



# Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

## Tennessee

### Implementing Agricultural Best Management Practices Helps Restore Stream

#### Waterbody Improved

Stream channelization and non-irrigated crop production on Tennessee’s Crooked Creek caused erosion and physical substrate habitat alterations. The Tennessee Department of Environment and Conservation (TDEC) added a 4.7-mile segment of Crooked Creek to the state’s Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Local farmers implemented agricultural best management practices (BMPs) including sediment control basins, an underground outlet and critical area plantings to improve drainage and reduce sediment. As a result, water quality improved, prompting TDEC to remove the creek from the state’s list of impaired waters in 2008.

#### Problem

The Crooked Creek watershed is just north of Huntingdon, Tennessee, in Carroll County. It flows from the confluence of Guins Creek and empties into the South Fork Obion River (Figure 1). The creek is in a highly agricultural area where soil loss is primarily caused by overgrazing and farming practices on cropland.

In 2002 TDEC added a 4.7-mile segment of Crooked Creek to Tennessee’s CWA section 303(d) list for not supporting its designated uses of fish and aquatic life, irrigation, livestock watering and wildlife, and recreation. In the past, landowners had channelized Crooked Creek to help control flooding and to accommodate row crops in agricultural fields. Those actions caused accelerated erosion and degradation of the entire watershed. Erosion also occurred on non-irrigated, conventionally tilled fields of strawberries, corn, soybeans, milo and cotton crops.

#### Project Highlights

Using money from both the CWA section 319 program and Tennessee’s Agricultural Resources Conservation Fund (ARCF), local farmers installed agricultural BMPs, including no-till farming practices and cover crops, which help to stabilize soil and reduce erosion. Farmers installed four water and sediment control basins—one in the upper reaches of the watershed (installed in 2004 and funded by section 319 dollars) and three more along the 4.7-mile creek segment (installed 2006–2008 and funded by ARCF dollars). Those control basins trap loose sediment and reduce erosion from Crooked

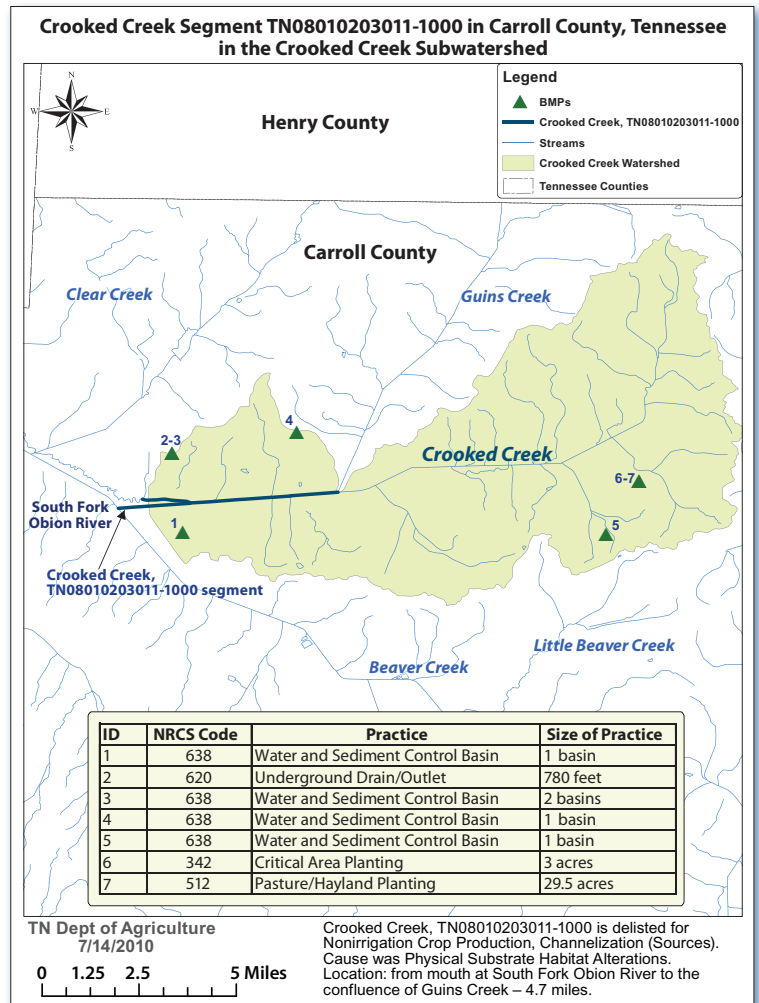


Figure 1. Crooked Creek flows into the South Fork Obion River in western Tennessee. Landowners installed numerous BMPs in the watershed to control erosion.

Creek's exposed and eroded streambanks. The sediment basins also improve downstream water quality and prevent crop damage by slowing down and retaining runoff (Figure 2). One water and sediment control basin includes an underground outlet pipe, which is installed underground and works in conjunction with the basin to drain excess runoff slowly through the soil, preventing erosion during heavy rainstorm events.



Figure 2. Water and sediment control basins such as this one prevent bank and gully erosion on farmland. The runoff water is temporarily stored behind the berm, eliminating its erosive capabilities further down slope. The ponded water slowly flows out through an inlet riser pipe (center) to an underground tile drainage network.

In 2008 farmers in the upper reaches of the Crooked Creek watershed installed 3 acres of critical area planting and 29.5 acres of pasture and hayland planting with native forage. Establishing native forage reduces soil erosion, improves water quality and helps maintain livestock health.

## Results

Implementing BMPs successfully reduced erosion and improved water quality. In 2006 TDEC performed a biological reconnaissance (bioecon) survey on Crooked Creek. A bioecon survey is a tool used to evaluate stream impairments as determined by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. The bioecon survey score is used as a measure of compliance with water quality standards for the beneficial use of fish and aquatic life. The principal metrics used are the total macroinvertebrate families (or genera); the number of families (or genera) of mayflies, stoneflies, and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera); and the number of pollution-intolerant families (or genera) found in a stream. The bioecon survey is scored on a scale from 1 to 15—a score of less than 5 is regarded as very poor, while a score of more than 10 is considered good.

The bioecon documented 4 EPT families, 3 intolerant, and 21 total families, which resulted in the bioecon score of 13 out of 15 and a habitat score of 155 out of 200. The increased bioecon score with the habitat score in 2006 indicate that the headwaters of Crooked Creek are fully restored. From the data, TDEC determined that Crooked Creek now meets its designated uses and removed the 4.7-mile creek segment from the CWA section 303(d) list of impaired waters in 2008.

## Partners and Funding

Projects in Crooked Creek received funding from the CWA section 319 program (\$3,884 plus additional matching funds of \$1,295) and the Tennessee ARCF (\$23,139 plus matching funds of \$10,358). Key partners include the Carroll County Soil Conservation District (which helped to implement BMPs) and local landowners (who contributed the majority of the in-kind match for the BMPs).



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

EPA 841-F-11-001E  
February 2011

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