NONPOINT SOURCE SUCCESS STORY

West Virginia

Tuscarora Creek Relocation and Restoration Improves Biodiversity

Waterbody Improved

Tuscarora Creek was added to West Virginia's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002 for not meeting the state's biological water quality standard. Sediment and organic enrichment were identified as the key stressors to aquatic life in the 2008 total maximum daily load. Project partners re-routed the creek around an obsolete dam to adjust the creek's profile and pattern to transport sediment more effectively through a 950-foot reach. Abundance and diversity of benthic macroinvertebrates have improved in the first year, indicating water quality progress. Thanks to the generous cooperation of the landowners, the site has served as a demonstration to the community through articles, videos and tours to inspire more streamside vegetation and general awareness about pollution in the Tuscarora Creek watershed.

Problem

Tuscarora Creek is a tributary of Opequon Creek in Berkeley County, West Virginia (Figure 1). Tuscarora Creek was added to West Virginia's list of impaired waters in 2002 for not meeting the state's biological water quality standard due to organic enrichment and sediment. A dam was built in the 1920s to provide irrigation water for a nearby orchard (now gone). A local group of fishermen, the Creekside Anglers, identified the removal of the dam as an important next step for improving habitat for trout, because the slack water behind the dam was causing an increase in water temperature. The dam was also a barrier to aquatic organism passage and captured sediment being naturally transported by the stream. West Virginia Department of Environmental Protection (DEP) staff sampled above and below the dam in April 2013 for benthic macroinvertebrates and found that the community had a combined score of "poor."

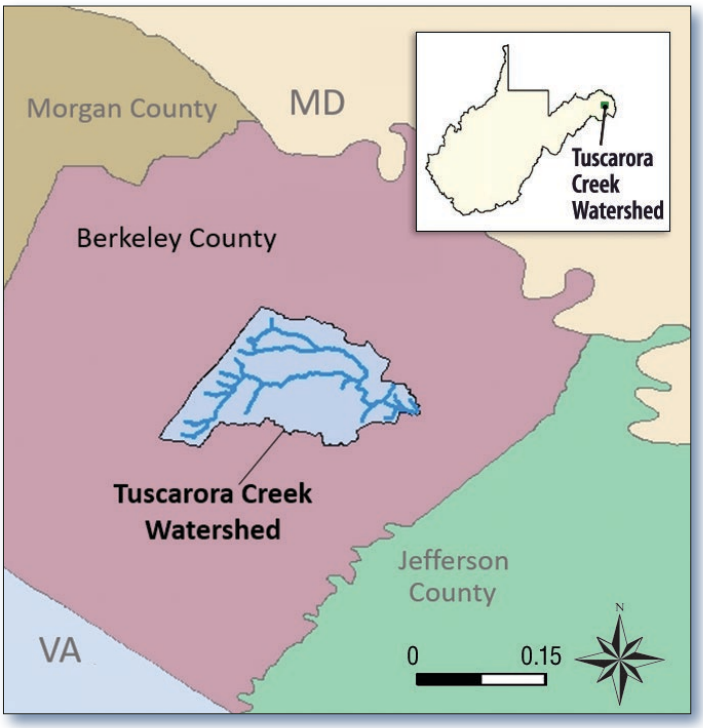

Figure 1. Tuscarora Creek is in the West Virginia panhandle.

Story Highlights

Using CWA section 319 funds, the Canaan Valley Institute (CVI) designed a stream restoration project that adjusted the stream's path to avoid the dam while also approaching the road culvert at a better angle (Figures 2 and 3). The new design added shallow riffles, deep pools, and vegetative bank stabilization to improve the benthic habitat for organisms as well. The project restored 448 feet of natural channel and established 1.5 acres of trees and shrubs. CVI obtained a grant from National Fish and Wildlife Foundation to implement the dam removal portion of the project. In 2016 a portion of the spillway was removed, the remaining portion of the dam was abandoned and buried in place, and the stream was rerouted to flow around the abandoned dam site.

Figure 2. The new stream channel diverts water around a small concrete dam, now buried.

Figure 3. The stream channel was configured to allow water to flow more directly into the culvert.

Figure 4. Upper portion of the restored reach.

Figure 5. Lower portion of the restored reach.

Results

Native plants in the new riparian buffer along the restored areas flourished quickly after project completion, stabilizing the area (Figures 4 and 5). In September 2017 (one year after the project was completed), DEP collected benthic macroinvertebrates with dip nets from several riffles along the project reach and found that the IBI score has significantly improved. The IBI score recorded on April 23, 2013 (before project implementation) was 31.5 ("poor" integrity). The IBI score recorded on September 12, 2017 (after project implementation), was 57.4 ("marginal" integrity)—a 58 percent increase.

An elevated nitrate-nitrogen level and the abundance of certain pollutant-tolerant macroinvertebrates indicate there are still water quality challenges influencing this reach. The Tuscarora Creek Project Team continues to implement the watershed-based plan to reduce nonpoint sources of pollution such as leaking septic systems, livestock access to surface water, and residential fertilizer over-use. Streambank stabilization work at upstream sites may also decrease excess sediment delivered to the creek.

Partners and Funding

This work was implemented with funding from the National Fish and Wildlife Foundation (through a Chesapeake Stewardship grant) and the West Virginia DEP CWA Section 319 Program. CVI designed and managed the project with help from the Roach Family, Eastern Panhandle Conservation District, West Virginia DEP, West Virginia Division of Forestry, U.S. Environmental Protection Agency, Appalachian Stream Restoration and the Opequon Creek Project Team.

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