

Good Neighbors:

Leopard frogs and backyard ponds on Tucson's east side

By Don Swann and Dennis Caldwell

Karen Reifschneider was discouraged. As head of the Historic Notch Neighborhood Association in Tucson, and a passionate advocate for wildlife, she had been promoting a project among her neighbors to raise native leopard frogs in backyard ponds. Her pond was the first to receive tadpoles — but she hadn't seen any sign of them in months.



LOWLAND LEOPARD FROG TADPOLE BY GEORGE ANTONETTI



LOWLAND LEOPARD FROG BY DENNIS CALDWELL



PHOTO: THIS PAGE BY GEORGE ANDELINO

Karen Reifschneider, pond owner, and Dennis Caldwell, part-time biologist, are two of the many people who have brought lowland leopard frogs to ponds in Tucson's Historic Notch Neighborhood.

It was spring 2006 and southern Arizona was gripped in severe drought. Most desert waters in nearby Saguaro National Park had gone dry, and frog populations were precariously low.

"We poked around through the rocks and plants for weeks, then just gave up," says Reifschneider. "I felt the weight of all the leopard frogs in Tucson on my shoulders. It was a bit like being responsible for the last breeding pair of passenger pigeons, and I knew how that turned out."

But one spring day, while having her morning coffee beside the pond, Reifschneider heard a distinctive plop — a juvenile leopard frog. She looked more closely, and saw another ... and another. As her eyes focused, the little frogs stood out among the native reeds,

like smooth jewels of green and bronze.

Reifschneider's frogs soon flourished. Within months she had a second generation, then a third. Other ponds were built in other backyards and stocked with frogs, with similar results. After decades of losing ground in Tucson, the lowland leopard frog had expanded its range ever so slightly. Not exactly the return of the passenger pigeon, perhaps, but an important hop forward for Arizona's native frogs.

Notch Neighbors to the Rescue

For more than a decade, the Arizona Game and Fish Department has been helping native frogs regain lost ground. It's an important, but daunting task. Amphibians are reported to be declining, from the cloud forests of Colombia

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to the rivers of Australia, and Arizona is no exception. Our “true” frogs, including the large, subtropical Tarahumara frog (which disappeared from the United States in 1983) and five species of leopard frogs, are all having troubles. Introduced predators, loss of wetlands, dropping water-tables, pandemic diseases and changing climate all may be contributing factors to these declines.

In southern Arizona, the department is working with the Tarahumara Frog Conservation Team, which includes the Arizona-Sonora Desert Museum and Phoenix Zoo, to reintroduce that species into the Santa Rita Mountains. Another effort is underway to remove all American bullfrogs, the predator associated with native frog declines throughout the West, from the Altar Valley near Tucson. Bullfrogs also are being removed from the area around Pena Blanca Lake so they cannot re-establish themselves in the lake following its draining last fall. In northern Arizona, Chiricahua leopard frogs recently were reintroduced on private lands near Show Low. These efforts all involve state and federal agencies, non-governmental organizations, universities and private landowners.

In the Tucson area, the department has long collaborated with Saguaro National Park to help preserve the lowland leopard frog, a desert-adapted frog that nonetheless requires some water. The species has lost ground throughout the Southwest, but the good news is that it is not listed under the Endangered Species Act as endangered or threatened. The goal is to keep it that way.

The Rincon Mountain District of Saguaro National Park has a number of small populations of these frogs, but biologists worry about habitat loss due to flooding and sedimentation following large fires. Also, the widespread fungal disease known as “chytrids” or “Bd” (a shorthand notation taken from the fungus’ scientific name) is found in the park. When some frog

populations disappeared, biologists began thinking the best recourse was to create “refugia” for them — places where water is not dependent on rainfall, and where frogs could survive to replenish wild populations in the future, if needed.

When Saguaro National Park asked for help in 2004, Reifschneider and the Historic Notch Neighborhood Association, already at work improving wildlife habitat, jumped at the chance. Also interested were the Tucson Herpetological Society, dedicated to the conservation of native reptiles and amphibians, and the Rincon Institute, which works to create cooperative conservation projects between government agencies and private landowners. With the U.S. Geological Survey and University of Arizona on board, a collaborative project was born.

From the beginning, the commitment was to try, try and try again — to do whatever we could to create backyard ponds that would support lowland leopard frogs. Because we didn’t know what problems might arise, we used an experimental, “adaptive management” approach. We started with questions: How large should the ponds be? How deep? What kinds of native plants were best? How could we control mosquitoes? What stage of frogs should we introduce? And, most important, how would we know if we were succeeding?

After consulting many experts, we rolled up our sleeves and went to work. We found landowners willing to build ponds, and went through the environmental compliance process. Our first funds came from a U.S. Department of the Interior initiative that encourages government and private organizations to work together to creatively solve conservation problems. (The project has continued with generous support from the Friends of Saguaro National Park, the Desert Southwest Cooperative Ecosystem Studies Unit and the National Fish and Wildlife Foundation.) In addition to back-

yard ponds, we included monitoring and applied research in the project.

An Anxious Wait

By spring 2005, with the help of sturdy volunteers from the Tucson Herpetological Society and Sky Island Alliance, three backyard ponds had been constructed. Pond owners were responsible for purchasing supplies such as liners, landscaping materials and pumps, but received active assistance from our team and volunteers. Native plants were pre-treated for Bd, then planted and given time to grow.

For mosquito control, fish were essential. We did not want to use goldfish or other nonnative species, but most native fish were not available because they are threatened or endangered. We settled on the native long-fin dace, an excellent mosquito controller that coexists with leopard frogs in nearby Cienega Creek. We were not certain this tiny stream-dweller would survive in small ponds, but it flourished and immediately began to multiply.

