



Keeping you up to date on South River Science Team activities

First Half 2011

At A Glance: Focus of Science Team Evolves as Progress Continues

With over a decade's worth of work to investigate and characterize the South River watershed, the South River Science Team is now focusing its efforts on identifying and testing technologies to improve the mercury situation in the South River and South Fork Shenandoah River. The data generated from the various studies conducted over the years has allowed the Science Team to understand the ways that mercury enters the South River, determine the importance of floodplain soil in the mercury cycle, and locate where mercury resides in the food web. Using this information



and based on evaluations and laboratory tests of mercury remediation technologies, the Science Team plans to further evaluate the most promising technologies at one or more locations along the river.

This newsletter highlights two technologies that are currently being tested. Science Team members will continue these efforts, with the ultimate goal of trying to reduce the mercury level in fish tissue.

This word map (left) highlights some of the many activities that the Science Team has performed. The larger words emphasize the focus of the team as they perform activities.

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About this Newsletter...

In the Fall 2000, the South River Science Team was formed to serve as a focal point for technical issues concerning mercury in the South River and downstream waterways. The Science Team is a cooperative effort between the Virginia Department of Environmental Quality, Department of Health and the Department of Game and Inland Fisheries and representatives from academia, citizens groups, the Environmental Protection Agency and DuPont. The Science Team provides technical direction for the mercury monitoring program and ensures that there is effective communication provided to the users of the river. The Science Team's goal is to understand why mercury in South River fish has not decreased over time and to identify potential solutions to improve the situation.

TechCorner:

Science Team Puts Biochar to the Test in Floodplain Pond

Led by scientists from DuPont, the South River Science Team is participating in a pilot study in a South River floodplain pond to determine whether adding biochar to the pond sediments will help reduce the amount of mercury that may be released. As discussed in the last issue of the newsletter, biochar is an eco-friendly material that is made by



To create the barrier, the Science Team installed posts into the bottom of the pond and then placed a top rail across the posts.

heating organic carbon materials like hardwood or pine bark under oxygen-limited conditions. The study involves installing a barrier in the pond to separate the side of the pond that will be treated with biochar and the other side that will remain untreated.

In the first phase of the study, scientists reviewed aerial photographs and selected a pond based on its location along the South River floodplain; its accessibility; and its service as a home to insects and organisms like mayflies, tadpoles, and freshwater snails. Once a pond was selected, samples were collected to characterize the physical, chemical, and biological conditions within the pond. The resulting data were used to develop the approach of the next phase and design the barrier.

The second phase of the study started this spring. Scientists collected samples of sediment, water, and pond organisms so that they can compare the chemical conditions in the pond before and after the barrier is installed and the biochar is added. In early summer, the pond was physically divided in half using a barrier. Researchers will add biochar to the

sediments on one side of the barrier. The other side of the barrier will not be treated with biochar and will serve as a control. The barrier is designed so water will not pass through it and, during installation, field crews made every attempt to ensure that water does not seep under the barrier. Using a modified road salt spreader, biochar will be distributed as evenly as possible on one side of the pond. Sediment, water, and organism samples will be collected before and after adding the biochar.

The Science Team will help researchers evaluate the sampling results to determine if the biochar was successful in binding the mercury to the pond sediments and, in turn, reducing the amount of mercury available for uptake by living organisms. The results will also help the Science Team determine if the biochar affects the water quality of the pond, the sediment characteristics, or the mercury levels in organisms.



After installing the posts and rail, the Science Team installed a liner to make sure that water would not pass through the barrier. Sandbags were placed on the bottom of the pond on top of the liner.

Based on the results, the Science Team may consider other applications for biochar such as mercury-impacted floodplain soil. While incorporating biochar into the sediments of a swift, flowing river may be impractical, applying biochar to mill races, riverbanks, and floodplain soil may be feasible.

For more information about this study, contact Nancy Grosso at (302) 999-3114 or Nancy.R.Grosso@usa.dupont.com.

From the Team...

Science Team Planning for More Riverbank Stabilizations

The South River Science Team is evaluating eroding banks along the South River in an effort to determine which banks should and could be stabilized to prevent mercury-impacted soil from going into the river. As highlighted in previous newsletters, the erosion of mercury-contaminated soil from riverbanks is believed to be a significant source of mercury to the South River. The Science Team initiated this project because the riverbank stabilization across from Constitution Park in Waynesboro, implemented in 2009, has significantly reduced the amount of mercury-impacted soil entering the river in this area. The stabilized riverbank also has withstood periods of high river flow over the last year and a half. Armed with these promising results, the Science Team is working to identify other eroding banks along the South River that can be stabilized.

