

## **Clues Emerge in South Branch Intersex Fish Study**

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**Samples taken from fish kills in the South Branch of the Potomac River are providing new clues into why fish in the area are suffering from unusual health problems.**

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Samples taken from fish kills on the South Branch of the Potomac River in May are providing new clues in the several-year-old mystery of poor fish health in some Potomac tributaries.

Redhorse suckers and hogsuckers began turning up dead in the lower reaches of the South Branch, below Moorefield, in mid-May, according to Bret Preston, assistant chief of the state Division of Natural Resources wildlife resources section.

The fish kill resembled one on the South Branch in 2002, he said. That event led to the discovery that some male smallmouth bass were producing eggs, a condition called intersex, and triggered an ongoing research collaboration between the DNR, the state Department of Environmental Protection, U.S. Geological Survey and U.S. Fish and Wildlife Service.

Many fish in this year's kill had sores, Preston said, as in 2002.

Also, "Preceding reports of dead fish both in 2002 and in 2006, there was a fairly high-flow event -- not a flood event but some pretty high flows. Also there were peaks in pH," he said. "The timing, in terms of time of the year, was similar -- end of May, first part of June time period."

The two events also were similar in their difference from most fish kills, he said.

"In the vast majority of fish kills, there is a responsible or causative agent, a pipe, a spill that you can trace back to a certain point," he said. "I don't think that that's what we're dealing with here. There were different locations of dead fish up and down the river, both in 2002 and 2006."

## **Laboratory Work**

"We went out with the DNR and collected fish that often were up at the surface, sort of gasping and just behaving abnormally, and then, of course, dying," said Vicky Blazer. As a fish pathologist at the USGS's National Fish Health Laboratory in Leetown, Blazer has studied the problem since 2003.

"And then there were similar reports in the Shenandoah later in the month." The fish seemed to be dying from lack of oxygen, she said. "I think that's why they were up at the surface gasping."

On examination, she said, the gill tissue had fused, leaving no surface area for oxygen exchange.

"And there were lots of different parasites and bacteria present," she added. In laboratory data that have just been analyzed, one bacterium was of particular interest: *Aeromonas salmonicida*, usually associated with trout and salmon. That same bacterium had been found during spring sampling. It's a surprising discovery, Blazer said, and raises new questions.

Could the spikes in pH that are seen in the South Branch affect bacteria? she asked. Are there factors that allow parasites to proliferate?

"Those are things we need to start thinking more about," she said. "Not only the fish but the parasites and pathogens that are affecting them: What are the environmental factors that might influence those?"

## **Estrogen Mimics**

Blazer has long suspected the fishes' immune function is being suppressed by a contaminant or contaminants in the water -- and that those same contaminants may be estrogen mimics that lead to the intersex condition.

"Because we're seeing them in the same areas," she said. "And we know that the variety of estrogenic compounds -- not just hormones but pesticides and other things that have estrogenic activity -- there's more and more data being gathered saying they also influence the immune response."

Suspected estrogenic compounds include estrogens in untreated human and livestock urine and in discarded birth control pills, as well as antimicrobial chemicals, compounds that make plastics flexible and pesticides.

Notably present around the South Branch is livestock waste, with poultry farms concentrated heavily in the watershed.

Although the state Department of Agriculture said in a report released in May that parts of the South Branch appear to meet state water quality standards for fecal coliform bacteria -- an indicator of the presence of animal waste -- that doesn't exclude poultry litter as a potential source of the problem, Blazer said. "You only find what you're looking for," she said.

"When they say it's meeting fecal coliform standards, that says E. coli is at a level that whoever decides is acceptable," she added. "That doesn't say anything about contaminants like hormones and antimicrobials and all these emerging contaminants. It doesn't say anything about total nutrients and those things that might affect bacterial growth."

## **Human Health Concerns**

What about human health in the region?

"There are some cancers that seem to occur at slightly higher rates in Hardy County," said Patricia Colsher, director of the West Virginia Cancer Registry. "In situ female breast cancer, the breast cancers that are detected really, really early, are slightly higher, not significantly higher, in Hardy County," she said. "Uterine cancer is non-significantly higher in Hardy County. Esophagus, liver and gall bladder cancers are non-significantly higher in Hardy County."

What is notable, she said, is these cancers have the potential to be sensitive to endocrine disruptors.

"If we've got a non-significantly elevated rate and independent evidence of some kind of estrogen mimicker in the water, we're going to look deeper," she said. "Are we going to be able to prove a link? If you look at the history of this kind of activity, probably not. But are we going to run it as far as we can to try to find out what's going on? Yeah, of course we are."

That includes checking with area hospitals about the types of breast cancer cases treated and checking patient histories to find out where they've lived and when. Those activities are going on now.

## **Limit Fish Consumption**

"As anglers, we should all be concerned when fish die and we can't figure out the reason right away," said DNR's Preston. "If people catch fish with open sores, they may not want to eat that fish."

The state Department of Health and Human Resources recommends limiting consumption of all suckers and of smallmouth bass under 12 inches caught in West Virginia waters to two meals a month. Larger smallmouth should be consumed no more than once a month.

Meanwhile, the agencies are continuing with a seasonal sampling routine that is expected eventually to point to the cause, Blazer said. More information will be available when the fall data have been analyzed.