



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Turbidity Delisting Results After Agricultural BMP Implementation

Waterbody Improved

High turbidity, due in part to practices associated with wheat, corn, cattle, and poultry production, resulted in impairment of Cloud Creek and placement on Oklahoma's CWA section 303(d) list in 2006. Implementing 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 a five-mile-long segment of Cloud Creek be removed from Oklahoma's 2010 Clean Water Act (CWA) section 303(d) list for turbidity impairment. Cloud Creek now partially attains its fish and wildlife propagation designated use.

Problem

Cloud Creek is located in Okmulgee and Muskogee counties in the central eastern part of Oklahoma (Figures 1 and 2). Land use in the watershed consists of a large amount of cropland, primarily for wheat and corn, as well as a large amount of cattle and poultry production and a few hog operations. Poor grazing land and cropland management contributed to excess sedimentation in the watershed. In the 2006 water quality assessment, monitoring showed that 20 percent of Cloud Creek's seasonal baseflow 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 Cloud Creek to the 2006 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), General Conservation Technical Assistance program, and Grazing Lands Conservation (GLC) program. Cloud Creek drains a larger stream, Cane Creek, and the monitoring site is located below this confluence. Thus, the monitoring data capture the effects of implementation surrounding more than 30 miles of stream rather than just the 5 miles reflected on the CWA section 303(d) list (see Figure 2). From 2003 to 2007,



Figure 1. Oklahoma's Cloud Creek.

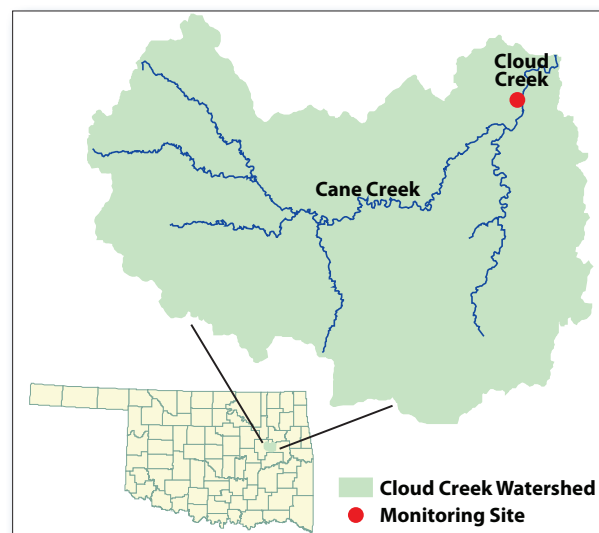


Figure 2. Cloud Creek is located in Oklahoma's Okmulgee and Muskogee counties.

landowners in the watershed reduced the potential for erosion from cropland by implementing conservation crop rotations on 338 acres and adopting conservation tillage (no-till, strip-till, mulch-till) methods on 554 acres. To address erosion from grazing lands, prescribed grazing was implemented on 8,770 acres, with 18,309 linear feet of cross-fencing installed to improve grazing land quality and 43 ponds constructed for alternative water supply. Nearly three acres of erosion-susceptible areas received heavy use protection to reduce sediment runoff. Hay and forage planting occurred on 905 acres, and 1,101 acres of pest (weed) management helped to improve the quality of grazing lands. Landowners improved forage harvest management on 317 acres and upland wildlife habitat management on 28 acres. Nutrient management plans were adopted on 3,102 acres, with a small amount of waste transfer and waste utilization included.

From 2008 to 2010, additional BMPs implemented include conservation crop rotation on 259 acres, conservation tillage on 440 acres, prescribed grazing on 14,268 acres, 21,926 linear feet of fencing, 10 ponds, 259 acres of forage/biomass planting, 2,051 acres of weed management, 869 acres of brush management, forage harvest management on 957 acres, upland wildlife habitat management of 481 acres, nutrient management for 3,553 acres, and 1,750 acres of waste utilization to improve grazing lands.

The Oklahoma Conservation Commission's education program, Blue Thumb, has several volunteer monitoring sites in Okmulgee County. Three intensive educational programs have been offered by Blue Thumb staff in the watershed since 2004 as well. These activities provide vital education of the residents of the watershed and may help facilitate behavior changes. Active volunteer monitoring 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 Cloud Creek due to landowners implementing BMPs. In the 2006 and 2008

assessments, 20 percent of seasonal base flow water samples exceeded the turbidity criteria of 50 NTU. This exceedance was reduced to 0 percent in the 2010 assessment (Figure 3). Hence, Cloud Creek has been recommended for removal from Oklahoma's CWA section 303(d) list for its turbidity impairment and now partially attains 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 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 \$33,964 in state funding for BMPs in this watershed through the Muskogee and Okmulgee County Conservation Districts, and landowners contributed \$47,036 through this program. The NRCS spent approximately \$138,017 for implementation of BMPs in the watershed from 2003 to 2010 through NRCS EQIP, GLC, and general technical assistance funds. Landowners provided a significant percentage toward BMP implementation in these programs as well.

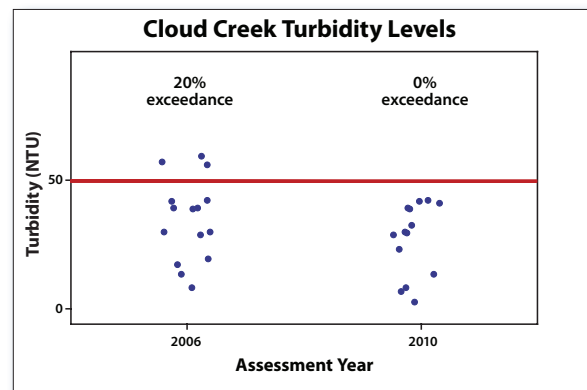


Figure 3. Restoration efforts reduced turbidity levels in Cloud Creek.



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