In summer 2005, biologists armed with dip nets and buckets visited the healthiest frog populations in Saguaro National Park. We selected partial egg masses and a small number of tadpoles. To maintain local genetic strains, we moved tadpoles to backyards only within local watersheds — Tanque Verde Creek for the north side of the park and Rincon Creek for the south. Many tadpoles in the Notch Neighborhood ended up only a few miles from their pools of origin, which we felt was important for genetic integrity if frogs left the neighborhood on their own.

Finally, we waited ... through the winter months, which were drier than any in recent memory, and the even drier spring of 2006. While Reifschneider and other pond owners anxiously waited, many natural frog pools in the park dried up. By early summer 2006, of more than 20 natural pools regularly sup-



BOTH PHOTOGRAPHS BY DENNIS CALDWELL



Volunteers from the Tucson Herpetological Society and the University of Arizona’s student chapter of the Wildlife Society helped build pond No. 4, which now provides attractive habitat for lowland leopard frogs.

porting frog reproduction in the northern part of the park, only one could be found that still contained tadpoles.

Small wonder, then, that Reifschneider was so elated when her tadpoles finally metamorphosed, and frogs appeared out of the hidden depths of her pond.

Challenges and Opportunities

Eight backyard ponds are now part of the Notch Neighborhood Frog Restoration project. Except for the newest pond, all have had successful reproduction and multiple generations of leopard frogs. In the four years since the project started, native fish and plants have thrived. The ponds are attractive habitat for birds and other wildlife, including native toads and the Sonoran mud turtle. The project is focused on applied local conservation, and is not intended to encourage people to rear frogs in their ponds simply for viewing (see sidebar). However, outreach and publicity associated with the project have helped educate Tucsonans about the importance of native frogs, fish and aquatic plants.

At the same time, there have been problems; or opportunities, as project organizers like to think of them. The biggest challenge came as early as 2005, when we discovered a large American bullfrog in one pond. Bullfrogs are not native to Arizona, but they are (we now know) well-established in neighborhoods on Tucson's east side. They can travel miles overland, are difficult to capture and have a voracious appetite for native leopard frogs. In response, we are now fencing some ponds and asking neighbors to help control bullfrogs.

In addition, efforts to keep frog diseases out of backyard ponds have not succeeded. In the winter of 2008, several leopard frogs

with the chytrid disease were found dead. Scientists from the University of Arizona are studying the dynamics of this disease in the ponds, and we are experimenting with habitat modifications to try to lessen its impacts.

In the end, a major benefit of this project is that it provides land managers from the park and nearby Coronado National Forest with options — for restocking populations that have disappeared in the past, and as a hedge for populations that may disappear or decline in the future. In addition to promoting leopard frogs in backyard ponds, the project also has included experimental habitat restoration for the species within Saguaro National Park.

When we began the project in 2004, we hoped to learn how to build the ideal backyard pond for native frogs. With some success behind us, we have refined our initial questions: What is the optimal sun exposure? Which plants provide the best cover against predators? Research in Saguaro National Park shows that natural leopard frog habitat has unique features related to the availability of sun and shade, cover in the form of rock cavities and tree roots, pool depth, water quality and the dynamics of flood and drought. As a result, we are experimenting with pool size, artificial stream elements and other habitat features in the hope of creating healthier, more sustainable communities of leopard frogs.

Reifschneider is not discouraged by the challenges; in fact, as both a pond owner and a project organizer, she enjoys working through them. "The important thing is that we learn how we can help our wildlife, from a practical point of view," she says. "The truth is that we learn more from the ponds when we have problems than we do when

nothing goes wrong. If our small project can contribute significantly to a body of knowledge dedicated to successfully preserving species in our neighborhoods, the lives of our neighbors will be enriched and wildlife will benefit. That might be our greatest success. It has been exciting and enlightening to work on this project with the potential to learn so much."

■ Don Swann has been a biologist at Saguaro National Park since 1995, working on collaborative monitoring and conservation programs for Sonoran Desert wildlife and plants. Dennis Caldwell is a graphic artist and part-time biologist specializing in educational outreach and the conservation of aquatic ecosystems in the desert Southwest. (The authors thank Cecil Schwalbe, Taylor Edwards, Roy Averill-Murray, Lynsey Miller, Karen Reifschneider, Meg Weesner, Tom Jones, Mike Sredl and Natasha Kline for their assistance.)

Natives in Backyard Ponds

The Notch Neighborhood Frog Refugia project is one of several projects in Arizona specifically focused on local conservation of native amphibians. Although many backyard pond owners would like to stock native frogs and fish, moving wild animals (especially protected native species) to private yards is not permitted. What is encouraged is establishment of native plants within and surrounding backyard ponds. To learn more about native plants, visit the Arizona Native Plant Society's website: www.aznps.org.

In addition, pond owners should avoid stocking invasive exotic plants and animals that may spread to natural areas. Common invasive plants to avoid include mosquito fern, hydrilla, parrot feather watermilfoil, giant salvinia, tamarisk (saltcedar) and fountaingrass. Invasive animals include crayfish, bullfrogs, pond (or red-eared) sliders, and fish such as mosquitofish, sunfish and bullheads. To learn more about invasive aquatic species, a good source is the Backyard Pond brochure from www.TucsonHerpSociety.org/bypond.pdf.



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To control mosquitoes, longfin dace are introduced into all backyard ponds in the Notch Neighborhood Frog Restoration project. Here, Dennis Caldwell releases these small native fish into a pond.