



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Installing Agricultural Best Management Practices Improves Dissolved Oxygen Levels in Duck Pond Creek

Waterbody Improved

Low dissolved oxygen (DO), due in part to practices associated with widespread livestock and wheat production, led to the impairment of Duck Pond Creek. As a result, Oklahoma added the creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2006. Implementing best management practices (BMPs) to promote better quality grazing land and cropland decreased the amount of sediment, nutrients and bacteria reaching the creek. Water quality improved, prompting Oklahoma to remove Duck Pond Creek from the state's 2010 CWA section 303(d) list for DO impairment. Duck Pond Creek now fully supports its fish and wildlife propagation designated use.

Problem

Duck Pond Creek, in northwestern Oklahoma's Beaver County, is a 40-mile-long tributary to the Beaver/North Canadian River. Land use in the watershed includes mostly cattle and wheat production. Poor grazing land and cropland management, as well as a lack of healthy riparian buffer areas, contributed to excess sedimentation, nutrient and bacteria runoff in the watershed. 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 showed that DO levels in Duck Pond Creek fell 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 Duck Pond 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



Figure 1. Duck Pond Creek flows through an agricultural region in northwestern Oklahoma.

through the local Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program, No-Till Local Emphasis Area program, Conservation Stewardship Program, Conservation Reserve Program and general technical assistance program. These projects focused on reducing erosion by improving cropland and grazing land. 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. In addition, because Duck Pond Creek is in the Beaver and Cimarron River NRCS Local Emphasis Area, some projects have focused on increasing the amount of

water flow in these rivers, primarily through removal of brush species such as Eastern red cedar, salt cedar and Russian olive. Increased water flow can lead to increased DO levels.

In the Duck Pond Creek watershed, agricultural producers planted 781 acres of cover crops, performed contour farming on 247 acres, and implemented no-till, strip-till or mulch-till on 1,259 acres. Nutrient management was implemented on 2,483 acres of cropland, along with 2,230 acres of integrated pest management. Rangeland improvements included 358 acres of prescribed grazing, 543 acres of conservation cover, 37 acres of pasture planting, 11,000 feet of cross-fencing, 4.5 acres of heavy-use area protection and 950 acres of upland wildlife habitat management. Producers also installed four watering facilities and two wells.

Results

The Oklahoma Conservation Commission's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Duck Pond Creek after restoration efforts. To meet state DO criteria for warm-water aquatic communities, Duck Pond 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 examined for the 2006 assessment showed that 32 percent of samples fell below the critical DO levels and failed to meet state DO criteria.

Implemented practices and the accompanying education of landowners helped reduce nutrients entering the stream, which in turn helped to improve levels of DO because algae were less likely to be overgrown and die off. Data collected for the 2010 and 2012 assessments show that DO levels improved over time and now meet state DO criteria—only 10 percent fell below the critical DO levels in 2010 and nine percent fell below in 2012 assessment (Figure 2). Because DO levels met state criteria, Oklahoma removed Duck Pond Creek from the state's 2010 CWA section 303(d) list for DO

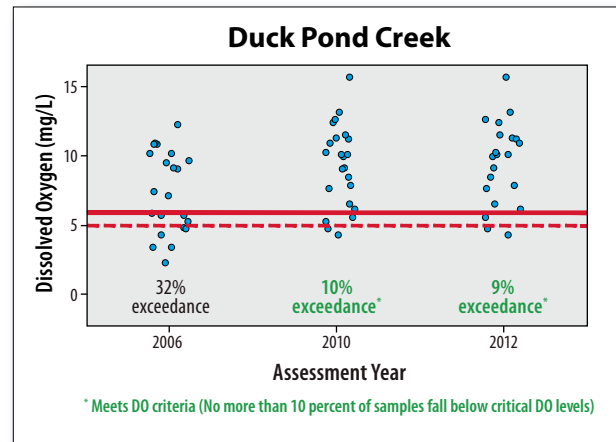


Figure 2. Data show that DO levels in Duck Pond Creek have met state DO criteria for warm-water aquatic communities since 2010.

impairment. The creek now fully supports its fish and wildlife propagation designated use.

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. The Oklahoma cost-share program has provided \$6,400 in state funding for BMPs in the Duck Pond Creek watershed since 2004 through the Beaver County Conservation District. The NRCS spent approximately \$41,455 in the Duck Pond Creek watershed from 2006–2011. Landowners provided a significant percentage of the cost (usually 40–60 percent) toward BMP implementation.



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