



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Installing Best Management Practices Improves Dissolved Oxygen Levels in Camp Creek

Waterbody Improved

Low dissolved oxygen (DO), attributed in part to practices associated with cattle production, resulted in impairment of Camp Creek. As a result, Oklahoma added the creek to the state's 2006 Clean Water Act (CWA) section 303(d) list of impaired waters. Implementing best management practices (BMPs) helped to reduce erosion from grazing lands by decreasing sediment and nutrient runoff into the creeks. DO levels improved, prompting Oklahoma to nominate Camp Creek for removal from the state's 2012 CWA section 303(d) list for its DO impairment.

Problem

Camp Creek is a 5-mile-long stream in Lincoln and Creek counties in central Oklahoma (Figure 1). The primary land use in the watershed is cattle production. A lack of healthy riparian areas, combined with runoff from livestock areas, grazing lands, and areas with land-applied animal waste, contributed to excess sedimentation and nutrients (including animal waste) entering the creek. Excess nutrients, in turn, can lead to the overgrowth of nuisance algae, and the subsequent breakdown of the algae can then cause DO levels to decrease.

Water quality assessments in 2006 showed that 30 percent of the water samples in Camp Creek were below (i.e., did not meet) state DO 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 five 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 Camp Creek to the 2006 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



Figure 1. Camp Creek flows through agricultural land in central Oklahoma.

Program, Conservation Stewardship Program, and general technical assistance program. These projects focused on keeping livestock away from the stream, protecting the riparian area and improving grazing land. One landowner installed a well to provide livestock with an alternative watering source and keep them out of the creek. To improve the condition of pasture and rangeland across the watershed, agricultural producers implemented prescribed grazing on 1,014 acres and developed nutrient management plans for 60 acres. Producers practiced better forage harvest management on 70 acres and applied integrated pest management on 203 acres. Brush management occurred on 417 acres and prescribed burning took place on 99 acres after installing 1,380 feet of firebreak. Landowners managed upland wildlife habitat on 1,032 acres.

In addition, the Oklahoma Conservation Commission's (OCC) education program, Blue Thumb, actively promoted restoration efforts in the Camp Creek watershed starting in 2006. Volunteer training events were held in Chandler and at Langston University. These activities provided vital education of the residents of the watershed and helped facilitate behavior changes to adopt best practices to restore and maintain water quality. Active volunteer monitoring and education efforts continue in the area.

Current initiatives in Creek and Lincoln counties include managing Eastern red cedar, controlling waste from animal feeding operations and closing failing animal waste lagoons. All of these efforts should continue to improve water quality.

Results

The OCC's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Camp Creek after restoration efforts. To meet state DO criteria for warm-water aquatic communities, Camp Creek samples must 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 show that 30 percent of samples examined for a 2006 assessment fell below the critical DO level and failed to meet state DO criteria.

Implemented practices and the accompanying education of landowners helped reduce nutrients entering the stream, which in turn improved DO levels because algae were less likely to be overgrown and die off. Data collected for a 2010 assessment showed that 14 percent of samples fell below the DO criteria (not yet meeting state DO criteria, but showing improvement). In 2012, data showed that only five percent of values fell below the critical DO levels, which meets the state DO criteria (Figure 2). As a result, Oklahoma has recommended that Camp Creek be removed from the state's 2012 CWA section 303(d) list of impaired waters for low DO levels.

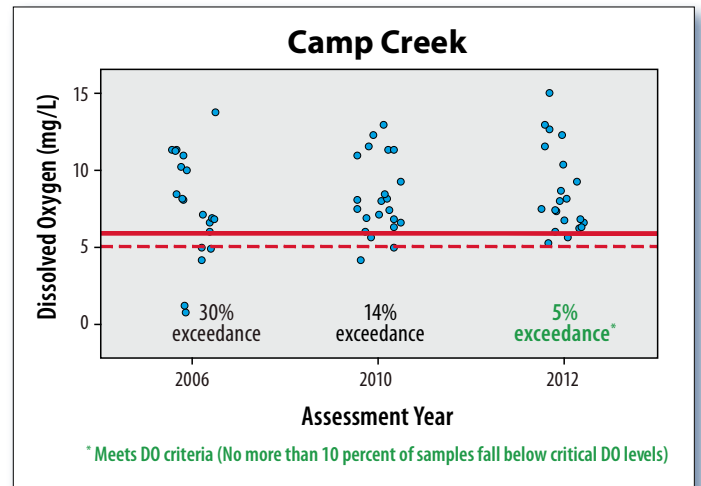


Figure 2. Data show that Camp Creek met state DO water quality criteria in 2012.

Partners and Funding

The Rotating Basin Monitoring Program, which includes both fixed and probabilistic components, is supported with U.S. Environmental Protection Agency (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 CWA section 319 funding supports statewide education, outreach and monitoring efforts through the Blue Thumb program. Over the past decade, the Oklahoma cost-share program provided \$3,000 in state funding for BMPs in this watershed through the Lincoln and Creek County Conservation Districts. The NRCS has spent approximately \$20,000 to implement BMPs in the watershed from 2006–2012. Landowners have provided a significant percentage of the cost toward BMP implementation.



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