Mercury TMDL Update
February, 2006

Cooperating Agencies

DEQ Virginia Department of Environmental Quality

United States Environmental Protection Agency

Jack Eggleston

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Goals of the Project

- Collect data characterizing mercury (Hg) and methyl-mercury (MeHg) fluxes and production rates in the South River watershed.
- Develop numerical models for simulating surface water flows and Hg cyling and transport.
- Using the surface water and contaminant transport models, calculate maximum allowable mercury loads (TMDL) from all point and non-point sources.

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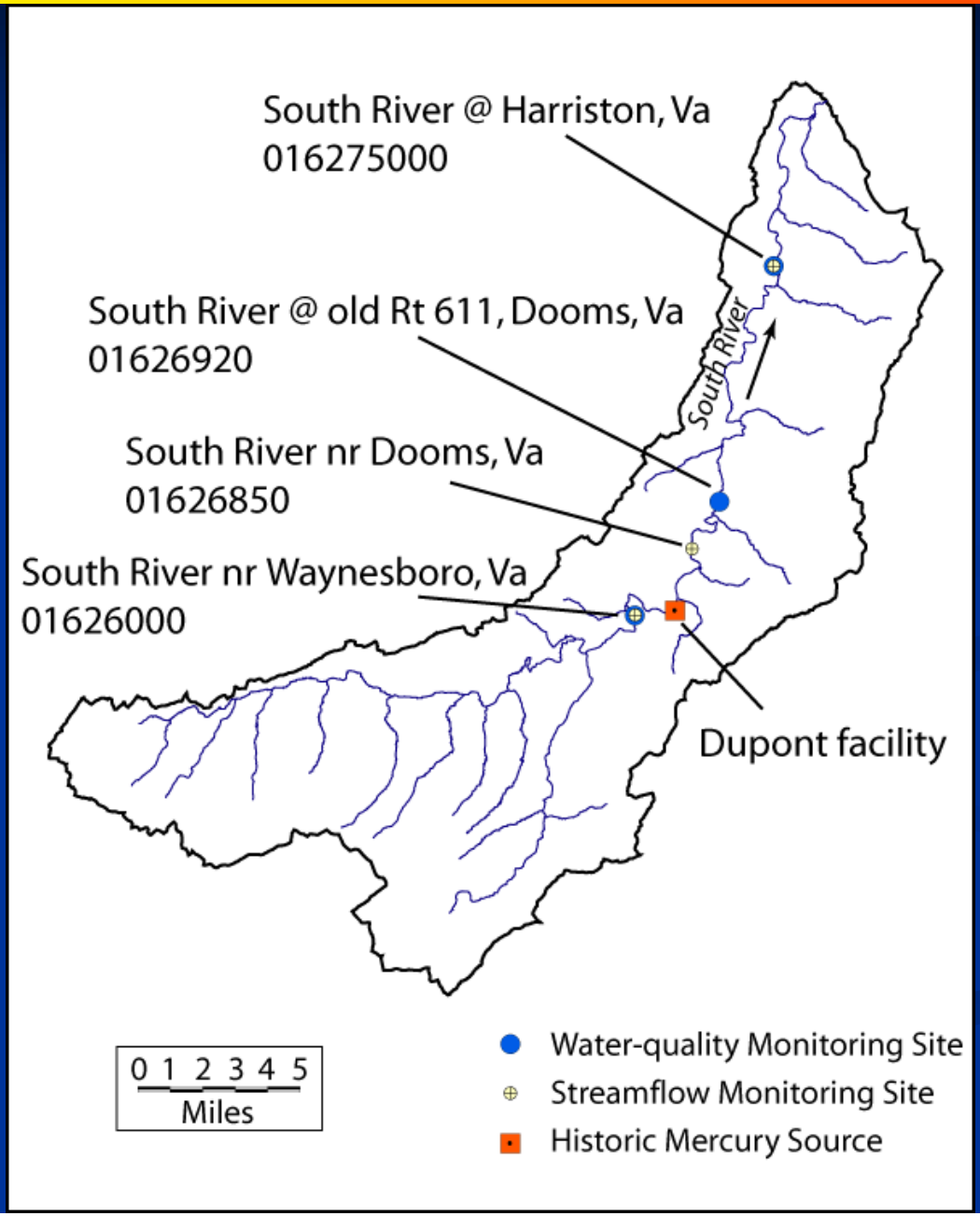
USGS Monitoring Stations



