

Federal Hatchery Develops Technology for Imperiled Bonytail Chub

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The grasslands of southeast New Mexico, known for cattle and crops and an occasional UFO crash, seem an unlikely place for leading-edge biotechnology. The little town of Dexter, essentially a service center for ranchers and farmers, is also host to a state-of-the-art National Fish Hatchery & Technology Center. The Dexter hatchery is no newcomer—good water led to its founding in 1931, and game fishes were then the focus. But the focus shifted in 1990 toward technology development for managing critically imperiled fishes, like the bonytail chub (*Gila elegans*).

Scientists believe the endangered bonytail chub may be the most imperiled vertebrate in North America. The not-so-gentle hand of nature has shaped its body over eons to fit its environment. It is a testament to meeting the challenges of nature. A keel on its nape and a tightly fusiform body have allowed it to prevail in the harshest of conditions: turbulent and turbid water—water warmed by intense southwestern sun. But all the specialization for survival was no match for the dams that altered stream flows, nor the stocking of predatory non-native fish that also compete with bonytail for food and space. Built for survival where life is a struggle, it's incongruous that this species struggles to hang on.

But hang on it does, if only by a thread. That thread is a lifeline cast at the technology center. Scientists there have developed a broodstock—a captive population of adults—that produce offspring that ultimately make their way to the wilds of the Colorado River and its many large tributaries, the fish's native habitat.

“With so few adults left in the world, it is of paramount importance that scientific principles guide bonytail chub management,” said U.S. Fish & Wildlife Service geneticist, Connie Keeler-Foster.

Toward that end, Foster has employed leading-edge technology to manage the bonytail chub stock on the genetic level. The Center's laboratory was recently equipped with a DNA sequencer, an apparatus that allows Foster to identify individual fish by their genes.

Foster likens her work to fingerprinting. Knowing the genetic makeup of the entire broodstock, essentially having a pedigree chart, permits Center scientists to selectively pair up males and females for mating. And therein lies the crux for survival, the strands in the thread. Picking mates that are most genetically divergent produces offspring that are more fit to face the rigors of life in the wild.

“Mates well suited for each other may produce young that are less prone to disease, and just better fit for survival,” noted Foster. “They themselves are more likely to reach adulthood and produce their own young in the wild. And that's what we want.”

The end product, a reproducing population in the wild, is far removed from the technology center. But science is the first step in conserving a species staring at extinction.

The Dexter National Fish Hatchery & Technology Center is unique. It's one of 70 national fish hatcheries operated by the U.S. Fish & Wildlife Service around the country, but is the only one dedicated entirely to endangered fish conservation.

To see the bonytail chub, and a host of other rare fishes, up close, visit Dexter National Fish Hatchery & Technology Center, open daily from 7:00 am to 4:00 pm. Special group tours are available by appointment. Call (505)734-5910.

Right: Bonytail chub are built for life in turbulent water. Photos: Craig Springer/FWS. 

