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Subject: : Paflyfish General Forum

Topic: : Interesting Study

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Here's an interesting study for your consideration. 😊

A Washington and Lee University biology professor is exploring the impact that placing large stocked trout in reservoirs around Virginia may be having on the genetic identity of the Commonwealth's native brook trout.

The stocked trout are the result of the Department of Inland Game and Fisheries' Fingerling Stocking Program, which for the last 20 years has placed very small hatchery-raised brook trout in reservoirs around Virginia. There, the fish have grown to large sizes due to the ideal environment.

Although the large stocked trout may be a boon for avid anglers in Virginia, the department asked Robert Humston, assistant professor of biology at W&L, to answer three questions about the program's effect. **Are the hatchery-bred trout leaving their reservoirs and taking residence upstream? If so, are they able to spawn naturally upstream? Finally, are they interbreeding with and thus negatively affecting the genetics of the native brook trout upstream?**

According to Humston, native brook trout are a sensitive species. Increased stream temperatures due to residential development and agriculture have caused the native trout populations to fragment and retreat into small headwater streams in the mountains. These isolated fish populations don't mix with each other, which reduces variations in genes. "We want as much as possible to encourage the diversity that allows populations to evolve," said Humston. "On the flip side, some native brook trout will have adapted to their local environment, perhaps developing different spawning times or becoming smaller to adapt to a faster flowing stream, and we want to preserve those adaptations."

Using genetic analysis to differentiate hatchery and native strains, a relatively new focus for brook trout, Humston concentrated on three remote reservoirs stocked by hatchery trout and fed by mountain streams. **The first, Lexington reservoir fed by Moore Creek, has never held native brook trout.** The other two reservoirs near the Big Levels wilderness area, Coles Run and Mills Creek, both have mountain streams that hold native populations.

Starting in 2009, Humston and student researchers from Washington and Lee caught 200 trout from the streams feeding into the reservoirs. They measured them and collected tissue samples by snipping a piece of the pelvic fin from each fish. "By summer 2010 the work was all in the laboratory," said Humston. "Brent Meekins, a senior biology major at W&L, learned how to use really advanced data analysis methods and software packages. This was my first time doing any genetic work, and I want to add that none of this would have happened without the help of Kelly Hemminger, our molecular technician, and Professor Paul Cabe."

The research found hatchery fish in all three of the tributaries of the reservoirs, which meant the fish were definitely leaving the reservoirs. "What's interesting is that we found hatchery fish much farther up the streams than we expected," said Humston. "We're not sure why they went that far, but it shows what they are capable of."

They also found fish in the streams that were smaller than the hatchery fish yet matched their genetic signature, which meant that the hatchery fish were spawning in the streams. "Even in tributaries where they have to compete with native fish for spawning habitats, they are still naturally reproducing," said Humston.

But Humston found hardly any evidence of interbreeding between the native trout and the hatchery trout. "You would expect that after 20 years there would be more natural interbreeding, so that was interesting," he said.

Humston attributed the lack of interbreeding to two possible scenarios. "It could be some sort of exclusionary process whereby native fish are only breeding with native fish. Or the hatchery fish could just be poor competitors for spawning sites, since requirements for good spawning habitats are fairly rigorous," he said.

**Humston said that in some ways the results of his research showed the best case scenario.**

**"Introducing this separate population of hatchery trout with a different genetic signature is adding more variation. That diversity increases the likelihood that a population can adapt to changes," he said. "At the same time, the hatchery trout haven't impacted the native species yet. And if we haven't diluted any local adaptation by the native trout they may be better able to persist in the long term."**

The Department of Game and Inland Fisheries has researched native brook trout populations for a number of years-characterizing how many populations are still intact, how large those populations are compared to their historical size and what remaining habitats could be improved to the point where the trout could return.

Humston's research adds further progress toward the department's ultimate goal of restoring native brook trout throughout their historic range in Virginia.

Nate Adkins, who graduated with a biology major from W&L last May and worked on the trout research, will present the study's findings at the national meeting of the American Fisheries Society on Sept. 12 in Pittsburgh, Pa. The paper has also been selected for the Wild Trout Symposium at the end of September. "This is a huge symposium held every three years and we are very excited about this," said Humston.

Humston's research was funded by the Hess Scholars Program, founded by W&L alumni Andrew and Megan Hess, to help professors at W&L conduct research with students.

<http://www.wlu.edu/x50357.xml>

It would be interesting to see some studies like this done in PA.