South River Mercury TMDL - Briefing Paper

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USGS- Jack Eggleston
VADEQ- Robert Brent

Purpose of Study : The purpose of the TMDL study is to determine the fluxes of mercury and methyl-mercury in the South River basin and to calculate loading reductions needed to lower fish tissue mercury concentrations below the state standard of 0.5 ppm.

Study Period : January, 2005 – December, 2008

Recent Results:

- Continuous Monitoring
  Collection of water-quality data is ongoing at the three continuous monitoring stations: Waynesboro 2.5 miles upstream of the historic mercury source area (01626000), Dooms 5.4 miles downstream of the source area (01626920), and Harriston 16.7 miles downstream of the source area (01627500). Parameters continuously measured are discharge, pH, Temperature, specific conductivity, and turbidity.

  Patterns seen in the continuous data include: diurnal fluctuation for all four water-quality parameters, strong correlations with discharge (positive for SC and turbidity, negative for pH and temperature), and fluctuations in SC at Dooms and Harriston apparently related to upstream wastewater discharges.

  Interruptions in the data have occurred due to electrical bugs. Data gaps will be filled in later, where possible, with data recorded on the probe memory chips or with estimated values. Electrical glitches are slowly being overcome.

- Grab Sampling
  Collection of grab samples continues. Monthly sampling is scheduled for approximately 2 more years. Storm sampling occurs when possible.

  The storm of October 7-8 caused high flows in the South River and grab samples were collected at two points on the rising limb of the storm hydrograph for each of the three stations. Because the majority of total mercury flux is expected to occur during flood events, these samples should yield interesting results.

  Mercury concentration values are trickling in from the laboratory. So far, the major conclusion is that dissolved total mercury increases from Waynesboro (upstream) to Dooms (2.5 mi downstream) to Harriston (16.7 mi downstream). This concurs with previous and other ongoing studies.

  A cross-sectional sampling at the Harriston station was performed on August 28, 2005. Eight sampling points were chosen across the stream to assess the mixing of the stream for the different parameters. The results received so far from the lab

show that dissolved total mercury concentrations did not vary much across the stream, with only an 11% difference between maximum and minimum values, indicating no correlation with point water velocities and hence a well-mixed stream. As more results come in, other parameters such as methyl-mercury may or may not show the same patterns.

- Inter-Agency Comparison of Mercury Analyses.
  On Sept. 7, 2005, concurrent sampling was done by USGS, DEQ, and Dupont consultant Ralph Turner at two South River sites, Dooms and Harriston. The purpose of the concurrent sampling was to compare field techniques, sampling handling, and laboratory results. USGS is still waiting to get complete results back from the Mercury laboratory. Once in, the data will be compiled, compared and presented by the three agencies.

Upcoming Work

- Mercury Results: As more of the mercury concentration values are received, more conclusions will be possible.
- 36-Hour Sampling: A round of sampling is planned to look for diurnal patterns in total and methyl- mercury. Samples will be collected every 90 minutes for 36 hours at the Harriston station. It is hoped that Rich Landes will be able to deploy the flux chamber for measurement of riverbed methyl-mercury production at the same time and location.
- Source characterization: Estimates of the mercury fluxes in the total and mthyl-mercury budgets are being compiled. Some early estimates will be presented at the meeting.