



A SECOND CHANCE IN WEST TEXAS

ONCE FEARED EXTINCT, THE LEON SPRINGS PUPFISH IS BOUNCING BACK, THANKS IN PART TO THE TIMELY INTERVENTION OF BIOLOGIST MURRAY ITZKOWITZ AND HIS STUDENTS.

STORY BY CHRIS QUIRK PHOTOGRAPHS COURTESY OF MURRAY ITZKOWITZ



Small and hardy, but highly endangered, the Leon Springs Pupfish has shown a flagrant disregard for the research preferences of Murray Itzkowitz.

In the last 13 years, the pupfish, which grows to an adult length of 2 inches and was once feared to be extinct, has occupied the top of Itzkowitz's priority list. "I'm not a conservation biologist!" says Itzkowitz, who chairs Lehigh's department of biological sciences. He raises his hands, almost in defense, as he describes his work with the pupfish. "My interest is the theoretical aspects of social behavior."

Itzkowitz is a gregarious and charmingly self-deprecating man. The paneled walls of his office in Iacocca Hall are adorned with vibrant landscape paintings, all done by his late uncle, that combine post-Impressionist and Southwest school characteristics. His

encounter with the Leon Springs Pupfish began when he inherited a ranch from his uncle adjacent to Big Bend National Park in west Texas. Itzkowitz found he liked spending time on his new property. Having studied pupfish in different parts of the globe, he wondered if there was a species living nearby so that he could continue his research. The Leon Springs Pupfish, which inhabited a few small ponds and springs north of Fort Stockton, Texas, fit the bill. "I enjoyed being there, and was having a wonderful time in the 110-degree west Texas heat," says the native New Yorker. The pupfish habitat, a preserve called the Diamond Y Draw, is a *ciénega*, or rare desert marshland. The habitat also happens to be smack-dab in a fully operational natural gas field.

Itzkowitz speculates that the Leon Springs Pupfish are a relic population, marooned from larger bodies of water that have receded.

The fish persist in residual springs and pools. Conditions are harsh. Their numbers may be fragile, but the fish themselves are tough and they can tolerate high temperatures and variations in the salinity of the water.

“So I’m happy as a clam going out and observing the pupfish,” Itzkowitz recalls—until he noticed the population was beginning to decline. Equally troubling, he wasn’t finding any juveniles. “In vibrant populations you see lots of small and large individuals. That means there are lots of different age classes. But in this case I was thinking, ‘Where are the teenagers?’” The pupfish breeding was clearly being disrupted, and their life span is only between one and two years. “That was unnerving,” Itzkowitz took his concerns to The Nature Conservancy, which owns the land of the pupfish’s habitat. The organization asked if he could help discover the cause of the decline and save the fish from extinction. “I had been studying this type of fish for many, many years,” says Itzkowitz, “and I came up with two hypotheses about the decline.”

First, he saw that the pupfish were slowly losing their already minuscule habitat, in this case to the encroachment of bulrush, a grass-like aquatic plant. The pupfish spend most of their time in a deep refuge pool that is only a dozen feet or so in diameter. To spawn, however, they swim through trickling water bridges to adjacent shallow pools which are heated by the ferocious desert sun. With the bulrush growing unchecked, the already small spawning areas were shrinking. “Endangered species often go extinct because they lose habitat,” says Itzkowitz.

His second hypothesis was that *Gambusia Nobilis*, another small, endangered fish, was feeding on the eggs of the pupfish, in part because the constriction of their habitat was forcing them into pupfish spawning areas. “Here we had a second endangered species in the habitat that complicated the problem,” says Itzkowitz. “Now my academic interest surfaces. How do you protect both species, and not have one eliminate the other?”

Itzkowitz and his students crafted a solution to the pupfish decline that was approved and funded by the Texas Fish and Wildlife Department. Their plan involved ingenuity, sweat equity and a trip to the hardware store.

First they cleared out the bulrush to ex-



Itzkowitz (second from left) and his students (1) gather in the 100-degree-plus heat of West Texas. The team clears away encroaching bulrush (2) to expand the pupfish’s tiny spawning area. The Leon Springs Pupfish (3) measures about 2 inches in length. Jennifer Gumm (left) and a friend (4) observe the spawning area.

pand the tiny spawning areas. “The roots were like rubber steel,” Itzkowitz says. “You hit the bulrush with an axe and it snaps right back up.” Next, they put down prefabricated concrete tiles to prevent the resurgence of the bulrush.

This small expansion of the spawning area had the effect of both halting the bulrush—which has not returned—and relieving

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congestion. The *Gambusia*, with more room to operate, became less inclined to wander into the pupfish spawning areas, and the male pupfish, who are territorial by nature, are now better able to ward them off when they do. Over time, the Leon Springs Pupfish population has revived.

Jennifer Gumm ’09 Ph.D., an assistant professor of biology at Stephen F. Austin University, worked with Itzkowitz on the pupfish project in 2006. She says her involvement helped open up practical applications for her research. “Being involved in that project helped me work on the conservation side of things, and apply my expertise in behavioral ecology to real problems in natural populations. Murray was incredibly important to me as a mentor and remains so to this day. I can call him anytime, and he’ll listen and give me advice, whether or not I want to hear it! Working in the field that closely, and for such long hours, really gives you a unique perspective,” she says. “You have the comfort to ask riskier questions and come up with riskier ideas, and that’s what helped us push this work forward.”

Based on his success with the Leon Springs Pupfish, Itzkowitz, working with Paul Samallow, a professor of genetics at Texas A&M University, has received new funding from Texas Parks and Wildlife to repopulate a nearby area where the pupfish had previously been wiped out when their habitat mysteriously dried up. That project will begin this summer.

Itzkowitz has traveled to enviable locales like Barbados and Jamaica to study coral reef fish, and he has endured some ribbing about the arduous life of the biologist. In recent years, he says, the teasing has let up.

“West Texas is a tough environment, and when I’m headed there, people don’t say I’m so lucky.” **LU**