



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Installing Best Management Practices Improves Dissolved Oxygen Levels in Oklahoma's Stinking Creek

Waterbody Improved

Low dissolved oxygen (DO), attributed in part to practices associated with wheat and cattle production, resulted in impairment of Stinking Creek. As a result, Oklahoma placed the creek on the state's Clean Water Act (CWA) section 303(d) list in 2008. Implementing best management practices (BMPs) improved the quality of cropland and grazing lands, thereby decreasing sediment and nutrient runoff into the creek. DO levels improved, prompting Oklahoma to recommend that Stinking Creek be removed from the state's 2012 CWA section 303(d) list for low DO.

Problem

Stinking Creek (Figure 1) flows for more than 12 miles through central Oklahoma's Caddo County, an area with high rates of wheat and cattle production. Poor management of cropland and grazing lands contributed to excess sedimentation and nutrient runoff in the watershed. Excess nutrients can lead to the overgrowth of nuisance algae, and the subsequent breakdown of the algae can then cause DO levels to decline. Water quality assessments conducted between 2006 and 2008 showed that the amount of DO was continuing to drop, with 43 percent of the water samples included in the 2008 assessment below (i.e., not meeting) state criteria for warm-water aquatic communities. A waterbody is considered impaired for DO if more than 10 percent of samples (based on no more than 5 years of data before the assessment year) fall below 6.0 milligrams per liter (mg/L) from April 1 through June 15 or below 5.0 mg/L during the remainder of the year. On the basis of these assessment results, Oklahoma added Stinking Creek to the 2008 and subsequent CWA section 303(d) lists for failing to support the fish and wildlife propagation designated use due to DO impairment.

Project Highlights

Landowners implemented BMPs with assistance from Oklahoma's locally led cost-share program and through the local Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program and general technical assistance program. These projects focused on

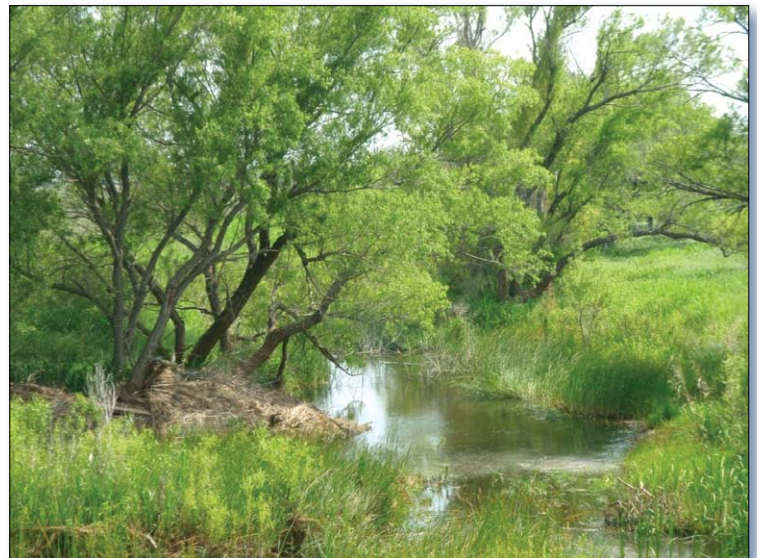


Figure 1. Stinking Creek is in central Oklahoma.

reducing erosion by improving cropland and grazing lands. From 2006 to 2012, landowners implemented no-till, strip-till or direct-seed practices on 210 acres. In contrast to traditional tillage, these "conservation tillage" methods retain soil moisture and reduce soil erosion by decreasing the amount of soil exposed to wind and rain. Landowners installed 1,150 feet of diversions, three grade stabilization structures, three acres of grassed waterways, and 12 acres of critical area planting, which further reduced erosion potential on cropland. Landowners also adopted integrated pest management practices on 1,767 acres. To improve

the condition of pasture and rangeland, prescribed grazing was implemented on 1,484 acres, and 2,045 acres received nutrient management plans. Producers installed four new ponds, one water well, and 400 feet of pipeline to provide livestock with alternative water supplies to keep them out of the creek. Agricultural producers also planted forage on 625 acres.

In addition, the Oklahoma Conservation Commission's (OCC) education program, Blue Thumb, actively promoted restoration efforts in the Stinking Creek watershed in conjunction with the nearby Fort Cobb and Sugar Creek watersheds. Several volunteer training events were held. These activities provided vital education of the residents of the watershed and helped facilitate behavior changes. Active volunteer monitoring and education efforts continue in the area.

Results

The OCC's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Stinking Creek after restoration efforts. Implementing practices and educating landowners helped reduce nutrients entering the stream, which in turn allowed DO levels to improve because algae were less likely to be overgrown and die off.

To meet state DO criteria for warm-water aquatic communities, Stinking Creek samples may not fall below critical DO levels (5.0 or 6.0 mg/L, depending on the season) more than 10 percent of the time. Monitoring data showed that 43 percent of samples from the 2008 assessment fell below the critical DO levels and failed to meet state DO criteria. During the 2012 assessment, only eight percent of samples fell below the critical DO level, which met the state DO criteria (Figure 2). As a result, Oklahoma has recommended Stinking Creek for removal from the state's 2012 CWA section 303(d) list for dissolved oxygen impairment.

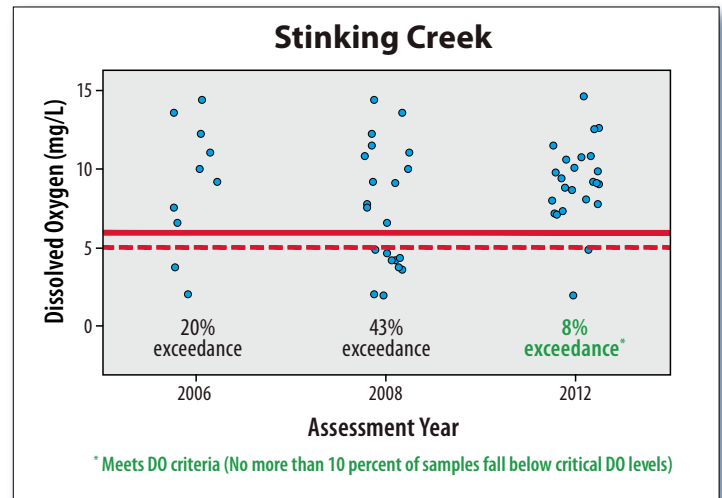


Figure 2. Data show that DO levels in Stinking Creek met state criteria for warm-water aquatic communities in 2012.

Partners and Funding

The Rotating Basin Monitoring Program, which includes both fixed and probabilistic components, is funded through the U.S. Environmental Protection Agency's (EPA) CWA section 319 funds at an average annual cost of \$1 million. Monitoring costs include personnel, supplies and lab analysis for 19 parameters from samples collected every five weeks at about 100 sites. In-stream habitat, fish and macroinvertebrate samples are also collected. Approximately \$600,000 in EPA section 319 funds support statewide education, outreach and monitoring efforts through the Blue Thumb program. Over the past decade, the Oklahoma cost-share program has provided \$11,548 in state funding for BMPs in this watershed through the South Caddo Conservation District. NRCS has spent approximately \$93,500 to implement BMPs in the watershed from 2006 through 2012. Additionally, landowners have provided a significant percentage of the cost, usually 40 to 60 percent, toward BMP implementation.



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