

Mirror Lake Remediation and Restoration: 5 Years Later, Dover, Delaware

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Background/Objectives. The St. Jones River in Kent County, Delaware has been contaminated by PCBs, dioxins and furans, organochlorine pesticides, PAHs and mercury from various sources, mostly in the past. Mirror Lake is part of the St. Jones River and is located just downstream from the head of tide in historic Dover, DE. Delaware's DNREC, in partnership with Dr. Upal Ghosh of UMBC, targeted Mirror Lake for a full-scale application of activated carbon (AC) treatment of the sediments to reduce contaminant bioavailability in the lake. Activated carbon, in the form of SediMite™ pellets, was delivered directly to the surface of the lake. At the time of field application (Fall 2013), the project represented the first full scale remediation project in North America to use direct placement of activated carbon, and was the first State-led project of its kind anywhere in the USA. The remediation project was coupled with restoration activities aimed at habitat restoration.

Approach/Activities. Approximately 80 tons of SediMite™ was broadcast into the 5-acre Mirror Lake project area over a ten day period using four different methods. These methods included the use of a telebelt, a modified induction horn (using compressed air), a Vortex blowing system, and hand application. A new intertidal wetland, two flow diversion rock vanes, and 800 linear feet of coir logs were installed concurrent with the remediation effort in Fall 2013. Over 5,300 wetland plants were installed around the lake as part of the restoration effort. The total cost of the remediation/restoration project was \$940,000. Remedy effectiveness monitoring was conducted at 1 year post-application, and at 3 years post-application.

Results/Lessons Learned. Post-treatment sampling indicated an average AC concentration of 4.3% by dry weight in Mirror Lake surface sediments, which is within the targeted 3-5% post application range. The effectiveness of the AC treatment has been evaluated by monitoring bulk sediment, sediment porewater and surface water concentrations over time, as well as fish tissue bioaccumulation. Results have shown significant reductions in sediment porewater PCB levels after treatment. Comparisons between pre- treatment sampling and post-treatment sampling will be reported in this presentation. It is anticipated that the fish advisory that exists for this section of the St. Jones River will be lifted or reduced in a matter of years, instead of decades.