



NONPOINT SOURCE SUCCESS STORY

Kentucky

Watershed Planning and Partnerships Lead to Gunpowder Creek Delisting

Waterbody Improved

The Kentucky Division of Water (DOW) added a 15-mile segment of Gunpowder Creek (miles 0.0–15.0) to the 2002 Clean Water Act (CWA) section 303(d) list/Integrated Report as impaired (nonsupport) for warm water aquatic habitat (WAH) due to siltation and land development. After years of local improvements to stormwater controls, agricultural conservation practices, watershed planning, and stream restoration efforts, macroinvertebrate community data collected in 2014 indicated the segment fully supports its WAH designated use. As a result, DOW delisted the sedimentation/siltation impairment for this Gunpowder Creek segment in the 2018/2020 Integrated Report to Congress.

Problem

Gunpowder Creek drains into the Ohio River in northern Kentucky (Figure 1). Gunpowder Creek is approximately 21.9 miles long and drains a 58.2-square-mile watershed dominated by forest (42%), urban areas (32%), and agriculture (24%) in Boone County. The drainage area is made up of two subwatersheds (Upper and Lower Gunpowder creeks) and includes the cities of Florence and Union. Biological sampling of Gunpowder Creek (miles 0.0–15.0) in 1995–1999 indicated that siltation caused this segment to fail to support the aquatic life designated use, resulting in its placement on the 2002 CWA section 303(d) list. Additional biological monitoring in 2011 confirmed this impairment, and the stream remained listed on the 2016 CWA 303(d) list.

Story Highlights

In 2009, the CWA section 319(h) program awarded over \$501,000 to the Boone County Conservation District to develop a Gunpowder Creek watershed plan. This plan funded an extensive monitoring, planning, and collaboration effort that identified stormwater-driven sediment and bacteria as the primary pollution sources of concern. Partners, including the Boone County Conservation District, the cities of Florence and Union, Sanitation District No.1 of Northern Kentucky (SD1), and DOW, identified practices such as stream restoration, stormwater retention, and riparian buffers to mitigate siltation issues. Northern Kentucky University's (NKU's) Stream and Wetland Restoration Program helped restore 2,700 feet of stream in Florence with a history of erosion and

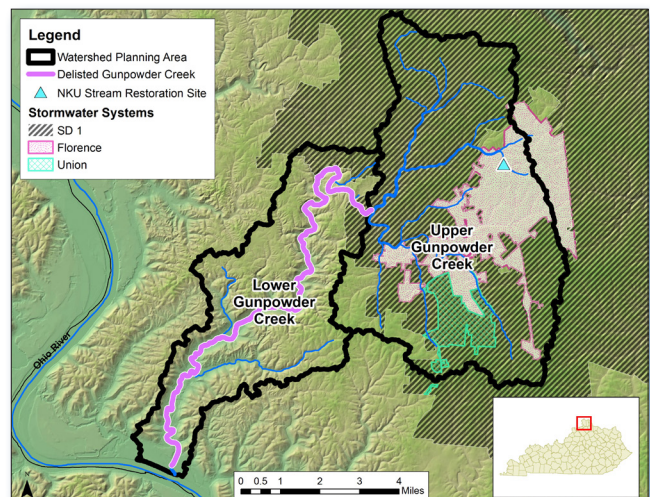


Figure 1. Gunpowder Creek is in northern Kentucky.

flooding (Figure 2). Restoration monitoring between 2009 and 2013 demonstrated that successful tree plantings (more than 2,000 plantings/acre) widened riparian buffers and improved stormwater storage, which helped to reduce erosion.

Additionally, several partners revised their stormwater rules to limit stormwater runoff, including the City of Florence (in 2005), Boone County (in 2012 and 2015), and SD1 (in 2011 and 2012). SD1 further developed a regional stormwater management program credit (in 2012) allowing property owners to receive a bill credit for implementing best management practices (BMPs) that improve water quality or stormwater runoff intensity.

Between 2000 and 2014, partners applied agriculture BMPs to over 10,000 acres in the Upper and Lower Gunpowder Creek watersheds with financial or technical assistance from the Natural Resources Conservation Service (NRCS). Additionally, over 14,800 linear feet of fence were installed to support rotational grazing, stream exclusion, and other erosion-mitigating agricultural practices.

Results

Following substantial watershed planning and collaboration, new data demonstrates the Gunpowder Creek segment (miles 0.0–15.0) is now supporting the WAH designated use. Sampling between 1995 and 1999 classified the biological community as *poor* due to siltation. In 2011, the macroinvertebrate community was found to be *fair* using the macroinvertebrate biological index (MBI). In 2014, the macroinvertebrate community improved, and Gunpowder Creek scored in the *good* MBI range. As a result, Gunpowder Creek (miles 0.0–15.0) now meets its WAH designated use, and sediment/siltation was delisted as part of the 2018/2020 Integrated Report to Congress.

Partners and Funding

The Gunpowder Creek watershed received significant partner engagement, catalyzed through the Gunpowder Creek Watershed Plan. In addition to EPA and DOW, key partners include the Boone County Conservation District, the cities of Florence and Union, SD1, NKU, and Kentucky NRCS. In addition to CWA Section 319 program funding (\$501,056) for watershed planning, NKU contributed \$239,000 towards stream restoration, and Kentucky NRCS funded \$94,560 in agricultural BMPs (primarily in the Lower Gunpowder Creek subwatersheds). The lasting impact of watershed planning is evident in ongoing collaborative investments, including installing new stormwater basins, upgrading existing stormwater basins (retrofits), constructing a bankfull stormwater wetland (2017), and adding stream exclusion fencing for livestock. Multiple stormwater improvement projects are being developed with SD1, the City of Florence, NKU, and the Cincinnati/Northern Kentucky International Airport—these are likely to improve water quality for years to come.



Figure 2. Stream restoration project in Gunpowder Creek watershed.



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

EPA 841-F-22-001J
June 2022

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