators such as the bullfrog, African clawed frog, and crayfish, which can move overland as well as through the water. In the Sierra Nevada of California, introduced trout are a serious impediment to survival of native frogs. In Arizona, introduced sunfish, bass, catfish, and mosquitofish also eliminate native frogs.

For help in identifying the amphibians (and reptiles) of coastal counties in southern California, visit “A Field Guide to the Reptiles and Amphibians of Coastal Southern California” at <http://www.werc.usgs.gov/fieldguide/>.



Effects of chytrid fungus are evident on these tadpoles. There would normally be three black tooththrows above the mouth and four below. In this individual (left), there are only short, broken, asymmetrical tooththrows above and below the open mouth. In more extreme cases, the beak will lose its color and the tooththrows will be entirely missing (right). Photo: G. Fellers, USGS.



The bullfrog, introduced into the West from the eastern United States, eats almost anything it can get into its mouth. In southeastern Arizona, almost half the diet (by volume) of the bullfrog consists of vertebrates, including other frogs, rodents, birds, snakes, lizards, turtles, and even an occasional bat. Photo: C. Schwalbe, USGS.

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