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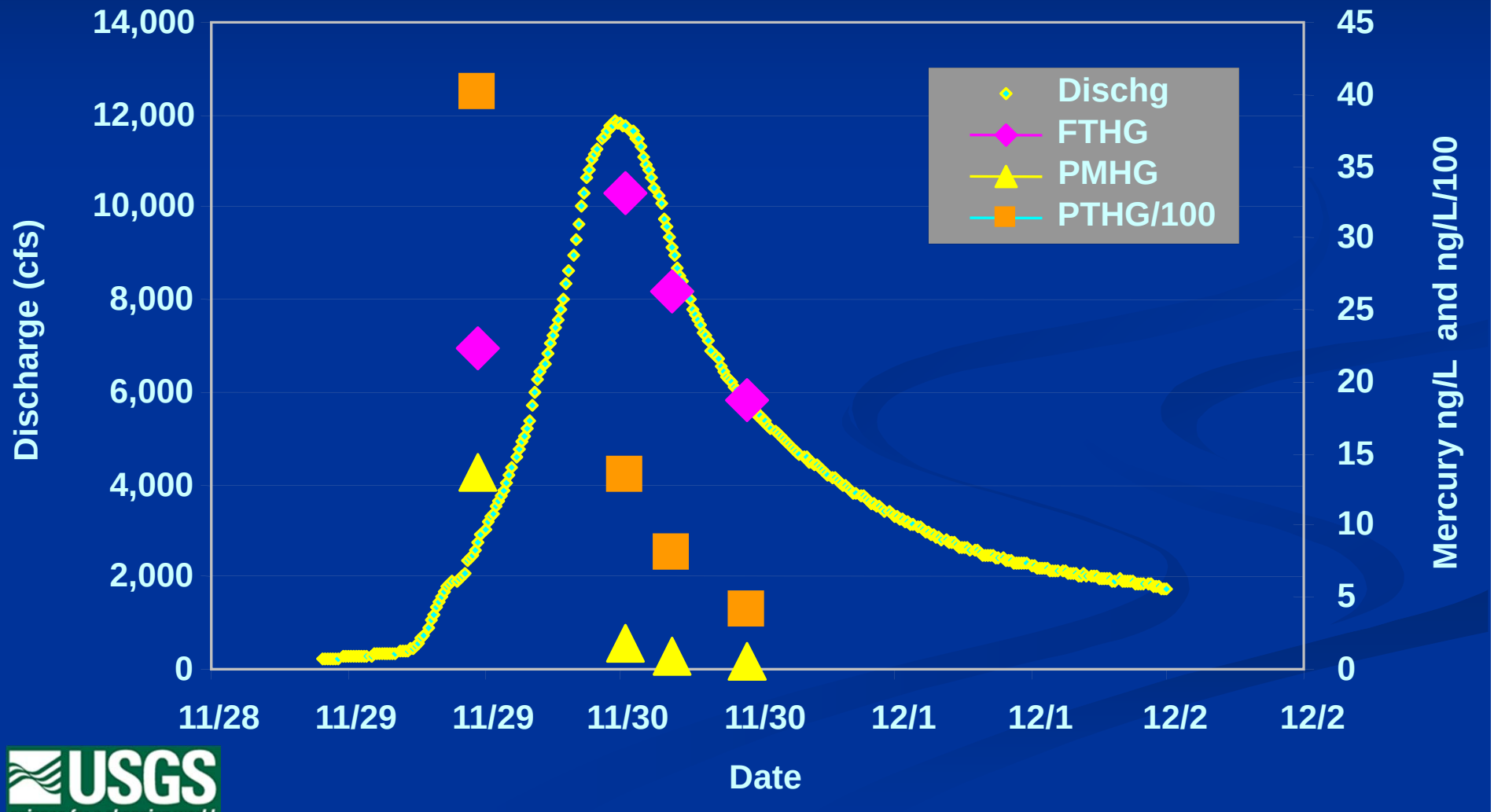
Mercury Flux During Storm, Nov. 29-30, 2005



