



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Oklahoma

Best Management Practices Result in Turbidity Delistings in Two Streams

Waterbody Improved

Excess turbidity due in part to practices associated with cattle and crop production impaired Dirty Creek and one of its tributaries, Elk Creek. As a result, Oklahoma added both streams to the state's 2006 Clean Water Act (CWA) section 303(d) list of impaired waters for turbidity. Implementing best management practices (BMPs) helped reduce erosion from grazing lands and croplands, and turbidity levels decreased. As a result, Dirty and Elk creeks have been nominated for removal from the state's CWA section 303(d) list for turbidity in 2010.

Problem

Elk Creek is in McIntosh County in the central eastern part of Oklahoma. It is a tributary of Dirty Creek, located in Muskogee and McIntosh counties (Figure 1). Land use in the watershed is primarily cattle and poultry production in addition to cropland (mainly wheat and corn). Sediment from eroding grazing lands and croplands contributed to elevated turbidity in both Elk and Dirty creeks.

Monitoring showed that seasonal base flow water samples exceeded 50 nephelometric turbidity units (NTU) in 2006 by 17 percent in Elk Creek and by 31 percent in Dirty Creek. A stream is considered impaired by turbidity if 10 percent or more of the seasonal base flow water samples exceed 50 NTUs (based on no more than five years of data prior to the assessment year). The high turbidity levels prompted Oklahoma to add the 44-mile-long Dirty Creek and the 14-mile-long Elk Creek to the 2006 CWA section 303(d) list of impaired waters as not attaining the fish and wildlife propagation designated use.

Project Highlights

Landowners implemented numerous BMPs with support from Oklahoma's locally led cost-share program and Natural Resources Conservation Service (NRCS) programs such as the Environmental Quality Incentives Program (EQIP), Grazing Land Conservation Program (GLC), and general technical assistance programs. From 2004 to 2007, landowners implemented prescribed (managed) grazing on 6,605 acres, which included installing 59,653 linear feet of cross-fencing, constructing 106 ponds, and providing 7 alternative water supply tanks. To further improve grazing land quality and reduce erosion, cooperators managed brush on 141 acres, removed invasive weeds from 3,690 acres, and planted supplemental forage on 3,042 acres.

