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ENDANGERED Species BULLETIN

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The Year of the Frog

The Association of Zoos & Aquariums in North America, the world's other professional zoo and aquarium associations, other conservation organizations, and government agencies have joined in a global effort to save imperiled amphibians. To raise global awareness of the plight of frogs, other amphibians, and activities to conserve vulnerable species, these partners have named 2008 as "The Year of the Frog."

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Telephone: 703-358-2390
Fax: 703-358-1735
E-mail: esb@fws.gov

Web site:
www.fws.gov/endangered/bulletin.html

Editor
Michael Bender

Art Director
Jennifer Hennessey

Contributors
Paul Boyle
Shelly Grow
Vicky Poole
Jim Rorabaugh
Melissa Kreutzian
Mike Sredl
Charlie Painter
Roberto Aguilar
Juan Carlos Bravo
Carter Kruse
Tara Sprankle
Diane Barber
Jeff Ettling
Jill Utrup
Kim Mitchell
Chad Mellison
Ashley Bradley
Kate Symonds
Della K. Snyder-Velto
Christina Lydick
Joe Milmoe
Lianne Ball
Jim Knox
Jeff Servoss

The Panamanian golden frog (cover) and the Mississippi dusky gopher frog (opposite page), both of which are imperiled with extinction, illustrate the dangers facing many of the world's amphibian species.
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The Endangered Species Bulletin is now an on-line publication. Three electronic editions are posted each year at www.fws.gov/endangered/bulletin.html, and one print edition of highlights is published each year. To be notified when a new on-line edition has been posted, sign up for our list-serv by clicking on "E-Mail List" on the Bulletin Web page.

The Bulletin welcomes manuscripts on a wide range of topics related to endangered species. We are particularly interested in news about recovery actions and conservation partnerships.

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Please send us your comments and ideas! E-mail them to us at esb@fws.gov.

IN THIS ISSUE

The Global Amphibian Crisis

by Paul Boyle and Shelly Grow

ASSOCIATION OF ZOOS & AQUARIUMS

A crisis of enormous proportions faces the world's amphibian species. At present, we estimate that about one-third of the more than 6,000 known amphibian species are at risk of extinction. This likely underestimates the real number since data are lacking on many species from Africa, Southeast Asia, and other regions. Several causes underlie this massive decline, but a crucial element is the very nature of amphibians; their skin must always be moist and it literally breathes, so they are especially vulnerable to environmental contaminants. Habitat destruction, disease, pollution, climate change, and other expanding human-related impacts have an entire class of the animal kingdom in serious decline.

Frogs hold great cultural significance. They figured prominently in ancient Egyptian and Greek mythology, as well as more recent folklore. Today's well-known character Kermit the Frog, whose motto is "It isn't easy being green," may have had an early premonition of the crisis frogs face today. Frogs were traditionally used for studying anatomy, physiology, neurobiology, and pharmacology, and were used globally in the 20th century for pregnancy tests. Today, as we see amphibian species in serious decline, frogs are like the "canary in the coal mine" – a class of animals more sensitive than most, potentially signaling an impending environmental calamity.

The severe decline of amphibians occurring today can be compared with the mass extinction of dinosaurs 65 million years ago. Yet, while most people know of the sudden disappearance of dinosaurs, few remember that when the dinosaurs disappeared, almost 70 percent of the other species on Earth disappeared with them. There could be truth in the notion of amphibians as an early indicator

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The Mississippi distinct population segment of the dusky gopher frog* (Rana capito sevosa) *is listed as endangered.

Chiricahua Leopard Frog Inches Towards Recovery

by Jim Rorabaugh, Melissa Kreutzian, Mike Sredl, Charlie Painter, Roberto Aguilar, Juan Carlos Bravo, and Carter Kruse

Recovery – it is the most important part of endangered species conservation. For most species, considerable funding and staff resources are needed to overcome years of population declines and habitat degradation. Despite the limited resources available, and with a lot of help from our friends and partners, such as state wildlife agencies, federal land managers, ranchers and other private landowners, Turner Enterprises, Phelps Dodge Corporation, the Phoenix Zoo, Arizona-Sonora Desert Museum, the Fort Worth Zoo, Nature Conservancy, Sky Island Alliance, and universities, we have put together a recovery program for the threatened Chiricahua leopard frog (*Lithobates chiricahuensis*). To augment the scarce funds available for recovery activities, we have engaged the Fish and Wildlife Service's Partners for Fish and Wildlife Program (see the story on page 36) and applied for grants from foundations. We and our very dedicated host of partners are slowly making progress towards the recovery of this species.

The Chiricahua leopard frog is a large, often green, spotted frog that historically was common in the mountains and high valleys of central and southeastern Arizona, west-central and southwestern New Mexico, and southward in the Sierra Madre Occidental and associated sky islands of northeastern Sonora and western Chihuahua, Mexico. We know of 469 historical localities. Declines were first noted in the early to mid-1970s, and today the species is only known to exist at about 41 localities in Arizona and 30 to 35 localities in New Mexico. Its status in Mexico is poorly known, but Chiricahua leopard frogs have declined to some extent there as well. The Mexican government lists it as *amenazada* (threatened).

The causes of the decline are not always clear, and several interacting factors are often at play, but experts on the Chiricahua leopard frog generally agree that predation by introduced species (especially American bullfrogs, sport fishes, and crayfish) and an apparently introduced fungal skin disease (chytridiomycosis) that is killing frogs and toads around the globe are the leading causes.

