Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
West Virginia

Innovative Community Wastewater System Restores Windmill Gap Creek and Protects Citizens' Health

Waterbody Improved

Failing household septic systems in McDowell County contributed to water quality impairments in West Virginia's Windmill Gap Creek. As a result, the West Virginia Department of Environmental Protection (WV DEP) added a 2.8-mile segment of the stream to the state's 2006 Clean Water Act (CWA) section 303(d) list of impaired waters for fecal coliform (FC). The Wastewater Treatment Coalition of McDowell County (WTCMC) worked with partner agencies and community residents to install a decentralized community wastewater system, which significantly improved water quality. The stream now meets the state's water quality standard for FC, and West Virginia will propose removing the segment from the CWA section 303(d) list of impaired waters in 2012.

Problem

Windmill Gap Creek is a small (2.8-mile) headwater stream in McDowell County, West Virginia. It flows through the community of Ashland (a former coal mining camp) to the North Fork of Elkhorn Creek, which eventually flows to the Ohio River. A designated trout stream with naturally reproducing trout, Windmill Gap Creek is a popular destination for anglers.

Many houses in the coal-mining community of Ashland were built in the early 1900s and had limited wastewater treatment. Homes and businesses were built on small lots, very close to Windmill Gap Creek, and over the years malfunctioning septic tanks began to contribute wastewater to the creek (Figure 1). The wastewater caused putrid odors, dramatic discoloration of the streambed, compromised biological communities and high FC loads.

Monitoring data in 2005 showed violations of the state's water quality standard for FC bacteria; as a result, in 2006 West Virginia added the 2.8-mile segment of Windmill Gap Creek to the state's CWA section 303(d) list. The FC standard states that water samples are not to exceed 200 colonies (col) per 100 milliliters (mL) as a monthly mean based on at least five samples per month. In addition, no more than 10 percent of all samples taken during the month may exceed 400 col/100 mL. With little to no agricultural activity in this watershed, no municipal wastewater treatment system, and no permitted wastewater treatment for 90 percent of the homes, the primary source of FC was identified as failing onsite wastewater treatment systems.

Figure 1. Homes in the coal-mining community of Ashland were built on small lots, directly next to Windmill Gap Creek.

Project Highlights

In 2001 and 2002, devastating floods increased local awareness of wastewater-related health hazards as drinking wells became contaminated with raw sewage throughout the county. In 2004 the WTCMC developed a countywide plan to provide wastewater treatment service to every household in the county, through a combination of traditional and alternative wastewater treatment systems. The WTCMC initially targeted wastewater treatment efforts in the Ashland community to improve water quality in the headwaters of the North Fork of Elkhorn Creek. In 2007 the WTCMC and partners developed a watershed-based

plan (WBP) for the North Fork of Elkhorn Creek, and CWA section 319 funding was later provided to support project design and construction.

Because of the rough terrain, small lot sizes and close proximity to the stream, a traditional sewer system could not be developed for the Ashland community. Therefore, the Canaan Valley Institute (CVI), a nonprofit organization that specializes in addressing polluted-water issues caused by inadequate wastewater treatment, designed an alternative decentralized wastewater treatment system in which sewage from the houses and two small businesses is collected and transported in a septic tank effluent gravity sewer line via gravity to a pump system and holding tank. The pump transports the effluent approximately 400 feet up the mountain to wetland cells for secondary treatment, reducing biochemical oxygen demand and nitrogen before the wastewater enters a drainfield through a low-pressure pipe drainfield system. Today, this project provides wastewater treatment for 23 homes and a renovated company store and café in the Ashland community.

This project was supported entirely by grant funding and was backed by community residents, all of whom attended public meetings and signed a statement that they were willing to connect to the system. This project provides a model for other communities trying to address infrastructure needs through a nontraditional approach. It also demonstrates how stakeholders—including community members and outside agencies—can work together to improve water quality. The WTCMC continues to implement the WBP by promoting the repair or installation of septic systems where feasible downstream from the Ashland community.

Results

Following installation of the Ashland community decentralized wastewater treatment system, monitoring data have shown significant improvements in water quality. FC levels dropped by more than 98 percent (Figure 2). Post-project water samples collected during low-flow events in fall 2010 comply with the state's FC water quality standards. Samples collected before and six months after the project show that the stream condition index score has improved from 54.4 (marginal) to 67.7 (suboptimal), reflecting improvements in macroinvertebrate diversity and abundance. On the basis of these data, WV DEP will propose to remove the 2.8-mile segment of Windmill Gap Creek from the state's CWA section 303(d) list of impaired waters in 2012.

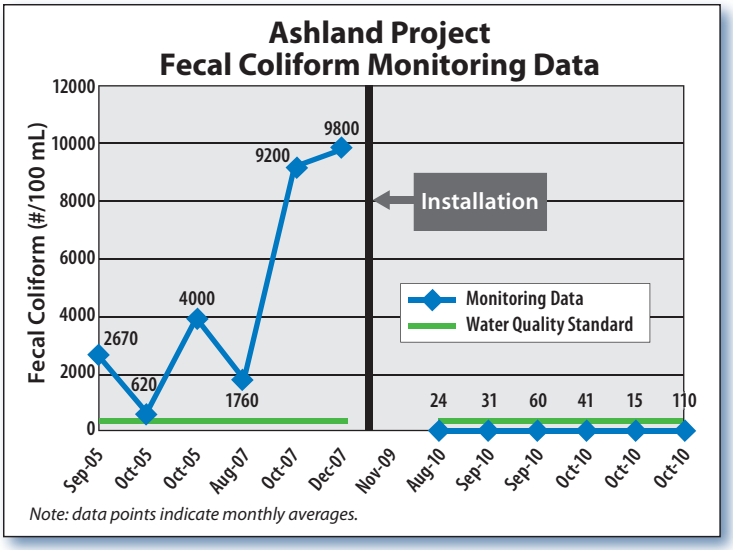

Figure 2. Monthly average fecal coliform levels dropped dramatically in Windmill Gap Creek after installation of Ashland's decentralized wastewater treatment system.

Partners and Funding

This project's success is the result of the collaborative efforts of many different partners, including WTCMC; WV DEP; CVI; SAFE Housing and Economic Development; West Virginia Ministry of Advocacy and Workcamps Inc.; West Virginia Stream Restoration Fund; McDavid Foundation; Change Happens in Honolulu Hawaii; West Virginia Affordable Housing Trust Fund; West Virginia Stream Partner's Program; Versa Con; Southern Department of Transportation; Mountain Resource Conservation and Development Council; McDowell County F.A.C.E.S.; McDowell County Health Department; Citizens Conservation Corps of West Virginia; Stafford Consultants, Inc.; First Presbyterian Church; McDowell County Commission; West Virginia Division of Natural Resources; Travel Beautiful Appalachia, Inc.; and local Rotary clubs.

Ashland Community Utilities, Inc., which provides drinking water to the community, operates and maintains the wastewater treatment system at an affordable level, with an annual estimated budget of $7,000 and monthly rates of $27. The cost to install Ashland's community decentralized wastewater treatment system was $770,970, of which $231,650 was provided by CWA section 319 funds. Matching funds for the project were provided by private, nonprofit and foundation donations, as well as state funds (West Virginia Stream Restoration Fund and West Virginia Stream Partners Program funds).

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