Land Air&Water

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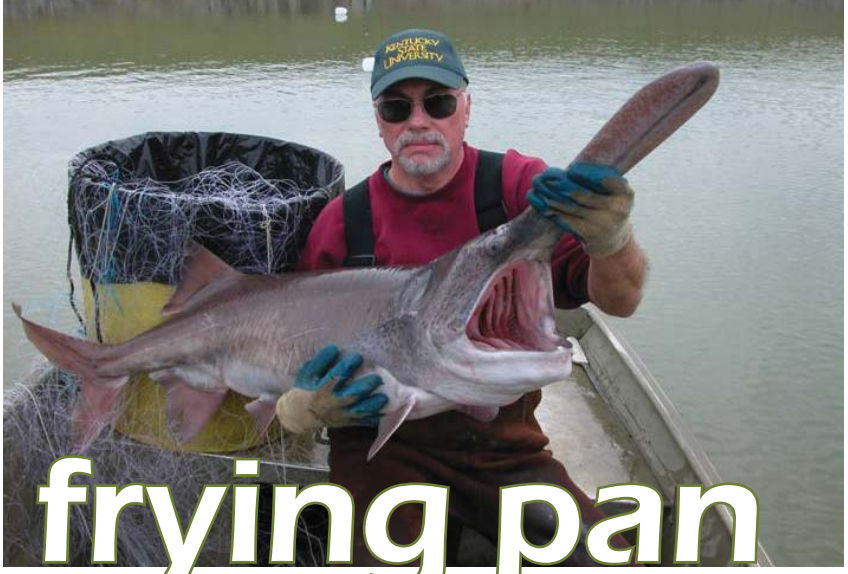
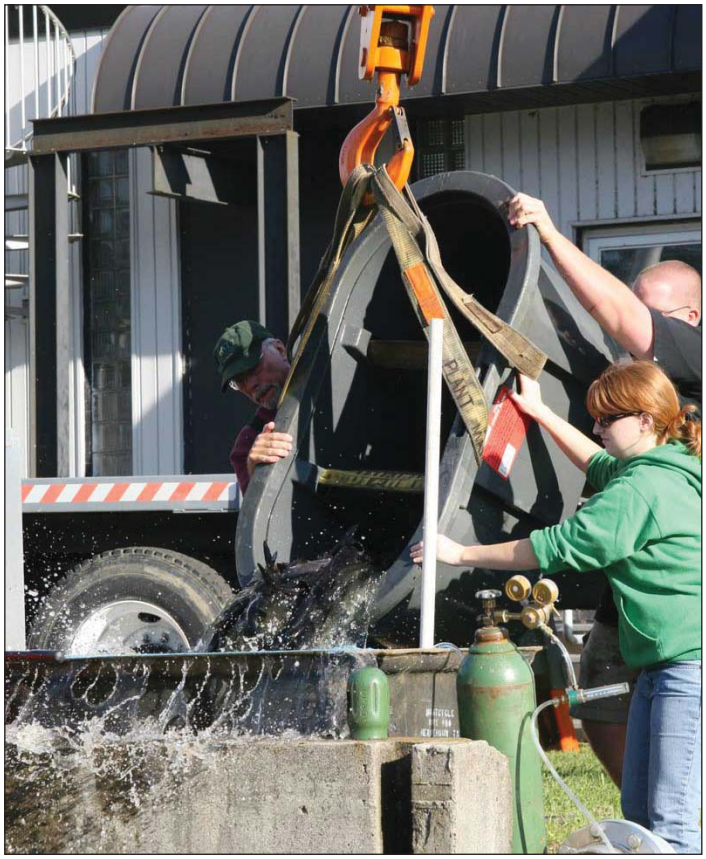
Our Cover

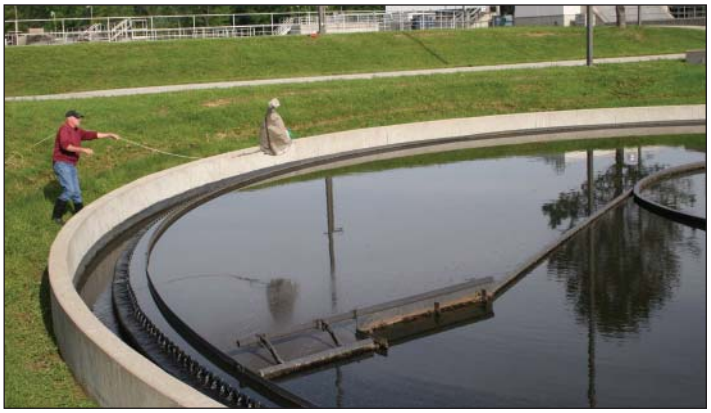
This lovely pricklypear *(Opuntia humifusa)*, a Kentucky native, was photographed in a Frankfort garden by Todd Hendricks of Nelson County.

