NONPOINT SOURCE SUCCESS STORY

West Virginia

High School's Wetland Project Benefits Cranberry Creek, Builds Partnerships, and Yields Ecological and Educational Success

Waterbody Improved

An aging pond on the Woodrow Wilson High School (WWHS) campus was identified as a major source of fecal coliform pollution in Cranberry Creek due to dozens of resident waterfowl. This unique project consisted of pond draining, wildlife relocation, wetland creation, riparian and wetland plantings, and stream restoration. Various stakeholders collaborated to make this project an environmental and educational success. Recent monitoring demonstrates that the project has reduced fecal coliform loads and will continue to yield further reductions.

Problem

The Piney Creek watershed is in southern West Virginia (WV). It is the largest contributing watershed to the lower New River, and many Piney Creek tributaries are impaired for bacteria, sediment, and iron. The creek flows into WV's New River Gorge National Park and Preserve. Cranberry Creek is a significant urban tributary of Piney Creek, with many impervious parking lots and roadways in its watershed, including in the city of Beckley. Cranberry Creek collects sediment-containing runoff from dirt roads, barren lands, eroding streambanks, and past mining practices. The communities in this watershed have centralized wastewater systems; however, bacterial contamination occurs from overflow conditions during flooding events and leakage from the aging sewer infrastructure. Other sources of bacteria include pet waste and waterfowl. A 50-year-old pond on the local high school's campus supported a large population of geese that defecated on the parking lot and school grounds, causing a health concern for staff and students. Water samples from the pond indicated high fecal coliform levels.

Story Highlights

After approval of the Piney Creek watershed-based plan in 2012, the Piney Creek Watershed Association (PCWA) began working on rain gardens and a land stabilization project. PCWA identified the WWHS project as a way to reduce bacterial contamination and sediment loads in Cranberry Creek while teaching students and the community about stream restoration, water quality, and the importance of wetlands.

Figure 1. The WWHS project transformed an old pond into a thriving wetland ecosystem. Inset photo: Girl scouts and other volunteers plant trees to buffer the wetland.

PCWA's technical advisory committee met monthly to plan to transform the pond into an emergent wetland, daylight the natural drainage flowing from the site, and replace invasive with native plant species.

PCWA worked with the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), who designed the project, provided oversight of the pond dewatering, and designed the wetland and stream drainageway (Figure 1). The pond was dewatered in April 2021, and PCWA worked with residents and state and federal agencies to relocate the fish and domesticated ducks to private ponds. A local contractor constructed the wetland and shaped the drainageway following the natural stream restoration protocols outlined in the NRCS plans.

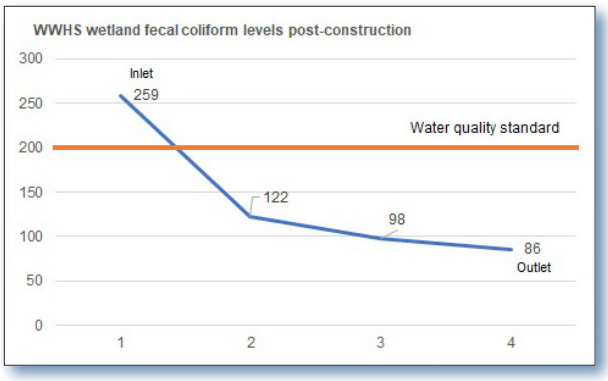

Figure 2. Post-construction data show bacteria levels decline as water moves through the wetland.

In May 2021, high school biology students seeded pollinator species in pots, and West Virginia University Institute of Technology (WVU Tech) maintained them in the campus greenhouse. In August, students, teachers, local volunteers, Master Gardeners, and WVU Tech women's soccer team members planted a pollinator garden adjacent to the project area. In April 2022, Girl Scouts helped plant live stakes and trees at an Earth Day event, learning about the importance of wetlands and other water quality issues. The carpentry class at the Academy of Careers and Technology built two walking bridges crossing the upper stream channel to provide access to the nearby softball field. Interpretive signage has also been installed. The high school biology classes are using the site as an outdoor classroom. Two enterprising students raised over $40,000 to fund a boardwalk and teaching pavilion. Multiple signs about wetlands, pollinators and the project details have been erected. The project is improving water quality and educating and inspiring students and local citizens (see story map).

Results

Pre-project data collected in 2020 (mid-summer, low-flow conditions) on the 0.75-acre pond showed the fecal coliform bacteria count exceeded 2,300 colony-forming units (cfu)/100 milliliters (mL). Post-project monitoring shows fecal coliform levels significantly decline (by an average of 32%) after flowing through the wetland (Figure 2). Further reductions are expected as the wetland and surrounding vegetation matures.

The project has created a thriving wetland filled with a wide range of species. Partners added over 1,750 plants, including willow, silky dogwood, and many other species. Many amphibians and wetland birds have been seen. A few Canada Geese still visit the site occasionally. Native flowers are growing in the pollinator garden, the wetland, and along the downstream channel, attracting bees and butterflies. The WWHS biology classes and faculty remain engaged. Future plans include constructing an accessible boardwalk that will extend over and around the wetland.

Partners and Funding

Many local groups and citizens collaborated on the project. Jim Fedders, PCWA's Executive Director, served as the project manager. NRCS provided engineering design services and construction oversight. ALL-CON, LLC, a local contractor, constructed the wetland and drainage channel. The WV Department of Environmental Protection (WVDEP) and the WV Conservation Agency provided expertise and guidance throughout the project. The WV Division of Natural Resources and the U.S. Fish and Wildlife Service helped capture and relocate fish from the pond. Local community members relocated the domestic waterfowl from the project area. The Beckley Area Foundation (BAF) provided grant funding for the pollinator garden and other project enhancements. Biology students started pollinator seeds in the classroom with the assistance of New River Master Gardeners. WVU Tech provided greenhouse resources to maintain and propagate plants, and the women's soccer team worked with the local Rotary club, 4-H clubs, and volunteers to plant the pollinator bed. The Beckley Fire Department watered the pollinator garden. Students and faculty at the Raleigh County Academy of Careers and Technology built walking bridges. The Girl Scouts of Black Diamond Council provided grant funding and planted live stakes and bare root shrubs. The City of Beckley installed asphalt curbing and continues to support PCWA. The Raleigh County Board of Education, a key partner, continues to support the efforts of students and teachers to maintain and enhance the site.

Funding sources included a U.S. Environmental Protection Agency section 319 $60,000 grant for constructing the wetland, a $15,000 grant from WVDEP's Water Quality Management Fund, and a BAF $6,670 community grant for interpretive signage, lumber for the walking bridges, live stakes, bare root shrubs, and seeds and planting materials for the pollinator garden. A $2,250 WV American Water grant to the girl scouts supported purchasing trees. Total project costs were $126,000, including $40,000 from student fundraising.

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