



# Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Mississippi

## Installing Best Management Practices Restored the Biological Integrity of Orphan Creek

### Waterbody Improved

Agricultural nutrients, cattle with access to the creek or tributaries, and sediment erosion in pasture land contributed nonpoint source pollution to Mississippi's Orphan Creek. Water quality monitoring conducted in 2001 and 2003 indicated that Orphan Creek was not attaining aquatic life designated use support, which is intended to assure that a waterbody is healthy enough to support the propagation of fish and wildlife that use the water. As a result, the Mississippi Department of Environmental Quality (MDEQ) added Orphan Creek to the state's 2006 Clean Water Act (CWA) section 303(d) list for aquatic life use impairment. The Dead Tiger/Orphan Creek Nonpoint Source Project significantly reduced sediment and nutrients entering Orphan Creek through the implementation of best management practices (BMPs). Using the data collected in 2009, Orphan Creek was assessed as attaining aquatic life use support as part of the 2012 CWA section 305(b) statewide assessment process.

### Problem

The Dead Tiger/Orphan Creek watershed is located in Hancock County in south Mississippi and spans approximately 25,146 acres (Figure 1). The watershed is comprised of approximately 44 percent pasture land, 54 percent timber land, and two percent wetlands, urban, and other. Orphan Creek is part of the Upper Jourdan River Drainage Area that was listed on Mississippi's 1998 CWA section 303(d) list of impaired waters (Waterbody ID: MS112E). This listing included all waters of the Upper Jourdan River Drainage Area, which was an entire 11-digit HUC (144,371 acres).

Biological community data are routinely used to assess waterbodies to determine if the stream is healthy enough to support a balanced aquatic community. In 2001, a targeted monitoring program was launched to collect biological community data on all wadeable waters outside of the Mississippi Alluvial Plain that were included in the CWA section 303(d) list. Orphan Creek was monitored as part of that program. MDEQ collected biological community data on Orphan Creek in 2001 and 2003. Using MDEQ's index of biological integrity, the Mississippi Index of Stream Quality (M-BISQ), the data from 2001 and 2003 scored 53.2 and 51.46, respectively. According to the reference condition established for this region from the original calibration of the index, the scores needed to be higher than 61 to be consid-

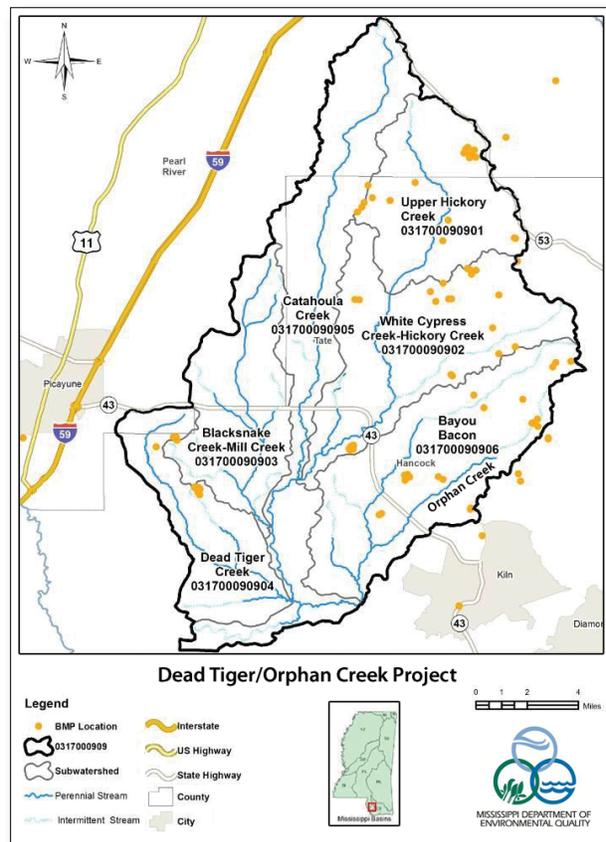


Figure 1. The Dead Tiger/Orphan Creek project area is in Hancock County in southern Mississippi.

ered attaining aquatic life use support. As such, the waterbody failed to support its aquatic life designated use. Using those data, a 6.2-mile segment of Orphan Creek (Waterbody ID: 203811) was placed on the 2006 CWA section 303(d) list for aquatic life use impairment and was subsequently selected as a priority watershed for restoration activities by MDEQ. In 2007, Orphan Creek data were analyzed according to EPA's Stressor Identification Guidance. Following this guidance, all available information collected in that waterbody, along with information on point and nonpoint source pollution and land use-land cover data, were used to determine the primary probable cause of the impairment to the stream. Resulting from this process, sediment and nutrients were identified as primary and secondary probable stressors causing the aquatic life use impairment. Sources in the problem areas included agricultural nutrients, cattle with access to the creek or tributaries, and sediment erosion in pasture land.

## Project Highlights

In 2007, MDEQ partnered with the Mississippi Soil and Water Conservation Commission and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) to implement BMPs within the watershed. BMP installation within the Orphan Creek subwatershed began in early 2008 and was completed later that year. The BMPs included over 190 acres of nutrient management, nearly 40 acres of pasture and hay land planting, and over 2,800 feet of cattle fencing within the Orphan Creek subwatershed. After addressing the causes of pollution and demonstrating in-stream improvements within Orphan Creek, BMP installation continued through 2011, comprising of a total of 43 BMPs covering 533 acres within the much broader Dead Tiger/Orphan Creek Watershed (Figures 2 and 3).

## Results

In 2009, MDEQ returned to the original 2001 and 2003 sampling location in Orphan Creek to collect biological community data. The score was 76.5. Data were also collected at two new sites on Orphan Creek and scored 78.9 and 82. The MBISQ was re-calibrated in 2008. As a result of the recalibration the threshold for attainment in this region was 66. Using the 2009 data from the original



Figure 2. Pasture and hay land planting established long-term vegetation that reduced sediment contributions from highly erosive areas near Orphan Creek.



Figure 3. Cattle fencing along Orphan Creek was an integral part of creek restoration in areas of heavy cattle influence. The new fencing prevents cattle from accessing the creek, alleviating direct nutrient loads to the creek.

sampling location and the two new sites, Orphan Creek was assessed as attaining the aquatic life use in the 2012 CWA section 305(b) reporting cycle and is no longer considered impaired.

## Partners and Funding

Due to the high level of stakeholder interest, the restoration of Orphan Creek was a collective effort between the Mississippi Soil and Water Conservation Commission, the MDEQ, the U.S. Environmental Protection Agency, the NRCS, and the Hancock County Soil and Water Conservation District. The total cost of the overall Dead Tiger/Orphan Creek watershed project was \$206,779, of which \$122,247 was comprised of CWA section 319 funds. Section 319 funds were expended in the following way: \$15,319 for technical assistance; \$3,273 for education and information outreach; and \$103,655 for BMP installation. Participating state and local stakeholders contributed a total of \$84,532 towards the implementation of the watershed project.



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