Tank-raised paddlefish can reel in the dough

from fish fry to the frying pan







By Allison Fleck
Division of Water

For five years, researchers at the Kentucky State University (KSU) Aquaculture Research Center have been successfully using old holding tanks at the Frankfort wastewater treatment plant to raise young paddlefish, known as fry, as a food fish.

Dr. Steven D. Mims, professor and principal investigator at the KSU Aquaculture Research Center who initiated this program, said the decommissioned tanks provide an ideal hatchery environment for paddlefish, which are highly prized for their tasty, boneless meat and high-quality caviar.

"As better methods for processing wastewater have developed in recent years, many communities are now building new, larger facilities and decommissioning the old ones," said Mims. "Many of these, like those at the Frankfort facility, include sedimentation ponds and tanks that could be converted for fish culture. Conversion to fish aquaculture can save local governments thousands in demolition costs while creating new jobs and generating revenue."

Mims said the proximity of many of these new plants to old ones is another plus because the hatchery makes use of the processed water.

"I'm sure a lot of people would think 'yuck' when considering eating fish grown in wastewater effluent," said Mims. "But the reality is that because water being discharged from the plant must meet federal water quality criteria for humans, wildlife and aquatic life, it can actually be lower in contaminants than lake or river water."

Mims said the fish produced in treated effluent have been tested for heavy metals and pesticides and found safe for consumption. The Frankfort plant holds a discharge permit through the Kentucky Division of Water, which regulates effluent

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ABOVE: Rick Onders, co-investigator at the KSU Aquaculture Research Center, holds a mature female paddlefish sampled from a water supply lake in central Kentucky. TOP LEFT: Young paddlefish are emptied into a bin for transport to water supply lakes. LEFT: Daphnia collected from the clarifying tank are fed to paddlefish fry in the decommissioned digester tank. Photos courtesy of Charles Wiebel, KSU

from fish fry to the frying pan

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from wastewater treatment plants.

The process begins when paddlefish fry are placed in old 300,000-gallon concrete tanks originally used as digesters. Inside the tanks, the tiny paddlefish live in water disinfected with ozone and feed on the zooplankton *Daphnia*, commonly known as water fleas. Daphnia are often found in active clarifier tanks as sludge settles to the bottom. Daphnia can be problematic for wastewater plant operations. The tiny crustacean feeds on bacteria and agitates the sewage sludge, sometimes keeping part of it from settling. When millions of them come together in masses, plant operations can be disrupted and may lead to permit violations. However, the problem has been turned into free food for the developing paddlefish, as researchers harvest the daphnia and transfer it to the digesters as a fish feast.

"Daphnia are a great food source for young fish for their first 30 to 40 days," said Mims. "What's more, daphnia can't survive in water containing toxic materials like lead and pesticides, so their presence in high densities is an indicator of good water quality."

From the time the fish are stocked into the tank as fingerlings in May, the fish grow to nearly a foot in length by September and can be released to Kentucky water supply lakes as stocker fish. Mims said taste tests have given high marks to the harvested fish.

"In a blind test to 13 chefs from high-end restaurants in the southeast, all but one said they would serve it in their restaurants," said Mims.

Tim Parrot, president of Aquila International Inc., worked alongside KSU researchers and developed a stocking program for municipalities to participate in reservoir ranching using their water supply lakes and producing paddlefish for meat and black roe to make into caviar.

The Madisonville City Council was an early supporter of the tanks-to-lakes paddlefish plan. In 2007, the city council voted to stock two public lakes with the tank-raised paddlefish. When the fish are harvested as meat and caviar in another couple of years, city officials hope to make some money.

"It would be great to get some income from the sale of the paddlefish in a couple years, but we believe we've already benefited from the program," said Mike Franklin, superintendent of the Madisonville Water Filtration Department. "They gave us the fish to stock two lakes—Lake Peewee, our main drinking water supply lake, and Grapevine Lake. In the last few years, we have seen a sharp decline in algae blooms. That means we save money on copper sulfate, which is used in the drinking water treatment process when the blooms develop in summer. We're looking at stocking the fish in two other recreational lakes. Even if the drop in blooms is coincidental, the paddlefish are good eatin'."

Mims hopes more municipalities will begin using abandoned sewer tanks to grow paddlefish.

"We encourage utilities to consider joining in on this pioneer industry that should be a win-win situation for all parties involved," said Mims. "Reuse technology can provide economically viable opportunities to grow healthy fish in a sustainable process."

For more information on the paddlefish project, email steven.mims@kysu.edu. The project has been partially funded by the Kentucky Science and Engineering Foundation and the Kentucky Science and Technology Corporation.