



NONPOINT SOURCE SUCCESS STORY

West Virginia

Muddy Creek Watershed Restoration Projects and Partnership Improve Water Quality of Cheat River

Waterbodies Improved

The lower 3.4 miles of Muddy Creek, a tributary to the Cheat River, has been impaired by acid mine drainage (AMD). The acidity, due to dissolved metals in AMD, severely impacts fish, other stream organisms and the river ecosystem. Muddy Creek failed to meet water quality standards for pH, iron and aluminum, and the Cheat River failed to meet standards for pH and iron. Partners, led by Friends of the Cheat (FOC), a citizens' group, have eliminated most of the pollution loads with passive treatment projects. A new AMD treatment facility provided even more treatment. Fish communities downstream in Muddy Creek now include pollution-sensitive species, such as brown trout. Walleye, which once inhabited the river and were stocked in a lake downstream, are now migrating upstream. Boaters on the Cheat report an improvement in the river and a more satisfying boating experience. ([Visit the story map](#))

Problem

Muddy Creek is a tributary to the Cheat River near the town of Albright in northern West Virginia (Figure 1). The Cheat River drains a rugged, 1,400-square mile watershed in West Virginia and Pennsylvania. It is a destination for whitewater boaters worldwide and has hosted commercial guided trips since 1968.

AMD pollution in Muddy Creek comes from coal mines, where pyrite, a mineral in the coal, oxidizes to form dissolved iron and sulfuric acid, which dissolves additional metals from rock and soil (Figure 2). In 1994, water in a mine void in the T&T Mine Complex “blew out” through a hillside. The AMD polluted not only Muddy Creek but the entire Cheat River, its receiving stream. The blow-out called attention to the need to neutralize hundreds of other long-term AMD sources in the Muddy Creek and Cheat River watersheds.

FOC used U.S. Environmental Protection Agency (EPA) Clean Water Act section 319 funds administered by the West Virginia Department of Environmental Protection (WVDEP) to begin building passive treatment projects for other AMD sources in the watershed.

In the meantime, WVDEP was treating AMD from mines that had gone bankrupt and forfeited their permits. The treated water was good enough to support fish and other aquatic life, but it would flow into

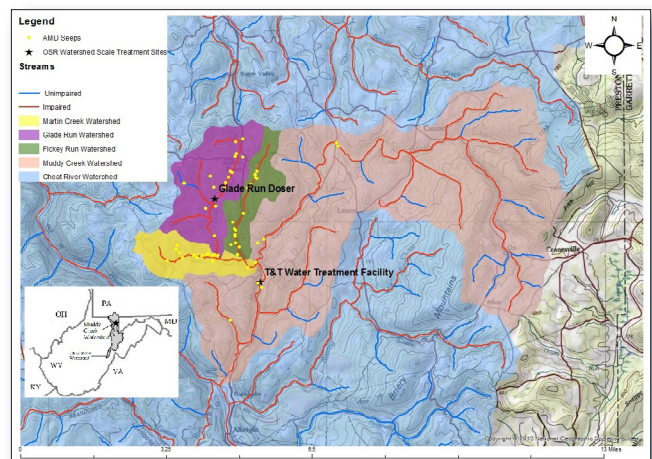


Figure 1. Muddy Creek is in the lower Cheat River watershed in northern West Virginia.

streams that were polluted to a pH level near 3.0 (i.e., acidic) by mines that had been abandoned before the law required stringent permits.

Story Highlights

FOC, formed after the 1994 AMD blow-out, organized efforts for the restoration of Muddy Creek and the Cheat River. FOC secured section 319 funding and installed four passive treatment projects on small-to-moderate AMD sources. They also hold a popular annual river festival and maintain access roads for



Figure 2. Iron-laden, acidic water from Fickey Run, center, discharged into Martin Creek, a tributary of Muddy Creek, before the restoration project.



Figure 3. Greg Short displays a walleye.

boaters. FOC also organized a partnership, called “River of Promise,” with state and federal agencies as well as local citizens and whitewater recreation advocates worldwide. The partnership coordinates resources and advocates for restoration projects. WVDEP, which has been part of River of Promise from the beginning, used its greater resources to finish the

work of improving Muddy Creek and the Cheat River. Under a 2017 water quality variance, EPA approved an innovative permitting strategy that allows for contaminated water flowing from several streams to be treated by an in-stream water doser or conveyed through the AMD water collection system that ties into a new treatment facility. The water is decontaminated using lime slurry, polymers and clarifiers to raise pH and remove the metal substances. Clean water is then returned to the watershed in a continuous flow that dilutes and gradually restores the creek.

Results

Before treatment, in 2015, results from an electro-shock fish survey near the mouth of Muddy Creek showed no fish. In 2019, after treatment had begun, a survey detected 143 fish of nine different species. Median pH values increased from 4.3 to 7.3 following treatment. Since June 2018, Muddy Creek has been net alkaline. Median aluminum and iron concentrations decreased from 10 and 9 milligrams per liter (mg/L), respectively, to 1 mg/L. The median discharge of acidity into the Cheat River decreased from 11,800 pounds per day (lbs/day) to -1,100 lbs/day calcium carbonate equivalent.

Sensitive game fish species, notably walleye, have been caught in the Cheat River closer to the mouth of Muddy Creek (Figure 3). Whitewater boaters downstream from Muddy Creek perceive the improvement as a decrease in turbidity. FOC continues to monitor Muddy Creek through regular water quality and benthic macroinvertebrate sampling, focused on assessing and quantifying watershed improvements from AMD treatment projects in the Muddy Creek watershed.

Partners and Funding

From 2005 through the present, a significant amount of funding has been dedicated to Muddy Creek restoration activities. FOC secured \$837,000 through the WVDEP’s and EPA’s nonpoint source programs. FOC also spent \$407,000 from EPA through a Targeted Watershed Initiative grant. These funds were matched by \$497,000 from the U.S. Office of Surface Mining Reclamation and Enforcement and \$478,000 in state matching funds. Most recently, WVDEP spent \$9 million on AMD treatment plants.



U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-21-001P
September 2021

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