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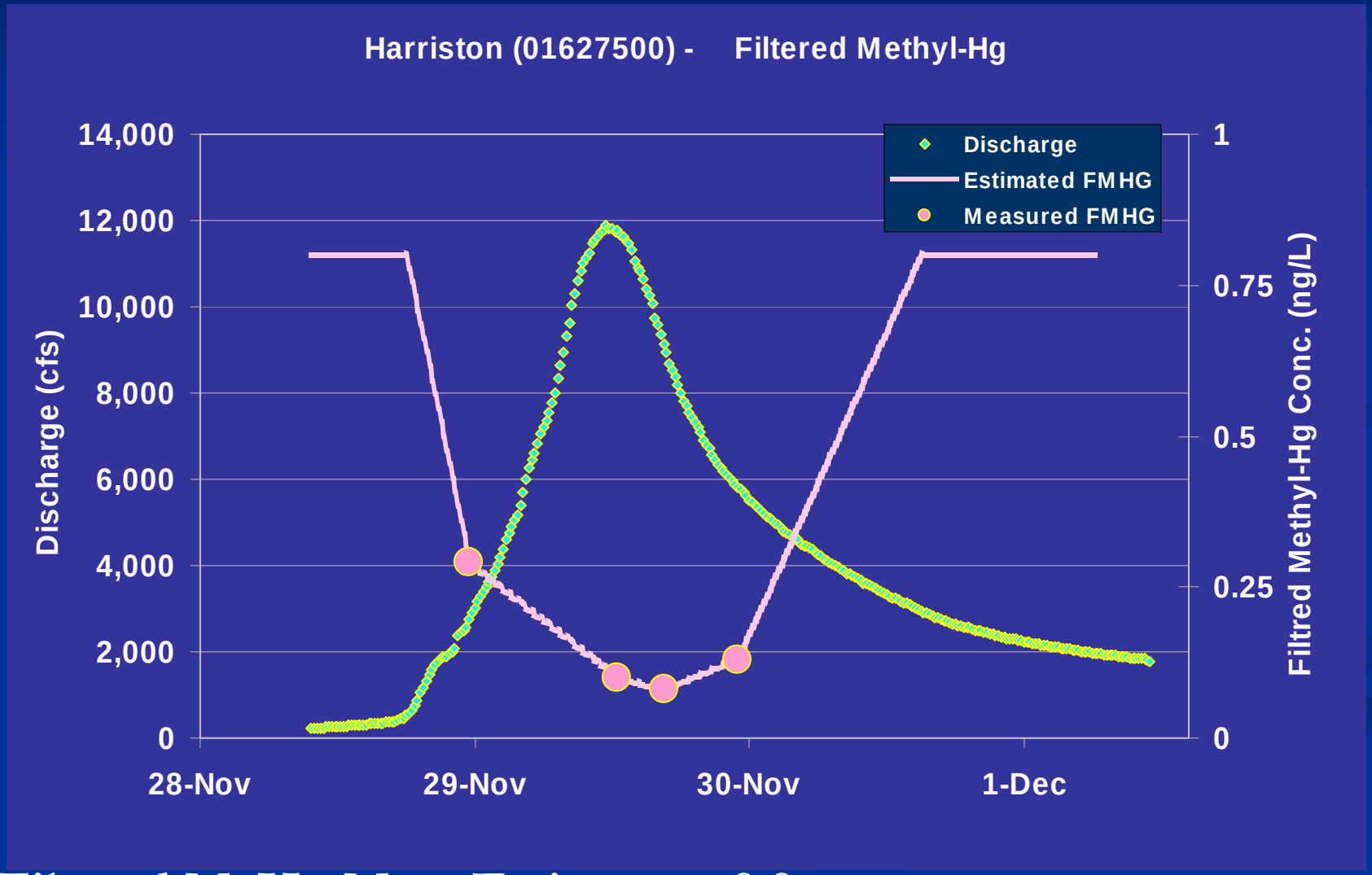
