



# Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

## Tennessee

## Installing Earth Embankments Improves Water Quality

### Waterbody Improved

Channelization and non-irrigated crop production led to increased erosion and siltation in an unnamed tributary to Tennessee's Obion River. High sediment levels altered the substrate habitat and caused a loss of biological integrity, prompting the Tennessee Department of Environment and Conservation (TDEC) to add the 25.8-mile-long unnamed tributary to the state's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. With support from the Tennessee Agricultural Resources Conservation Fund (ARCF), local landowners installed dikes (earth embankments) along the tributary. Water quality improved, and TDEC removed the Obion River tributary from Tennessee's CWA section 303(d) list of impaired waters in 2008.

### Problem

A 25.8-mile-long unnamed tributary to the Obion River flows through Tennessee's Dyer and Obion counties and the community of Miston (Figure 1). The tributary is in Northern Mississippi Alluvial Plain ecoregion 73a in northwest Tennessee. During the last century, landowners channelized sections of the Obion River and many of its small tributaries to increase flow efficiency for agricultural uses. Unfortunately, channelizing the waterways also caused increased erosion, downstream flooding, and a loss of wildlife habitat.

A 2001 macroinvertebrate survey of the unnamed tributary to the Obion River yielded a biological reconnaissance (bioecon) index score of poor. Bioecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. The principal metrics used were the total number of macroinvertebrate families (or genera), the number of families 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 found in the stream.

The 2001 bioecon score for the unnamed tributary to the Obion River indicated that the tributary did not support its designated use of fish and aquatic life. Sediment contributed by non-irrigated crop production and channelization physically altered the substrate habitat and caused a loss of biological

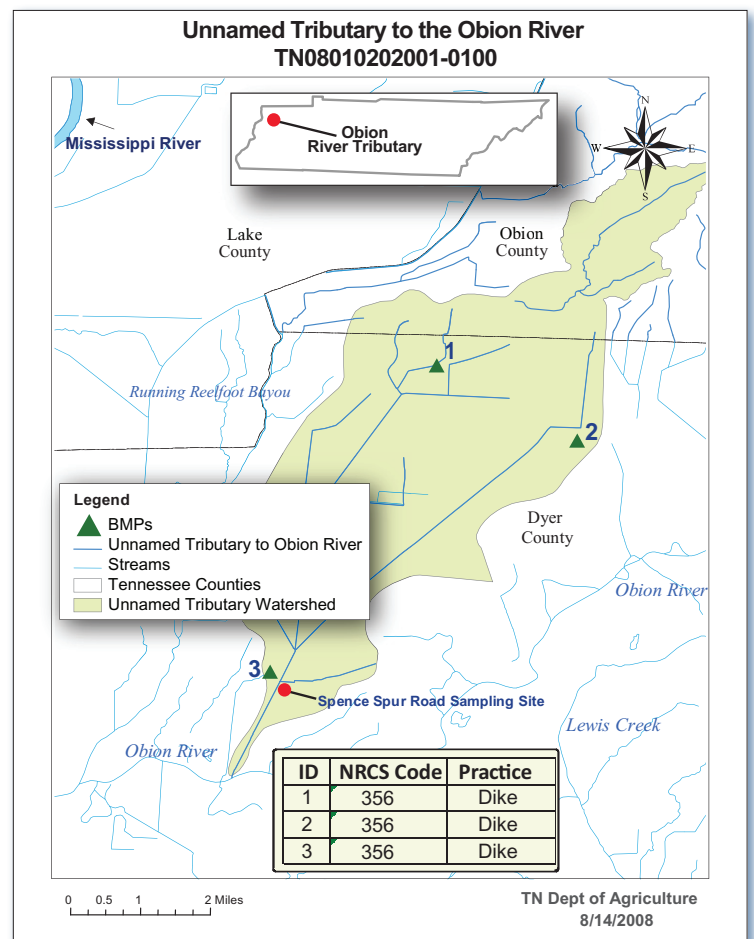


Figure 1. A 25.8-mile-long unnamed tributary flows into the Obion River in western Tennessee. Landowners installed three dikes in the watershed to reduce sedimentation from cropland.

Photo courtesy of NRCS.



Figure 2. Example of a dike, or earth embankment.

integrity. As a result, TDEC placed the unnamed tributary to the Obion River on the state's CWA section 303(d) list of impaired waters in 2002.

## Project Highlights

Using funds provided by Tennessee's ARCF, local landowners installed three dikes (embankments constructed of earth and planted with crops or grass) in the unnamed tributary's watershed (see Figure 1 for project locations). One was installed in 2004 and the two others in 2005. The dikes control water levels and protect against flooding, thereby preventing damage to cropland and property (Figure 2). During the winter and spring, the dikes retain water from the cropland areas, trapping sediment and any nutrients or pesticide residues in the outflow. The water is released slowly in the spring through pipe outlets, helping to prevent further erosion.

## Results

TDEC established a Semi-Quantitative Single Habitat Assessment station at mile 1.6 near Spence Spur Road and, in 2006, performed a bioecon evaluation at the station. Under the 73a biocriteria (73a is the Northern Mississippi Alluvial Plain ecoregion), the maximum bioecon score is 10. The bioecon results for the unnamed tributary to the Obion River show 1 EPT family, 18 total families, and a habitat score of 97. The unnamed tributary received a bioecon score of 8 out of 10, indicating that it now supports its fish and aquatic life use. Because these data suggest that the unnamed tributary to the Obion River now meets the standards for this subecoregion, TDEC removed the stream from the state's CWA section 303(d) list of impaired waters in 2008.

## Partners and Funding

Projects for the unnamed tributary to the Obion River received \$3,295 in funding from the Tennessee ARCF, with additional matching funds of \$6,498. Key partners included the Chickasaw-Shiloh Resource Conservation and Development Council, which helped to install the dikes, and landowners, who contributed most of the in-kind matching funds.



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