

**Wednesday, November 19, 2008**

## **Scientists continue investigation of mysterious fish kills**

**By Robert King -- Daily Staff Writer**

**FRONT ROYAL –** Chemicals such as ammonia and arsenic don't appear to be causing fish kills that have plagued the Shenandoah River since 2004, according to an official investigating the incidents.

**But scientists aren't ruling out poor water quality just yet, cautioning an unknown combination of chemicals could be affecting fish.**

**The fish kills have plagued the Shenandoah River each spring between 2004 and 2007. This year the river didn't experience a widespread fish kill.**

**The kill's usual victims are adult smallmouth bass and redbreasted sunfish.**

**Scientists collected water-quality data throughout the river this past spring.**

**"We looked at what we call base line or normal [river] flows, and we looked at storm events," said Don Kain, a water compliance manager in the Virginia Department of Environmental Quality's Harrisonburg office. Data gathered by passive water samplers in 2007 was also analyzed.**

**Kain, who is also a co-chairman of a state task force investigating the fish kills, discussed the latest studies earlier this month.**

**"Based on water quality, we don't see anything that's present in any concentration that would be expected to cause any toxic effects," Kain said. "That's looking at a wide range of water-quality parameters during normal flows and storms."**

**One parameter the task force studied was ammonia.**

**There was concern about high levels of ammonia getting into the river through runoff during storms because it is present in fertilizer and types of manure, Kain said.**

**The task force discovered ammonia wasn't a factor.**

**"We have just not found any evidence that ammonia reaches levels that causes these problems," Kain said.**

**Another parameter was arsenic.**

**"The arsenic levels have not given us any cause to think that arsenic is causing the problem," Kain said.**

**Kain also cites a study by a scientist at Virginia Tech that focused on populations of benthic invertebrates, aquatic insects.**

**"Aquatic insects are excellent water-quality indicators," Kain said.**

**The study found the river "is not demonstrating that the benthic community has been impacted by any toxic chemical," Kain said.**

**The data could mean "water quality is not the issue, and you want to be careful when you say that," Kain said.**

**There could be unknown combinations of water-quality parameters.**

**"What we don't know in terms of water quality is could there be some effect of combined chemicals," he said.**

**Kain said it is possible the studies missed something.**

**"We can never guarantee we have sampled all of the right things," he said. "We have some pretty highly recognized experts on this, so I don't think we have overlooked anything obvious, but [we] can't say with 100 percent confidence that [the cause of the kills] absolutely is not water quality."**

**The water-quality studies are part of numerous efforts in the investigation.**

**The United States Geological Survey and Virginia Tech did parallel fish health studies, and reaffirmed earlier conclusions the fish population is stressed.**

**“[We are] seeing some evidence of gills and internal organs stress that seems indicative of toxic chemicals and biological pathogens,” said Kain.**

**The task force is also focusing on a new bacteria.**

**“There is one bacteria that has shown up. It seems to be present in high numbers during the fish kills,” Kain said. “The bacterial work is something that is fairly new, and could be significant.”**

**Following a meeting on Monday, the task force issue a news release detailing the recent studies and noting that its focus in 2009 would be on “disease-causing organisms, fish health and water quality.”**