



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Oklahoma

## Turbidity Improves Due to BMP Implementation Efforts

### Waterbody Improved

High turbidity, due in part to practices associated with cattle and crop production, resulted in impairment of Dugout Creek and placement on Oklahoma's Clean Water Act (CWA) section 303(d) list in 2004. Implementation of best management practices (BMPs) to promote better quality grazing land and cropland decreased sediment loading into the creek. As a result, the Oklahoma Conservation Commission has proposed that Dugout Creek be removed from Oklahoma's 2010 CWA section 303(d) list for turbidity impairment. Dugout Creek now fully attains its fish and wildlife propagation designated use.

### Problem

Dugout Creek stretches nearly 14 miles through Lincoln and Payne counties in central Oklahoma, an area of high cattle and wheat production as well as some dairy and poultry production (Figure 1). Poor grazing land and cropland management contributed to excess sedimentation in the watershed. In the 2004 water quality assessment, monitoring showed that 50 percent of Dugout Creek's seasonal base-flow water samples exceeded 50 nephelometric turbidity units (NTU). A stream is considered impaired by turbidity if 10 percent or more of the seasonal base flow water samples exceed 50 NTU (based on 5 years of data before the assessment year). On the basis of these assessment results, Oklahoma added the entire length of Dugout Creek to the 2004 and subsequent CWA section 303(d) lists for nonattainment of the fish and wildlife propagation designated use due to turbidity 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 (EQIP) and general technical assistance program. The main focus of the NRCS programs was grazing land improvement. To improve the condition of pasture and rangeland, prescribed grazing was implemented on 2,650 acres. Producers planted forage on 74 acres, supplemented rangeland plants on 114 acres, and improved upland wildlife habitat management on 203 acres. Seventy-seven acres received nutrient management plans, and 164 acres received waste utilization improvements. Brush management occurred on approximately 471 acres, with



Figure 1. Dugout Creek is in Lincoln and Payne counties.

prescribed burning on 265 acres, and weed management was applied on 1,117 acres. From 2004 to 2007, mulch-till implementation occurred on 207 acres, with additional seasonal residue management on 169 acres. In contrast to traditional tillage, this type of tillage retains soil moisture and reduces soil erosion by decreasing the amount of soil exposed to wind and rain. Further reducing erosion potential on cropland, landowners installed 2 grade stabilization structures, 5 acres of critical area planting, and 4 acres of grassed waterways. More recent conservation practices, installed after 2008, include 322 acres of upland wildlife habitat enhancement, 70 additional acres of mulch tillage, 636 acres of prescribed grazing, 192 acres of forage management, and 153 acres of brush management.

In addition, the Oklahoma Conservation Commission's education program, Blue Thumb, actively promoted programs in the Dugout Creek

watershed starting in 2005. A groundwater screening and information session was held in Lincoln County in addition to a volunteer training event held in Payne County. These activities provide vital education of the residents of the area and help facilitate behavior changes. Volunteers are actively monitoring eight sites in the two counties, and education is continuing in the area.

## Results

The Oklahoma Conservation Commission's Rotating Basin Monitoring Program, a statewide nonpoint source ambient monitoring program, documented improved water quality in Dugout Creek due to landowners implementing BMPs. Because of the implemented practices and the accompanying education of landowners, turbidity decreased in the Dugout Creek watershed. In the 2004 assessment, 50 percent of seasonal base flow water samples exceeded the turbidity criteria of 50 NTU. This exceedance was reduced to 29 percent in the 2006 assessment and finally fell to 6 percent in the 2010 assessment (Figure 2). Hence, Dugout Creek has been recommended for removal from Oklahoma's CWA section 303(d) list for its turbidity impairment and is now in full attainment of the fish and wildlife propagation designated use.

## 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 program at an average annual cost of \$1 million. Monitoring costs include personnel, supplies, and lab analysis for 19 parameters from samples collected every 5 weeks at about 100 sites. In-stream habitat, fish and macroinvertebrate samples are also collected. Approximately \$600,000 in EPA CWA section 319 funds supports statewide education, outreach, and monitoring efforts through the Blue Thumb program. The Oklahoma cost-share program provided \$9,618 in state funding for BMPs in this watershed through the Lincoln County Conservation District, and landowners contributed \$8,528 through this program. The NRCS spent approximately \$232,494 for implementation of BMPs in the watershed from 2004-2007. Implementation is continuing, with \$194,354 in BMPs obligated in Oklahoma from 2008-2010 through EQIP and NRCS general technical assistance funds. Landowners provided a significant percentage toward BMP implementation in these programs as well.

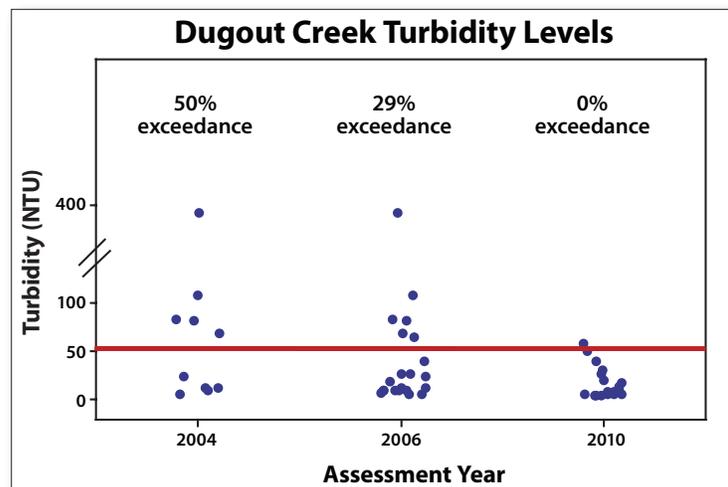


Figure 2. Monitoring data showing reduction in turbidity levels in Dugout Creek.



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