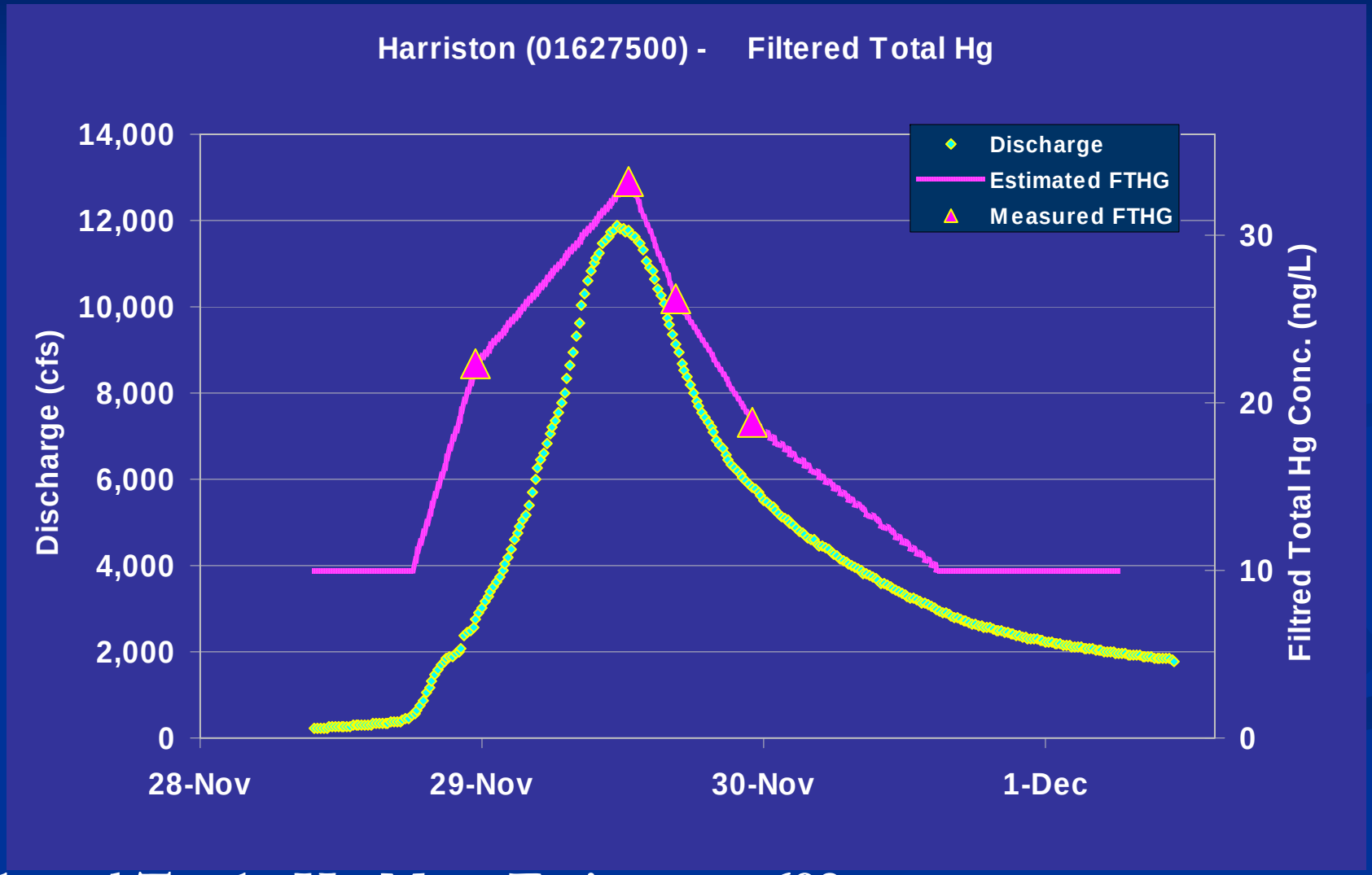
Mercury Flux During Storm, Nov. 29-30, 2005



