

South River and South Fork of the Shenandoah River Hg Sediment Assessment Methods

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Background: As part of the ongoing monitoring program established in the late '70s, stream bed sediment has been sampled in the South and South Fork Shenandoah Rivers at approximately 10 year intervals, with 3 sampling events conducted to date. Sediment has been collected near the water line along the banks, at stations systematically located at 1 mile intervals along the South River downstream from DuPont, and then at 5 mile intervals on the South Fork of the Shenandoah River from Port Republic to the West Virginia state line. Sediment data were intended to indicate the rate of Hg transport through and out of the river system.

The Issue: Recently, concerns regarding the heterogeneity of the sediment collected in the past have prompted a reassessment of the collection methods previously employed. Primary among these concerns is that sediments collected in the past were comprised of differing ratios of fine particles and TOC content. Additionally, there was also concern that bank samples may not be representative of actively transported sediments that would tend to reside in the stream bed proper, and would therefore not yield the most useful comparisons of spatial and temporal trends along the river. Several previous attempts to collect bed sediments had failed using traditional techniques such as ponar grabs, since these devices do not work well in high gradient, rocky streams. The DEQ, in anticipation of the upcoming 10 yr. sediment collection event scheduled for 2007, sought to develop an alternative collection method that would yield more homogeneous samples to facilitate inter-station comparisons.

With input from the South River Science Team, a method has been developed and tested. During collection, a hand powered bilge pump that is used to collect the thin layer of sediment that covers the streambed, along with a copious amount of water. Approximately 4 gallons of a water/sediment mixture is collected into a 5 gallon bucket. This mixture contains sand which is excluded by stirring the water rapidly, then allowing it to settle for about 20 seconds. The supernatant is then decanted into a second bucket and allowed to settle for approximately 20 minutes (conveniently, about the time it takes to move from one station to another via canoe). At this time, the overlying water is discarded, and the sediment remaining is poured into a 250 ml plastic bottle.

Projected Path Forward: Preliminary sampling demonstrates that this method yields approximately 50 grams dry weight of sediment. It is anticipated that this will provide enough material to perform Hg, TOC and particle size analyses. There will be at least one trial run before the 10 yr. sampling, to provide for testing and method adjustment. If this approach proves effective and representative, it will also likely be used to sample deep pools and other features of the stream that have until now remained inaccessible.