In early April, Professor Jim Pizzuto (University of Delaware) led Science Team members on a float trip down the South River. Mr. Bill Norris, a water resources engineer with Inter-Fluv, Inc., participated in the float trip so that he could see firsthand the different types of erosion along the riverbank and measure the steepness of the bank. Based on these observations and measurements, he will develop a

range of possible designs to stabilize the selected riverbanks. Regardless of the design, the goal of the stabilization remains the same: to minimize the disturbance of the existing river system and organisms while preventing erosion.

Before stabilization can begin, the Science Team needs to select the appropriate banks to stabilize based on location, access, and estimates of the amount of mercury-impacted soil going into the South River. Dr. Pizzuto, a geomorphologist, is using existing data to model the eroding riverbanks between Waynesboro and the Augusta Forestry Center so that he can calculate the estimates. The riverbanks in this portion of the South River are important because surface water and fish tissue in this area show the greatest increases of mercury compared to downstream areas. The next step will be to develop a riverbank soil sampling plan that will



Members of the South River Science Team saw firsthand the eroding riverbanks during an April float trip (above). Dr. Jim Pizzuto from the University of Delaware discusses the day's plan with float trip participants (below).



help validate the modeling results. The Science Team will use this information to help prioritize which eroding banks will be stabilized.

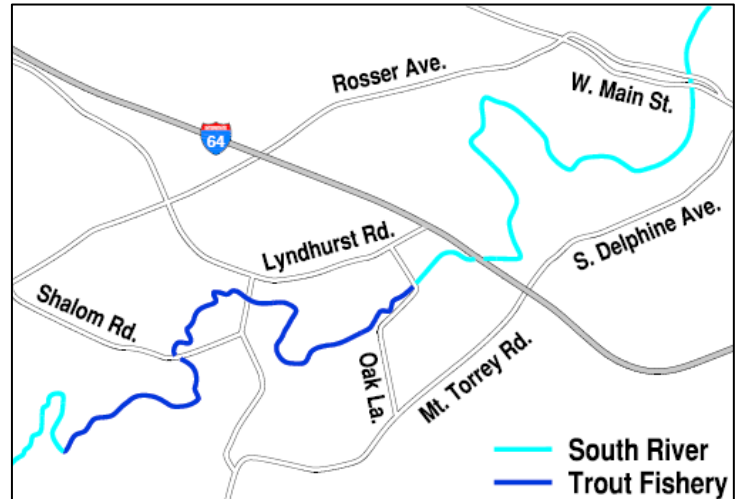
For more information about this study, contact Nancy Grosso at (302) 999-3114 or Nancy.R.Grosso@usa.dupont.com.

Did You Know?


Trout Lure Anglers to New Special Regulation Area

The Department of Game and Inland Fisheries has opened a four-mile special regulation fishing area on the Upper South River near Lyndhurst that is proving to be a great spot to catch trout. The area is loaded with the insects, bait fish, and water temperature that trout love, which might be the reason that these fish are growing $\frac{3}{4}$ inch to 1 inch every month. The trout fishery is thanks in large part to the Shenandoah Valley Chapter of Trout Unlimited, who stocked the 6- to 7-inch trout, and 40 property owners, who agreed to allow people to fish in front of their homes and use their land to access the river. As part of the agreement, anglers must park their vehicles in the designated areas and must use the designated trails to access the river.

The special regulation area allows fishing only by single hook using artificial lures, and no more than two fish at least 16 inches long can be taken per day. In addition to the required annual fishing license, a valid landowner permit is required to fish in this area. The permits are free and available at Stone Soup Bookstore and Café on W. Main Street in Waynesboro and Dominion Outdoors in Fishersville. More details about the fishing regulations in the area and the river access locations are available at <http://sites.google.com/site/shenandoahvalleytu/trout-streams/upper-south-river-special-regulations-area>.



Fishing is permitted in the special regulation area beginning at South Oak Lane in Waynesboro and continuing past Lyndhurst and Shalom Roads in Augusta County.

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