



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Installing Best Management Practices Improves Dissolved Oxygen Levels in Turkey Creek

Waterbody Improved

Low dissolved oxygen (DO), attributed in part to practices associated with cattle and wheat production, resulted in impairment of Turkey Creek. As a result, Oklahoma placed the creek on the state's Clean Water Act (CWA) section 303(d) list in 2004. Implementing best management practices (BMPs) improved the quality of grazing lands and cropland, thereby decreasing sediment and nutrient runoff into the creek. Water quality improved, prompting Oklahoma to remove Turkey Creek from the state's 2010 CWA section 303(d) list for DO impairment. Turkey Creek now fully supports its fish and wildlife propagation designated use.

Problem

Turkey Creek (Figure 1) flows for more than 20 miles through Woods County in western Oklahoma, an area with high rates of cattle and wheat production. Poor management of grazing lands and cropland 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 2004 and 2008 showed that DO levels were 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 Turkey Creek to the 2004 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, Conservation Stewardship Program, Wildlife Habitat Incentive

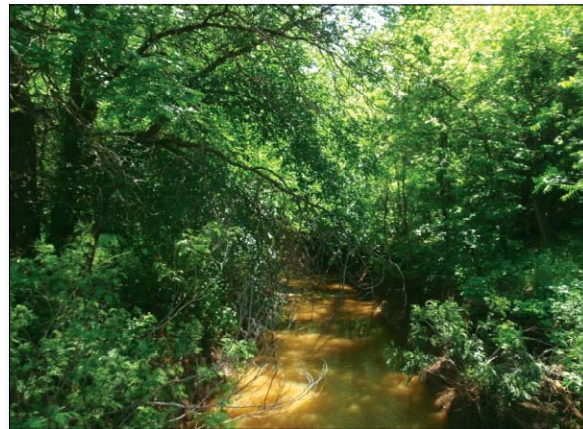


Figure 1. Turkey Creek flows through Woods County in western Oklahoma.

Program and general technical assistance program. These projects focused on reducing erosion by improving cropland and grazing lands. Since nutrients are often bound to soil particles, reducing soil erosion also reduces nutrient loading in streams and can then lead to improved DO levels. From 2004 to 2010, landowners implemented no-till and mulch-till practices on 253 acres, with conservation crop rotations on 213 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. To improve the condition of pasture and rangeland, and thus reduce erosion

and runoff, landowners implemented prescribed grazing on 1,860 acres, adopted nutrient management plans on 271 acres, and rotated supplement and feeding areas on 134 acres. Landowners adopted integrated pest management practices on 733 acres and installed a combination of 10,872 linear feet of fencing, four new ponds, two water wells and three watering facilities, which keep livestock out of the creek and provide them with alternative water supplies. Producers planted supplemental grass on 333 acres, replanted range vegetation on nine acres, and improved upland wildlife habitat management on 554 acres. Brush management occurred on 197 acres, and prescribed burning took place on 925 acres to improve the quality of grazing lands.

Results

The Oklahoma Conservation Commission's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Turkey Creek after landowners implemented BMPs. 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, Turkey 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 show that 29 percent of samples examined for the 2008 assessment fell below the critical DO levels and failed to meet state DO criteria. During the 2010 assessment only 5 percent of samples fell below the critical DO level, which met the state DO criteria. As a result, Oklahoma removed Turkey Creek from the state's CWA section 303(d) list in 2010 for DO. In 2012, all samples remained above the critical DO levels (Figure 2). The creek now fully attains its fish and wildlife propagation designated use.

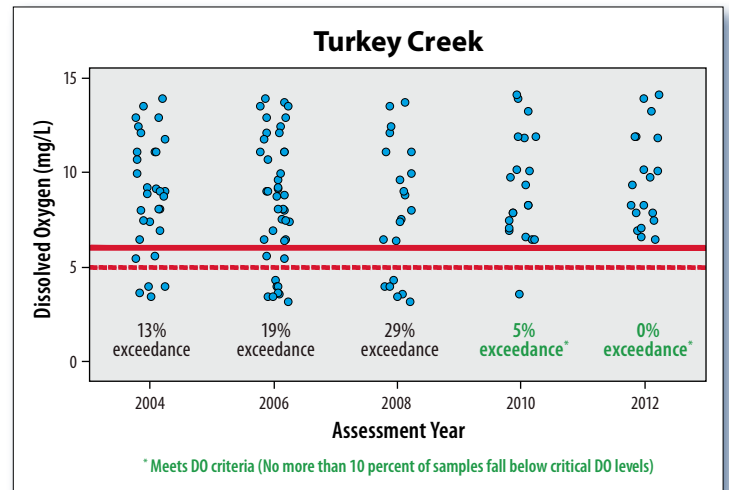


Figure 2. Data show that DO levels in Turkey Creek have met state criteria for warm-water aquatic communities since 2010.

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's) 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. Since 2004, the Oklahoma cost-share program has provided \$9,100 in state funding for BMPs in this watershed through the Woods County Conservation District. NRCS spent approximately \$50,000 to implement BMPs in the watershed between 2004 and 2010. Landowners have provided a significant percentage toward BMP implementation in these programs as well, usually contributing between 40 and 60 percent of the cost of a practice.



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For additional information contact:

Shanon Phillips, Director
Water Quality Division
Oklahoma Conservation Commission
shanon.phillips@conservation.ok.gov
405-522-4500