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Watershed-based strategy for treating acid mine drainage discharges

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Most mine drainage treatment approaches rely on treating the water at or near the point of discharge using active and passive systems suited for the site and water conditions. While these systems are generally effective, they do little to ameliorate receiving streams that often carry significant pollutant loads. We propose that addressing regulated, point source discharges, is *not* the best strategy for restoring stream miles. This is particularly true where unregulated discharges provide the bulk of stream pollution. Strategies relying solely on treatment of regulated discharges often result in no benefit to stream recovery.

Muddy Creek is a large, impaired stream in northern West Virginia, which receives hundreds of acid mine drainage point source discharges from abandoned and bond-forfeited mine sites. The West Virginia Department of Environmental Protection (WVDEP) has spent millions of dollars treating many point source discharges in the Muddy Creek watershed with chemical and passive systems. However, Muddy Creek remained impaired because over 95% of the iron and acidity loads came from dozens of abandoned mines. In 2015, the WVDEP planned the construction of a large chemical treatment plant on Muddy Creek that began operation in 2018 (costing roughly \$10M to build with \$530,000 annual operating costs). After four years of operation, the project resulted in restoration of 3.2 miles of Muddy Creek and an additional 16 miles of the Cheat River and Cheat Lake; both of which are now productive game fisheries.

Keywords: abandoned mine lands, acid mine drainage, mine water discharges