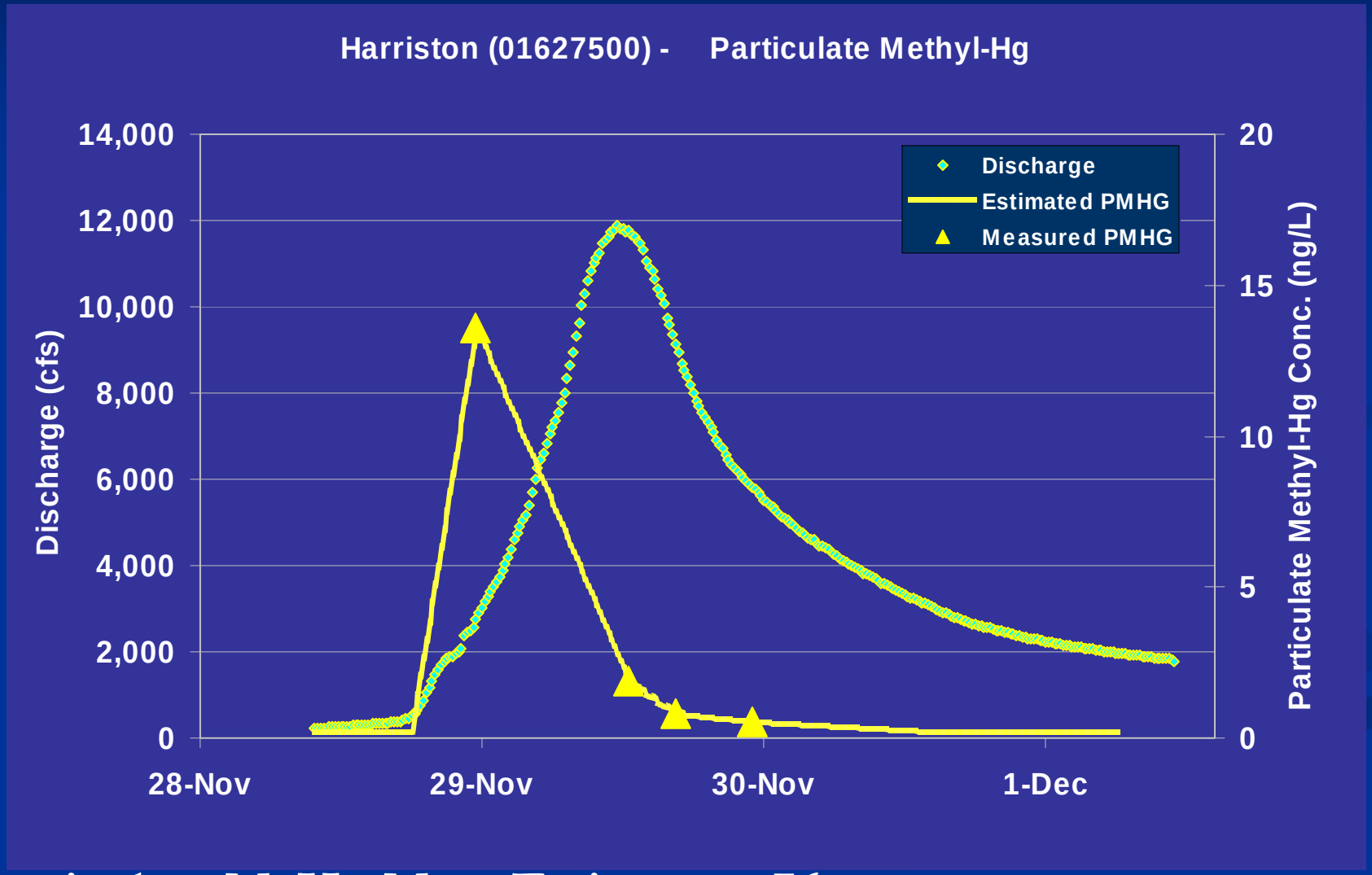
Filtered MeHg Mass Estimate = 9.9 grams

Mercury Flux During Storm, Nov. 29-30, 2005



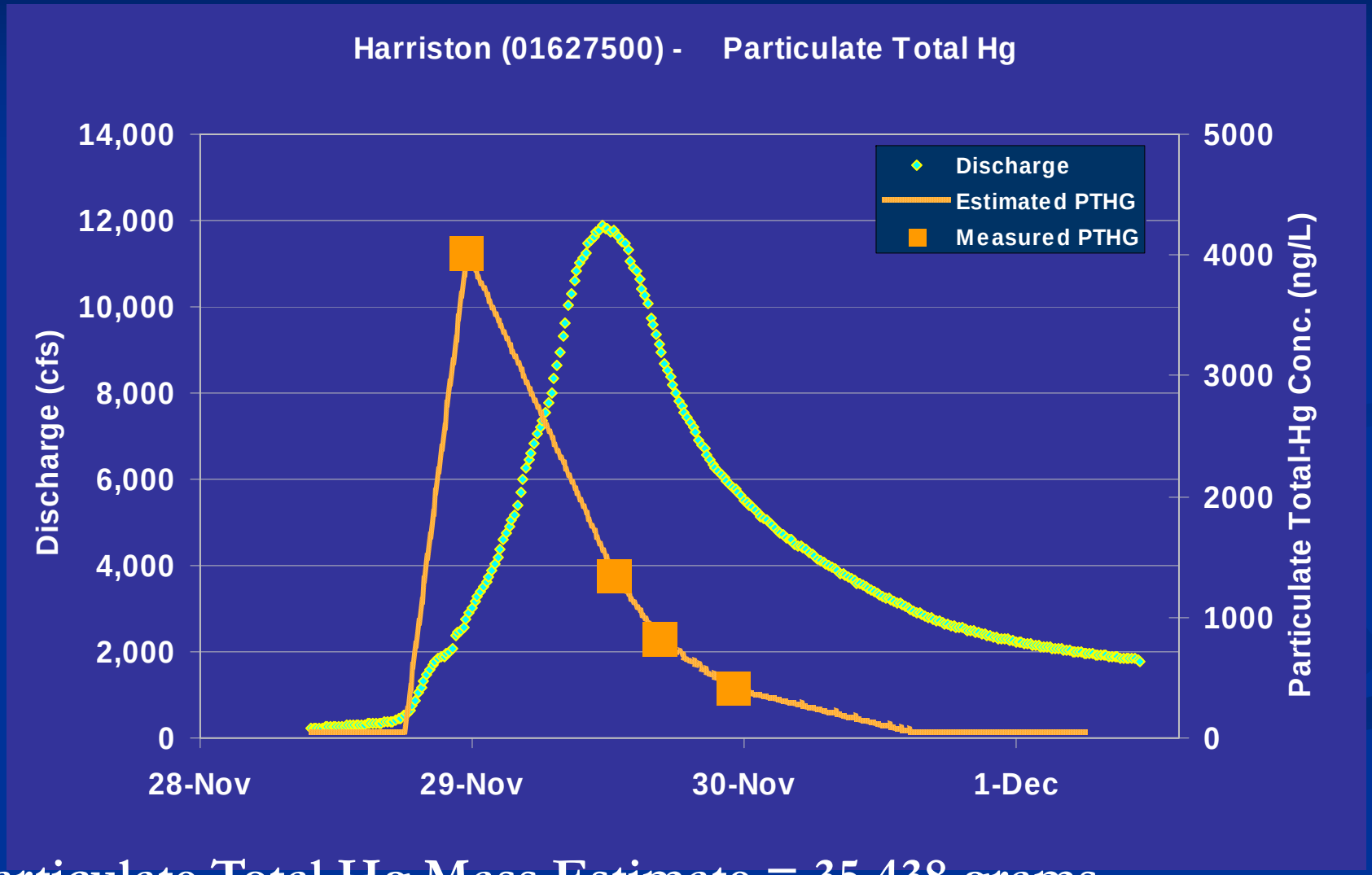
Filtered Total - Hg Mass Estimate = 692 grams

Mercury Flux During Storm, Nov. 29-30, 2005



Particulate MeHg Mass Estimate = 76 grams

Mercury Flux During Storm, Nov. 29-30, 2005



Particulate Total Hg Mass Estimate = 35,438 grams

Storm Summary - Harriston Nov. '05

Hg Species	Hg Phase	Concentration (ng/L)		Mass Passed (g)
		Baseflow Average	Storm Maximum	
Methyl	Particulate	0.2	13.6	76
	Filtered	0.8	(*minimum*) 0.1	10
Total	Particulate	50.0	4,021.7	35,438
	Filtered	10.0	33.2	692

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Notable Findings

- Filtered Total Hg concentrations increased during storm
- Particulate Total Hg dominates mass transport during baseflow ~90%
- And even more so during storms (>98% during November, 2005 flood)

