



# NONPOINT SOURCE SUCCESS STORY

## Tennessee

### A Focus on Repairing Septic Systems Helped Reduce Bacteria in the Headwaters of Big Fiery Gizzard Creek

#### Waterbodies Improved

Hedden Branch and an unnamed tributary to Little Fiery Gizzard Creek were added to Tennessee's 2002 Clean Water Act (CWA)

section 303(d) list for failing to meet *Escherichia coli* bacteria standards due to septic tanks and pasture grazing. A water contact advisory had been issued for Hedden Branch in 2000. From 2013 to 2016, the Southeast Tennessee Resource Conservation and Development Council (SETN RC&D), with support from a CWA section 319 grant, repaired or replaced multiple septic tanks and installed agriculture best management practices to reduce the pollutant load entering Hedden Branch and the unnamed tributary. Water quality improved, and the water contact advisory was lifted in 2013. As a result, 1.55 miles of Hedden Branch and 1.54 miles of an unnamed tributary to Little Fiery Gizzard Creek were removed from Tennessee's 2014 impaired waters list for *E. coli*.

#### Problem

Hedden Branch (TN06030001057 – 0921) and an unnamed tributary to Little Fiery Gizzard Creek (TN06030001057 – 0924) are within the Big Fiery Gizzard Creek watershed (060300010104) in Grundy and Marion counties, Tennessee (Figure 1). In 1982, 17 miles of Big Fiery Gizzard Creek were included on the Nationwide Rivers Inventory for exceptional scenery, recreation, geology and fish "outstandingly remarkable values." South Cumberland State Park, located just downstream from the segments on Little Fiery Gizzard Creek, includes a public swimming area.

As early as 1992, Big Fiery Gizzard Creek was identified in Tennessee's CWA section 303(d) list as impacted by pathogens from urban/stormwater and agricultural sources. In 2000 a water contact advisory was issued for Little Fiery Gizzard Creek and several tributaries (including Hedden Branch) due in part to the presence of failing septic systems at local homes. In 2002 Hedden Branch and an unnamed tributary were included on Tennessee's CWA section 303(d) list for failing to support all designated uses due to *E. coli*.

A total maximum daily load (TMDL) for *E. coli* for the Gunter'sville Lake watershed (06030001), which includes Hedden Branch and the unnamed tributary to Little Fiery Gizzard Creek, was developed by the Tennessee Department of Environment and Conservation (TDEC) and approved by the U.S.

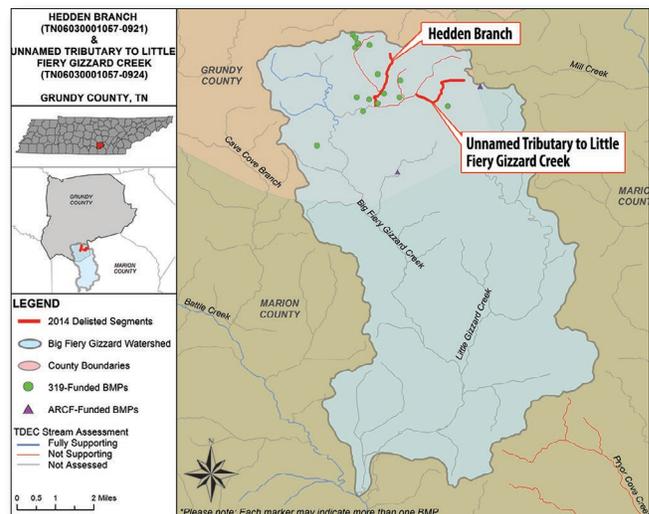


Figure 1. Approximate locations of implemented best management practices in Hedden Branch watershed.

Environmental Protection Agency in March 2008. A goal of the TMDL was to have Hedden Branch and the unnamed tributary meet the Tennessee water quality criteria, which states that no single sample may exceed a maximum of 941 colony-forming units per 100 milliliters of water (CFU/100 mL). In 2006 *E. coli* levels in Hedden Branch were as high as 2,419.2 counts/100 mL in a single sample. In August and September of 2010, samples in the unnamed tributary to Little Fiery Gizzard Creek were also determined to exceed Tennessee water quality standards.



