Researchers study threats to white sturgeon

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University of Georgia researchers are working to understand why the nation's largest freshwater fish, the white sturgeon, is struggling in northern California's Sacramento-San Joaquin Bay Delta, an environmentally endangered area suffering from declining fish populations and pollution.

Doug Peterson and Robert Bringolf, both with the UGA Warnell School of Forestry and Natural Resources, have begun work on the one-year, $200,000 joint project funded by the U.S. Fish and Wildlife Service. They will focus on two key objectives:

Determine which contaminants in the Sacramento-San Joaquin Bay-Delta might be hampering efforts to help the sturgeon population recover. The results of this project will determine the focus of future research projects, Bringolf said.

Evaluate the swimming performance of juvenile and sub-adult white sturgeon to better understand habitat needs at different life stages. "The white sturgeon has a complex life cycle that requires a diverse set of marine, estuarine and freshwater habitats," Peterson said. "By understanding how swimming performance of white sturgeon changes under different conditions, fisheries managers will be better able to protect critical habitats and to monitor populations in the wild."

The Sacramento-San Joaquin River Delta is home to approximately 22 fish species, including the delta smelt, which is now on the endangered species list. It is also a popular recreation destination and an ideal

location for agriculture because of its fertile soil. But the delta has been suffering from deteriorating levees, environmental pollution and declining fish populations. The white sturgeon (Acipenser transmontanus), a popular recreational fishery with a significant economic impact, is one of those fish under strife from the delta's problems.

Bringolf plans to perform a preliminary screening of the contaminants in fish tissue to determine which are accumulating in the sturgeon. He'll also examine gonad histology to determine if those contaminants are altering the structure or function of the sturgeon's reproductive ability. It is possible, he said, that the male fish are becoming "feminized," and are developing eggs in their testes as a result of chemical exposures. Recently, Bringolf and graduate student Kristen Kellock found male bass with eggs in their testes occurring in rivers, lakes and ponds across Georgia. Bringolf and other researchers theorize that "environmental estrogens" could be behind the gonad abnormalities, most likely because of the hormones and synthetic estrogens often found in birth control and other medications that make their way into an area's wastewater.

"Identification of contaminants and their effects on the reproductive system of white sturgeon could lead to more targeted management strategies for sturgeon recovery," Bringolf said. "Many chemicals enter the water through runoff (non-point source pollution), but others come from specific sources such as industrial or municipal wastewater discharge (point source pollution). Point source pollution is more easily remedied, but effective strategies for reducing non-point source pollution are available and becoming increasingly common."

While Bringolf is checking for contaminants, Peterson will be evaluating the swimming performance of white sturgeon under various environmental conditions. Determining sturgeon swimming ability is key to research into their survival, Peterson explained.

"Changes in dissolved oxygen, temperature and current velocity can dramatically affect the energetic costs incurred by swimming sturgeon. By determining how these variables affect the energy budgets of sturgeon, we will be better able to understand the critical linkages between habitat and population dynamics," he said.The results of these experiments will be used to design sampling protocols for a much broader study of the wild population in subsequent years. Peterson will visit California this fall to meet with local fisheries managers and to collect preliminary population data.

Peterson plans to transport about 100 of the 35-pound sturgeons to his research lab at the 65-acre Cohutta Fisheries Center in northwest Georgia, where his team plans to utilize a high-tech swimming chamber that resembles a "fish racetrack" that will allow researchers to measure swimming ability at different current velocities through a calibrated viewing window.

Bringolf and Peterson expect their project to be renewed yearly for another four years.

Provided by University of Georgia