



NONPOINT SOURCE SUCCESS STORY

Tennessee

Improvements to Agricultural Management Help in the Recovery of East Rock Creek (Marshall County)

Waterbody Improved

East Rock Creek, located in Marshall County, was added to Tennessee's 2002 Clean Water Act (CWA) section 303(d) list for impairments from siltation and habitat alterations from pasture grazing. By 2012, the causes of pollution had been expanded to include nitrate and *Escherichia coli* (*E. coli*). The Nature Conservancy (TNC), with support from two Clean Water Act (CWA) section 319 grants, helped producers install agricultural best management practices (BMPs). Tennessee's Agricultural Resources Conservation Fund (ARCF) also supported implementation of BMPs along East Rock Creek and its tributaries. In 2018, 14.17 miles of East Rock Creek had been improved significantly, and the segment was no longer listed as impaired by nitrate, siltation, or habitat alterations on the State of Tennessee's List of Impaired Waters.

Problem

East Rock Creek (TN06040002012 – 0100) is within the Rock Creek watershed (060400020501), in Marshall County, Tennessee (Figure 1). The designated uses for East Rock Creek are fish and aquatic life, recreation, livestock watering and wildlife, and irrigation. This portion of Marshall County is predominately rural, and the primary land use in the Rock Creek watershed is pasture grazing and hay production, with some row crop farming and forested areas.

In Tennessee's 1992 CWA section 303(d) list of impaired waters, Big Rock Creek (including East Rock Creek) was identified as impacted by ammonia, nutrients, and organic enrichment/dissolved oxygen. In 2002, East Rock Creek was listed individually on Tennessee's CWA section 303(d) list for siltation and other habitat alterations from pasture grazing. In 2006, nutrients (nitrates) were added as a cause of pollution; in 2008, *E. coli* was identified as an impairment.

In 2011, the Tennessee Department of Environment and Conservation (TDEC) conducted a Tennessee Macroinvertebrate Index (TMI) to measure biological function, which yielded a score of 24. (To meet biocriteria guidelines, a score of 32 or higher is required.)

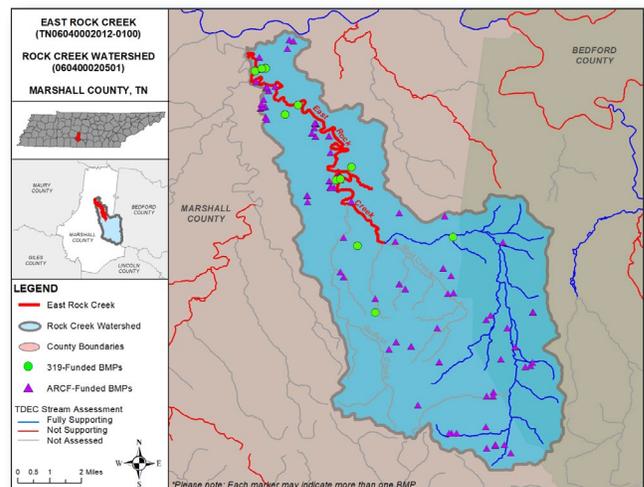


Figure 1. East Rock Creek is in central Tennessee.

A total maximum daily load (TMDL) for low dissolved oxygen and nutrients for the Upper Duck River watershed (060300001), which includes East Rock Creek, was developed by TDEC and approved by the U.S. Environmental Protection Agency (USEPA) in 2005. No target load reductions for East Rock Creek were identified. A TMDL for the Upper Duck River watershed for siltation and habitat alteration was also developed by TDEC and approved by USEPA in 2006. The TMDL recommended a decrease of 39.6 percent of the siltation load.

Story Highlights

In fiscal year (FY) 2001, TNC was awarded a CWA section 319 grant to develop a watershed management plan for Big Rock Creek (to which East Rock Creek flows). In FY 2006, TNC received a second CWA section 319 grant to implement the watershed management plan and assist with the installation of agricultural BMPs within the watershed. A total of 31 agricultural BMPs were installed in the Rock Creek watershed, including fencing, livestock pipelines, heavy use areas, watering facilities and riparian forest buffers (Table 1).

Table 1. BMPs installed in the Rock Creek watershed.

Practice name	Units installed		Total units installed
	CWA 319 funds	ARCF funds	
Cover crop	-	66 (2,547 ac)	66 (2,547 ac)
Fence	2 (5,100 ft)	2 (10,902 ft)	4 (16,002 ft)
Riparian forest buffer	1 (600 ft)	-	1 (600 ft)
Forage and bio-mass planting	-	8 (252 ac)	8 (252 ac)
Cropland conversion	-	10 (452 ac)	10 (452 ac)
Pipeline	7 (5,995 ft)	2 (4,520 ft)	9 (10,515 ft)
Heavy use area	9	6	15
Watering facility	12	7	19

Notes: ft = linear feet; ac = acres

The Tennessee Department of Agriculture’s (TDA) ARCF program has assisted with the implementation of 101 agricultural BMPs along East Rock Creek and its tributaries within the Rock Creek watershed, including fencing, heavy use areas, cover crops, and forage and biomass plantings (Figure 2).

Results

The biological function of East Rock Creek was reevaluated by TDEC in 2015. Macroinvertebrate sampling of East Rock Creek provided an improved TMI of 34 (passing score is 32), with an increase in intolerant species (indicating improved water quality). As a result of the 2015 TMI, East Rock Creek was removed from the Tennessee’s 2018 list of impaired waters for nitrate, siltation, and habitat alterations. (Tennessee has narrative nutrient and



Figure 2. Cross fencing installed near East Rock Creek in Marshall County.

siltation criteria; since nitrates and siltation are no longer causing measurable harm, TDEC delisted East Rock Creek for these parameters based on the improved habitat scores.) As of 2018, East Rock Creek remains impaired by *E. coli* from pasture grazing.

Partners and Funding

The TNC was awarded a CWA section 319 grant in 2001 totaling \$986,238 to support restoration efforts along Big Rock Creek and its tributaries (including East Rock Creek). During the FY 2001 grant period, a watershed management plan was developed for Big Rock Creek. In 2006, a second CWA section 319 grant (for \$492,987) was awarded to TNC for implementing BMPs along Big Rock Creek and its tributaries. Within the Rock Creek watershed specifically, in which East Rock Creek is located, a total of \$32,501 was invested in agricultural BMPs. Key partners with TNC included the Center for Watershed Protection, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Austin Peay University, Marshall County School District and the City of Lewisburg.

In addition to the CWA section 319 grant funding, Tennessee’s ARCF program has contributed \$118,355 for installing agricultural BMPs in the Rock Creek watershed. Partners with TDA for installation of BMPs through ARCF include USDA NRCS and the Marshall and Bedford county soil conservation districts.



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

EPA 841-F-19-001JJ
November 2019

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