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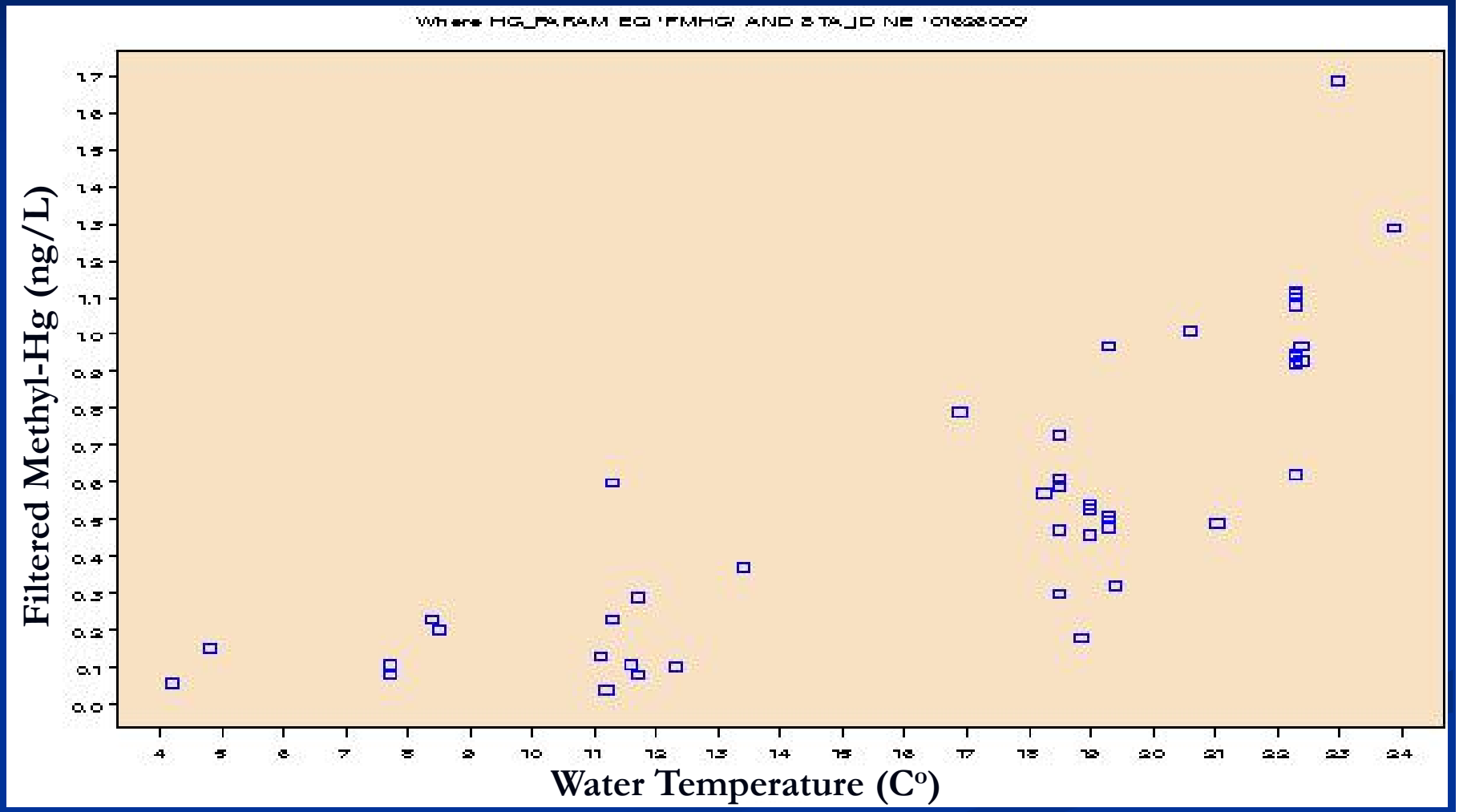
Statistical Analysis of Sample Data



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HSPF Modeling Approach

- Simulate stream flow
- Simulate total mercury concentrations
- Test response of mercury concentrations to changes in loading

