Web Version

TPWD Print-Friendly Page:
http://www.tpwd.state.tx.us/newsmedia/releases/print.phtml?req=20120612a

Media Contact: Larry Hodge, 903-676-2277, larry.hodge@tpwd.state.tx.us [LH]

TPWD Website: http://www.tpwd.state.tx.us

TPWD News Release — June 12, 2012

Texas Fish Hatcheries Serve as Refuges for Imperiled Species

ATHENS—The five state-operated fish hatcheries in Texas generally have one job: to produce fish for stocking into Texas waters.

But the record-breaking drought of 2011 was a game-changer for Texas in many ways, including how Texas Parks and Wildlife Department (TPWD) uses its fish hatcheries. One, the Dundee State Fish Hatchery near Wichita Falls, actually had to suspend operation because of lack of water.

Two fish hatcheries added new activities to their ongoing sportfish production responsibilities. The Possum Kingdom State Fish Hatchery used one pond to hold two species of minnows from the upper Brazos River in case it went dry. The A.E. Wood State Fish Hatchery in San Marcos improved a small portion of their incubation room to hold mussels that might be lost to dried-up rivers or highway bridge construction.

In both cases the purpose is the same: to provide a refuge for species threatened by natural conditions or human activities until they can be safely returned to the wild.

Brewing Shiners

The smalleye shiner (Notropis buccula) and sharpnose shiner (Notropis oxyrhynchus) are found nowhere in the world besides the Brazos River. They have been dealt near-fatal blows by humans and by nature. A string of dams in the mid-section of the Brazos River took away the ability of the species' semibuoyant eggs to drift downstream for 50 or more miles while they hatch and grow into small fry. Changes in water quality and water flows in the Lower Brazos contributed to the fish disappearing from that stretch. Then came the record heat and intense drought of 2011, and the last remaining stronghold of the shiners, the Upper Brazos—the Salt Fork, the Double Mountain Fork and the North Fork of the Double Mountain—stopped flowing.

"These fish live only two years, and they don't reproduce when there is not flowing water to spawn in," said Kevin Mayes, a TPWD fisheries biologist with the Rivers Studies program headquartered at the Texas Rivers Center in San Marcos. "We had no idea what was coming in 2012, so the decision was made to capture shiners from shrinking pools in the Upper Brazos, hold them at the Possum Kingdom hatchery over the winter, and stock them into the Lower Brazos."

Mayes worked with Dr. Gene Wilde, professor of biology at Texas Tech University, to coordinate collection and transport of the shiners and to be sure water conditions at the hatchery were suitable. Wilde has been working with the fish since 1996 and has published several scientific papers on the two species. “They live in fairly salty water in the Brazos, but they are pretty adaptable,” Wilde said. “Even though they live in water that has half the concentration of salt as sea water, they can handle the switch to fresher water pretty well.”

That adaptability may be the key to the effort to establish a second population of the fish in the Lower Brazos to serve as a safety net for the species if the Upper Brazos forks go completely dry.

On May 29, 2012, Mayes and fisheries technician Steve Boles trucked some 700 healthy, lively, ready-to-spawn shiners from the Possum Kingdom hatchery to the Farm-to-Market 485 crossing west of Hearne. Mayes and Boles ferried the shiners down a steep, slippery bank in buckets and an ice chest and mixed river water with the hauling water. Then, for the first time in years, smalleye and sharpnose shiners swam in the Lower Brazos.

“Historically, these fish occurred throughout the Brazos as far downstream as College Station and below,” said Mayes. “They disappeared from the Lower Brazos after reservoirs were constructed. We’re not sure if the conditions in the Lower Brazos have improved enough for the shiners to survive, but we do know that conditions in the Upper Brazos are very dire.”

Mayes said stocking the shiners into the Lower Brazos at least gives them a fighting chance. “The Middle Brazos has been impacted by fish kills from golden alga, and we don’t think the reaches between dams in the Middle Brazos are long enough to allow the fish to fulfill their life cycle,” he explained. “We have hundreds of miles below the last dam on the Lower Brazos. We are hoping to get them kick-started down here so if we need to we can take them from down here to restock the Upper Brazos, or use them for research to learn how to spawn them in captivity.”