A Chiricahua leopard frog from the Pajarito Mountains in Arizona near the Mexican border.

Jim Rorabaugh

Other problems, such as loss and degradation of wetlands, recent catastrophic wildfires, drought, and contaminants, have contributed to the decline.

The Chiricahua Leopard Frog Recovery Plan was completed in early 2007. It was developed in an open process with a technical team that provided top-notch scientific expertise, while three stakeholder groups kept the process grounded in the social, economic, and nuts-and-bolts realities of achieving recovery on the ground. Key elements include protecting the remaining populations and habitats, establishing new populations, monitoring progress, research, public outreach, and adaptive management.

The primary threats – introduced predators and chytridiomycosis – are not easily addressed. We can control predators at small sites, but eliminating them from large, complex systems is often impossible with current technology. Except for taking precautions not to spread the disease ourselves, we are only beginning to understand how we might deal with chytridiomycosis. Some frog populations are persisting with the disease, especially at warmer and lower sites, and they could provide key insights into how to manage the disease. We are looking into several questions: are the frogs developing resistance to the disease, are there environmental factors allowing their persistence, or both? We

Duke Klein (Forest Service biologist), at left, and Mike Sredl (Arizona Game and Fish Department) build pond habitat for Chiricahua leopard frogs in the Tonto National Forest, Arizona.

Jim Rorabaugh

have experimented with eliminating the disease from habitats but are a long way from solving that problem. Our strategy for now has been to try to maintain the remaining populations and begin reestablishing populations and improving habitats in places where introduced predators and disease are absent or manageable. These reintroductions typically involve collecting egg masses from the wild, hatching the eggs and head-starting tadpoles at the Phoenix Zoo or other facilities, and releasing late-stage tadpoles or metamorph frogs. Limited wild-to-wild movements of egg masses and frogs, as well as captive propagation, have also been employed. We have honed our techniques and protocols over the past 12 years (see Tara Sprankle's following article), and most reestablishments now successfully result in breeding populations.

These recovery actions have been facilitated by 1) a special rule under section 4(d) of the Endangered Species Act that allows incidental take of frogs resulting from operation and maintenance of livestock waters on non-federal lands, 2) Safe Harbor Agreements with the Arizona Game and Fish Department and the Malpai Borderlands Group (a progressive group of conservation ranchers), and 3) programmatic grazing consultations with involved federal agencies on public lands. The 4(d) rule and Safe Harbor Agreements help us build trust with ranchers and private landowners, while the programmatic consultations provide a framework within which we can move forward on recovery with the Forest Service, Bureau of Land Management, and livestock grazing permittees. Artificial water sources developed for cattle have become important habitats for Chiricahua leopard frogs, so tools that help us work in partnership with ranchers are critical to recovery.

On Ted Turner's Ladder Ranch in New Mexico and at a high school in Douglas, Arizona, captive propagation and head-starting facilities are under construction. Thanks to the Arizona Game and Fish Department, Tonto National Forest, and Phoenix Zoo, aggressive efforts to restore habitats and reestablish populations are rebuilding a metapopulation (a group of spatially separated populations that exchange individuals through immigration and emigration) of Chiricahua leopard frogs near Young, Arizona. Meanwhile, the Phoenix Zoo and the Arizona-Sonora

Combining outreach and recovery, students and their parents from Sierra Vista, Arizona, assist in a release of frogs that were head started at the Phoenix Zoo.

Jim Rorabaugh

Elizabeth Slown

Anna Slown (left) and Hannah Jacobsen (right) model the Chiricahua leopard frog tattoo that was produced for outreach about this threatened amphibian.

Desert Museum near Tucson are cautiously breeding the last remaining frogs from the Coconino National Forest and the Santa Rita Mountains in Arizona for reestablishment at multiple sites. Major habitat restoration programs underway at two sites in southeastern Arizona and one in the bootheel of New Mexico will benefit Chiricahua leopard frogs and other imperiled wetland species. We are also working with Mexican partners to build capacity for amphibian conservation in northwestern Mexico. In August 2008, we will hold a workshop at a private reserve in northern Sonora owned by Naturalia (a Mexican conservation group) to instruct Mexican biologists on survey protocols and techniques for captive husbandry, propagation, and headstarting of amphibians.

Restoring an imperiled species is not an easy process, but with hard work from many partners, we are beginning to see how the Chiricahua leopard frog might one day be secure again. Recovery is still a distant destination, but the journey has begun.

Jim Rorabaugh (Jim_Rorabaugh@fws.gov), the Service's recovery leader for the Chiricahua leopard frog, is located in the Tucson, Arizona, Field Office. Melissa Kreutzian (Melissa_Kreutzian@fws.gov), the Service's lead for Chiricahua leopard frog recovery in New Mexico, is located in Albuquerque. Mike Sredl (MSredl@azgfd.gov) is the Ranid Frog Programs Manager for the Arizona Game and Fish Department in Phoenix. Charlie Painter (CPainter@state.nm.us) is the herpetologist for the New Mexico Department of Game and Fish in Albuquerque. Roberto Aguilar DVM (raguilar@thephxzoo.com) is the Director of Conservation and Science at the Phoenix Zoo. Juan Carlos Bravo (juancarlos_bravo@naturalia.org.mx), Naturalia's Northwestern Mexico representative, is located in Hermosillo, Sonora. Carter Kruse (carter.kruse@retranches.com) is a senior aquatic biologist with the Turner Endangered Species Fund in Bozeman, Montana.