



NONPOINT SOURCE SUCCESS STORY

Pennsylvania

Passive Treatment Improves Water Quality and Trout Population in Upper Schuylkill River

Waterbody Improved

Drainage from abandoned mines contributed high metal loads to the Upper Schuylkill River. The Pennsylvania Department of Environmental Protection (PADEP) added 34.32 miles of the mainstem stream to the state's 1996 Clean Water Act (CWA) section 303(d) list of impaired waters. Project partners installed four passive acid mine drainage (AMD) treatment systems at a cost of \$2.5 million to remedy the impact of mine drainage discharges into the Upper Schuylkill River. Water quality and aquatic habitat have improved in the upper 8 miles of the headwaters around the town of New Philadelphia. As a result, the Schuylkill Headwaters Association, Schuylkill Conservation District and Schuylkill County Trout Unlimited formed a partnership to create a trout habitat project in the Upper Schuylkill River. Water quality improvement efforts are continuing.

Problem

The Upper Schuylkill River watershed drains approximately 264 square miles in Schuylkill County in east central Pennsylvania (Figure 1). The watershed is primarily forested but has experienced significant environmental impairment due to discharges from abandoned mines that date back to the early 1800s. A stream survey conducted by PADEP indicated that the Upper Schuylkill River has a degraded aquatic ecosystem with depressed aquatic life due to AMD impacts. Nonpoint source runoff from these AMD discharges delivers high metal loads to the Upper Schuylkill River. In 1996, PADEP added 34.32 stream miles of the main stem of the Upper Schuylkill River to the state's list of impaired waters. PADEP developed a total maximum daily load (TMDL) for the Upper Schuylkill River watershed, which established limits for aluminum, iron and manganese loads along stations on Upper Schuylkill River. These limits, which vary per station based on site-specific existing pollutant loads, serve as goals for remediation.

Story Highlights

The headwaters of the Schuylkill River and its many tributaries are located within the Southern Anthracite Coal Field, one of four major coal fields that are within the Appalachian mountains. Major sources of AMD discharges occur at 12 known deep-mine

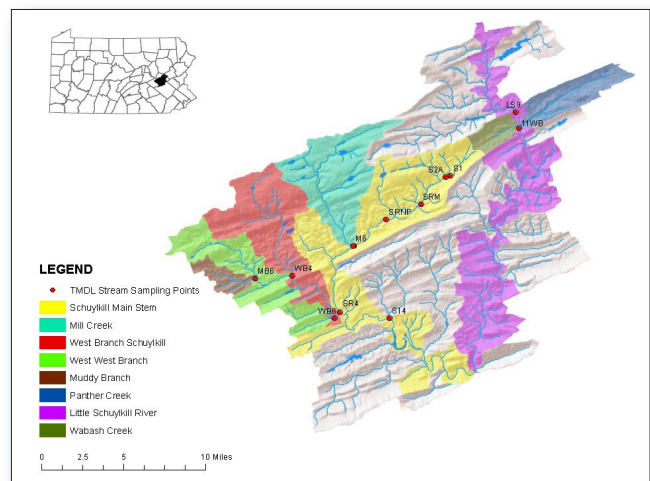


Figure 1. The Upper Schuylkill River watershed is in east central Pennsylvania.

discharges and are treated as nonpoint sources. In 1999, the Schuylkill Conservation District received a CWA section 319 grant from the U.S. Environmental Protection Agency (EPA) to assess the Upper Schuylkill River. Using the assessment data, the project partners developed a watershed implementation plan identifying 27 priority areas, which was approved in 2005. The Schuylkill Conservation District, along with PADEP Bureau of Abandoned Mine Reclamation, built four passive treatment systems targeting the highest-ranking discharges based on total metal loadings in the headwaters (Figure 2).

Results

Various sites along the stream have been monitored since 2005. A few TMDL points were chosen as sample points to measure any improvements. The first sampling location, TMDL point SRM, is located 6 miles downstream from the headwaters in Middleport and below three of the constructed systems. Further downstream, TMDL point SRNP is located around 8 miles from headwaters in New Philadelphia and below four of the passive treatment systems. Using TMDL data (2005–2006) as baseline, water quality at these sampling points has improved significantly. Although there are a few more discharges in the watershed that need to be addressed, data collected at TMDL point SRM show a decrease in iron from 0.64 mg/L (before treatment) to 0.47 mg/L (after treatment), a decrease in manganese from 0.94 mg/L (before treatment) to 0.73 mg/L (after treatment), and a decrease of acidity from 17.28 mg/L (before treatment) to 0 mg/L (after treatment). Data collected at TMDL point SRNP show a decrease in iron from 1.85 mg/L (before treatment) to 0.87 mg/L (after treatment), a decrease in manganese from 1.05 mg/L (before treatment) to 0.88 mg/L (after treatment), and a decrease of acidity from 21 mg/L (before treatment) to 0 mg/L (after treatment).

Post-treatment readings demonstrate that the water quality of the river has improved tremendously due to the construction of the passive treatment systems. Water quality at New Philadelphia, downstream from the treatment systems, is net alkaline providing a much better habitat for fish. As a result, Schuylkill Headwaters Association, Schuylkill Conservation District and Schuylkill Trout Unlimited partnered to create a trout habitat project. This project included installation of log framed stone deflectors, a single log vane deflector, log framed cross vanes and random boulders (Figures 3 and 4). Many more partners and 37 volunteers are involved with plans to expand the project and build more structures in the future.

Partners and Funding

Schuylkill Headwaters Association, Schuylkill Conservation District, U. S. Office of Surface Mining, Pennsylvania Fish and Boat Commission, Delaware River Basin Commission, Philadelphia Water Department, the Pennsylvania Department of



Figure 2. Partners installed an AMD passive treatment system on Silver Creek (a tributary).

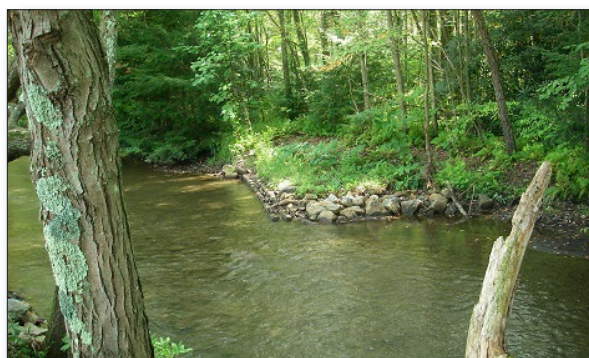


Figure 3. A log framed stone deflector was added.



Figure 4. Plunge pool habitat was created.

Community and Economic Development, and PADEP partnered to address the water quality problems in the Upper Schuylkill River watershed. Through 2018, the group was awarded \$627,950 from Growing Greener and approximately \$2,500,000 from EPA CWA section 319 funds to complete projects in the watershed.



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