Figure 2. A failing septic system along Hedden Branch.

## Story Highlights

The segments' primary sources of *E. coli* impairment included pollution from both a point source (malfunctioning wastewater treatment plant at an elementary school) and nonpoint sources (pasture grazing and multiple failing septic systems at homes and businesses) (Figure 2). The cities of Monteagle and Tracy City collaborated on upgrades to the wastewater treatment plant. In 2009 Monteagle received \$6.2 million through Tennessee's State Revolving Fund loan program and the American Recovery and Reinvestment Act to help improve the area's wastewater treatment and collection. In 2010 the sanitary sewer system was expanded to accept new hook-ups from homes and businesses. Existing sewer lines were upgraded to improve the wastewater collection system.

The SETN RC&D helped repair, maintain or replace 15 septic systems at homes and businesses outside the Monteagle/Tracy City service area, including eight projects that occurred before the segments were removed from the 2014 impaired waters list. In addition, the SETN RC&D has implemented two agricultural BMPs with the assistance of CWA section 319 grant funds. The Tennessee Department of Agriculture's (TDA's) Agricultural Resources Conservation Fund (ARCF) program has helped to implement six agricultural BMPs in the Big Fiery Gizzard Creek watershed, including fencing and alternative watering facilities (see Figure 1).

## Results

Sampling performed in August and September of 2010 indicated the stream met Tennessee's water quality criteria for *E. coli*. No single sample from Hedden

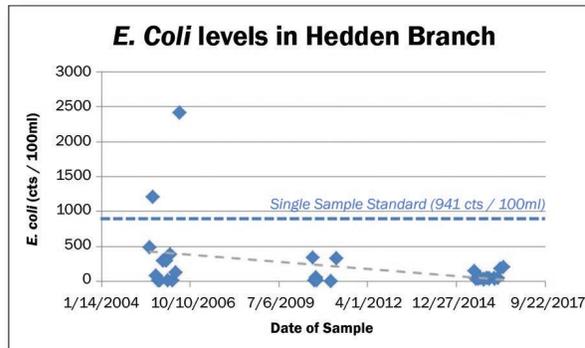


Figure 3. *E. coli* levels in Hedden Branch (2004 – 2017).

Branch or the unnamed tributary to Little Fiery Gizzard Creek taken from April 2011 through June 2016 has exceeded the state single sample criteria of 941 CFU/100 mL (Figure 3). In 2013 TDEC lifted the water contact advisory for Little Fiery Gizzard Creek and its tributaries in Grundy County. As a result, Hedden Branch and the unnamed tributary of Little Fiery Gizzard Creek were removed from Tennessee's 2014 impaired waters list for *E. coli*. Both segments continue to be listed for alteration in streamside or littoral vegetation from pasture grazing and high-density urbanization.

## Partners and Funding

The SETN RC&D was awarded a CWA section 319 grant totaling \$122,814 in fiscal year 2010, with approximately \$15,788 provided as cost-share for projects within the Big Fiery Gizzard Creek watershed. (Additional work performed by SETN RC&D in and around the Gunterville Lake watershed is not reflected on Figure 1, as the BMPs were installed in nearby watersheds and do not directly impact the segments being discussed.) Key partners with SETN RC&D include the University of the South; TDEC's Division of Water Resources; TDEC's Division of Groundwater Protection; the Grundy County Soil Conservation District (SCD); U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS); and the Tennessee Wildlife Resources Agency (TWRA). USDA NRCS and the Grundy County and Marion County SCDs partnered with TDA to install BMPs through ARCF. To date, SETN RC&D has provided \$9,220 in cost-share for the BMPs in the watershed. Tennessee's ARCF has also contributed approximately \$12,508 in cost-share assistance to implement agricultural BMPs.



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## For additional information contact:

**Sam Marshall**

Tennessee Department of Agriculture  
Land and Water Stewardship Section  
615-837-5306 • Sam.Marshall@tn.gov