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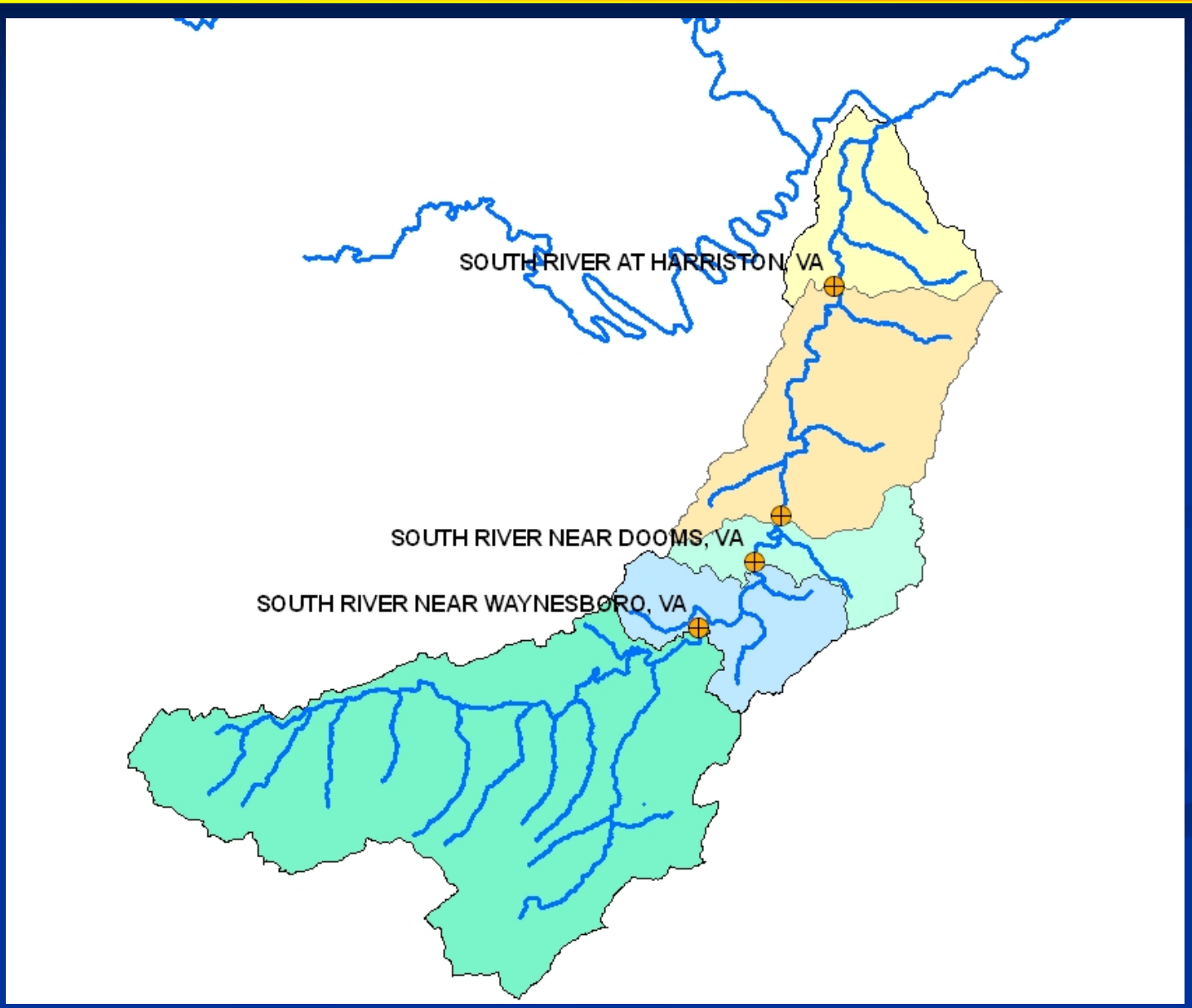
HSPF Sub-basins



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South River Mercury Webpage

http://va.water.usgs.gov/projects/south_river_hg.html

USGS Project: South River Mercury TMDL - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://va.water.usgs.gov/projects/south_river_hg.html

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Water Resources of Virginia

South River

Project

Title
South River Mercury TMDL

Number
2482-9RO95

Cooperating Agencies
Virginia Department of Environmental Quality

US EPA - Region III

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Period of Project
Jan. 2005 - Oct. 2008

South River Mercury TMDL

Problem
The South River and South Fork Shenandoah River are scenic recreational streams, but they are contaminated with mercury. The mercury contamination stretches from Waynesboro for 125 miles downstream to Front Royal. A major source of the mercury is known to be a former DuPont facility in Waynesboro that disposed mercury waste from 1929 to 1950. Regulatory actions dealing with the streams have focused on the health threat to people who eat mercury contaminated fish.

Fish Advisory: South River

The VADEQ regularly samples fish to monitor concentrations of mercury in fish. In 2002, smallmouth bass had mercury concentrations as high as 4 ppm and average concentrations of 1.3 ppm. These numbers are higher than the state mandated maximum allowable mercury concentrations in fish of 0.5 ppm. Because of this, the Virginia Department of Health has placed a fish consumption advisory on the South River and South Fork Shenandoah River.

Ongoing Studies
The US Environmental Protection Agency (EPA) has required Virginia to develop plans for cleaning polluted streams (those on the 303d list) in the state. This TMDL study will form the foundation used to develop a cleanup plan for the South River and South Fork Shenandoah River.

The Virginia DEQ samples fish every year and is scheduled to do a comprehensive sediment survey in 2007.

DuPont sponsors numerous studies of the mercury problem through a group known as the South River Science Team (SRST). The South River Science Team consists of scientists and representatives from government agencies, universities, environmental non-profit groups and Dupont. The group meets regularly to share scientific findings and plan future studies. Studies currently being performed by SRST members include investigations of mercury occurrence in stream water, groundwater, surface runoff, soil, plants, fish, algae, earthworms, and birds.

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