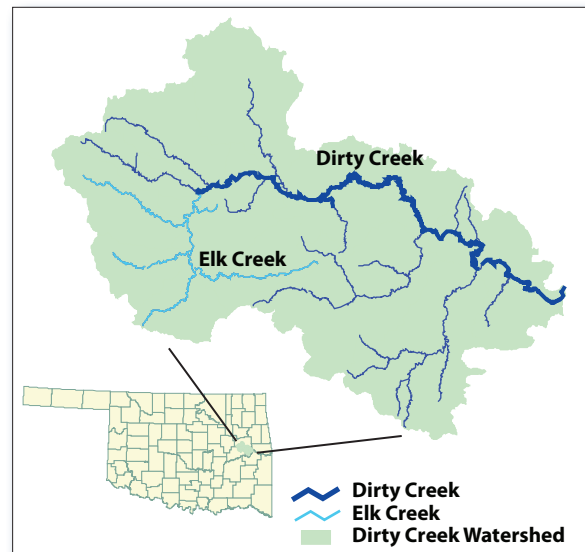


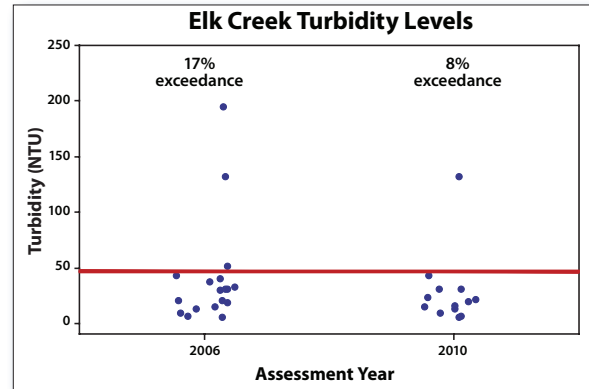
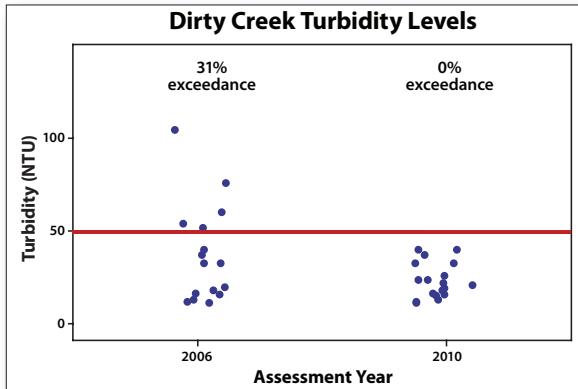
Figure 1. Elk Creek is a tributary within the Dirty Creek watershed.



Dirty Creek



Elk Creek



Figures 2 and 3. Less than 10 percent of samples in Dirty and Elk creeks exceeded the turbidity standard.

Landowners also adopted several cropland BMPs, including converting 480 acres of land from conventional to conservation tillage (mulch-till or no-till), implementing conservation/cover crop rotation on 447 acres, constructing one grade stabilization structure, and building 5,000 feet of terraces. Nutrient management plans were written for 3,270 acres, and one waste storage facility and two composting facilities were constructed. Landowners managed 55 acres for wetland wildlife habitat and 1,228 acres for upland wildlife habitat.

Landowners implemented additional BMPs from 2008 through 2010 that expanded the initial grazing and cropland improvements. Recent BMPs included an additional 10,240 acres of prescribed grazing, with 75,353 linear feet of cross-fencing, 25 additional ponds, and 6 alternative water supply tanks. Another 1,149 acres were managed for brush, 395 acres received supplemental forage/hay planting, and 4,102 acres had weed management. Cooperators converted 283 acres of conventional tillage cropland to mulch tillage, and conservation crop rotations were implemented on 55 acres. Nutrient management occurred on 3,824 acres, and three waste storage facilities were constructed. Finally, 919 acres were managed for upland wildlife habitat and 183 acres of forest were improved.

Results

Monitoring and data analysis was performed by the Oklahoma Conservation Commission (OCC) as part of the state's Rotating Basin Monitoring Program (RBMP). As a result of the implemented practices, turbidity has decreased in both the Dirty Creek and Elk Creek watersheds (Figures 2 and 3). In the 2006 and 2008 assessments, 17 percent of Elk Creek

seasonal base flow water samples exceeded the turbidity criterion of 50 NTU, while 31 percent of Dirty Creek samples exceeded. In the 2010 assessment, none of the Dirty Creek base flow values exceeded the criterion, and only 8 percent of the Elk Creek values exceeded the criterion. Both Elk and Dirty creeks have been nominated for removal from Oklahoma's CWA section 303(d) list for turbidity impairment in 2010. Both creeks are now in partial attainment of the fish and wildlife propagation designated use.

Partners and Funding

The improvement in water quality in Dirty and Elk creeks was documented by the OCC's statewide nonpoint source ambient monitoring program. The RBMP, which now includes a probabilistic component, is funded through the 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 five weeks at about 100 sites for a total of 20 episodes per five year cycle. In-stream habitat, fish, and macroinvertebrate samples are also collected. Statewide educational efforts through Blue Thumb are also funded by EPA CWA section 319 at a cost of approximately \$600,000 annually. These costs include supplies for monthly monitoring of 100 sites, as well as trainings and other outreach activities. The Oklahoma cost-share program provided \$69,059 in state funding for BMPs in this watershed through the Muskogee County and Checotah County Conservation Districts, and landowners contributed nearly \$85,352 through this program. The NRCS spent approximately \$377,930 for implementation of BMPs in the area from 2003 to 2007 and has obligated just over \$312,623 for BMPs from 2008 through 2010.



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