Saving the fish may prove to be important in ways we do not yet understand, says Wilde. “In most years, these are the most abundant fish in the Brazos,” he said. “They are the basis of the food chain, which is important to people who fish for bass or catfish. There is nothing to take their place. If they go away, we don’t know what will happen to other species of fish in the river, or how water quality will be affected. All these things are interrelated.”

Ultimately the fish will make the last call. “They will tell us how well the river is doing,” Mayes said.

Flexing Mussels

Fish are much more visible than mussels, which live in on the bottoms of streams and filter their food from the water. Both, however, must have water to live and are important to the ecology of the streams where they live.

As the drought of 2011 reached critical levels, TPWD’s Inland Fisheries Division put together a team to look for solutions to problems that could result from streams and rivers going dry. TPWD’s hatchery system seemed ideal places to temporarily hold small populations of fish or mussels.

Carl Kittel, TPWD's hatchery program director for black basses, sunfish, trout and forage species, led the effort to establish a mussel-holding facility at the San Marcos State Fish Hatchery. There was one problem: money. The Texas Department of Transportation (TxDOT) stepped in.

"TPWD had the space, but not the money," said Dr. Stirling Robertson, TxDOT's senior biologist in the Environmental Affairs Division. "We are involved in a project to replace a bridge over the San Saba River where we have identified three mussel species that are state-listed as threatened species and have to be relocated before construction, but we couldn't identify a suitable site upstream of the bridge. Building the holding facility where we could take the mussels and then return them after the project is complete is simpler."

About 150 yards of stream are involved, and it might seem simpler and cheaper still to just move the mussels elsewhere. But there's a catch. Mussels have a complicated life cycle that requires their larvae to attach to the gills of a species of fish—and for some just one species will do—and feed off the fishes' blood as they grow. "We don't know what the host fish for these mussels is, or if it will be present elsewhere in the stream," Robertson said. "We do assume that where they are, they like that place. If you move them to a new place, you have to monitor them to be sure they are surviving, and that is expensive."

"There is some habitat partitioning among species," said Mark Fisher, manager of the Ecological Resources Branch of TxDOT's Environmental Affairs Division. "Some species seem to be habitat-specific. Some have to have clean water. Other species are more tolerant of low dissolved oxygen, mud and silt. Most listed species seem to need minimally impacted, 'nicer' environments."

TxDOT is currently funding studies aimed at developing a model that will help predict if mussels will be found in a particular type of habitat. "Right now we have to triage and make an assessment at every bridge site," Fisher said. "One of the things that is emerging is shear stress. Mussels have to stay in the same location in a stream during flood events. If you channelize a stream, they may wash away in a flood event. We think flow dynamics have a significant impact on their distribution."

As it turns out, TxDOT will take some mussels to the hatchery and relocate others. "There are a lot more mussels at the site than we originally thought," Robertson said. "We will not be able to house all of them at the San Marcos facility, so we will relocate some downstream of the construction site and monitor them. That will let us look at differences between holding them at a hatchery and relocating them."

"We recognize that the work hatcheries do in fish production is important, but the state of Texas benefits greatly from agencies being able to collaborate on this type of project." Fisher said.

Why all the fuss about a creature that lives in the muck at the bottom of streams, doesn't move much, isn't particularly pretty and bears awful names like heelsplitter, pimpleback and fatmucket?

"Once you get to know them, they are not so unattractive," said Robertson. "They have very complex life cycles, and they are important sentinels of water quality. If you have a lot of mussels, you have good

water. The ones listed as threatened are not very tolerant of contaminants. They are the real canaries in the coal mine."

Describing mussels as canaries doesn't quite do them justice. They may not sing or pose prettily on a perch, but they do a service songbirds never could: As filter feeders they pump enormous amounts of water through their bodies, cleaning it and removing algae, bacteria and organic particles. In so doing they improve the health of the river itself. What flows from your faucet was made better by flowing through a mussel.

Whether smalleye shiner or Texas fatmucket, the almost unknown creatures that live in Texas streams are linked to us in ways we know exist but are only beginning to understand. This much we do know: The water they live in eventually becomes part of us.

That alone should make us wish them well.

###