



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Oklahoma

## Implementing Management Practices and Education Efforts Reduces Turbidity

### Waterbody Improved

High turbidity levels due in part to practices associated with wheat, cattle and hog production impaired Oklahoma's Wolf Creek. As a result, Oklahoma added a 44-mile segment of Wolf Creek to the state's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters for turbidity. A large volunteer monitoring and education effort was initiated in the watershed, combined with implementing best management practices (BMPs) to promote better quality rangeland and pastureland. Sediment in the creek declined, prompting Oklahoma to remove Wolf Creek from the 2006 CWA section 303(d) list for turbidity impairment. Wolf Creek now fully attains its fish and wildlife propagation designated use.

### Problem

Wolf Creek (Figure 1) flows through northwestern Oklahoma on the border with Texas. It is a large stream—extending 52 miles through Ellis and Woodward counties in Oklahoma and 40 miles in Texas in Ochiltree and Lipscomb counties. Erosion of poorly managed grazing land contributed excess sediment to Wolf Creek. Water quality assessments in 2002 and 2004 showed that 11 percent of Wolf Creek's seasonal baseflow water samples exceeded 50 nephelometric turbidity units (NTU). As a result, Oklahoma added a 44-mile segment of Wolf Creek to the 2002 CWA section 303(d) list for failure to attain its fish and wildlife propagation designated use because of turbidity impairment. A stream is considered impaired by turbidity if 10 percent or more of the seasonal baseflow water samples exceed 50 NTU (based on 5 years of data before the assessment year).

### 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), Conservation Reserve Program (CRP), Grassland Reserve Program (GRP) and Wildlife Habitat Incentives Program (WHIP). In addition, NRCS initiated an EQIP Local Emphasis Area project in the Wolf Creek watershed focused on grazing land. From 2002 to 2006, landowners improved more than 9,900 acres of pasture and hay land and 87,467 acres of rangeland through supplemental planting efforts. They implemented



Figure 1. Wolf Creek flows through portions of Oklahoma and Texas.

other BMPs, including brush management (12,000 acres), weed management (9,700 acres), nutrient management plans (90,350 acres), using cover crops (more than 20,000 acres) and seasonal residue management (995 acres), and implementing prescribed grazing (46,925 acres). Nearly 67 miles of cross-fencing have been installed to improve grazing lands and prevent cattle access to streams. Approximately 350 alternative water supplies have been installed to work in concert with cross-fencing and optimize pasture and range usage to minimize erosion. Similar BMPs have been installed in the Texas portion of the watershed.

Landowners installed additional BMPs between 2007 and 2009 that built on the initial grazing land improvements and helped the turbidity in

Wolf Creek remain low. The latest round of BMPs consisted of planting critical areas (6,467 acres), establishing conservation cover (39,890 acres), adding conservation crop/cover crop rotation (30,160 acres), adopting brush management (135,180 acres), changing to conservation tillage (58,087 acres), installing 53 miles of fencing, constructing 29 grade-stabilization structures and ponds, planting pasture and hay (46,427 acres), planting range (37,310 acres), implementing prescribed grazing (820,024 acres), adopting nutrient management plans (70,896 acres), adopting weed management (43,259 acres) and building 47 miles of terraces.

In addition, the Oklahoma Conservation Commission's (OCC's) Blue Thumb education program has been very active in the Wolf Creek watershed. In 2002 staff from the Ellis County Conservation District and the local NRCS staff participated in a Blue Thumb training session for local volunteers. After being trained, a local high school teacher and her students began monitoring Wolf Creek monthly. They submitted results in monthly reports to the local newspaper to inform local citizens about the stream and its problems. Blue Thumb volunteers also educated younger students about nonpoint source pollution using the

Enviroscape watershed model and a ground-water model at least annually (Figure 2). Annual *mini-academy* training is offered for students and teachers at Gage High School to educate the watershed residents about how nonpoint source pollution can affect water quality. Active volunteer monitoring and education is continuing in the watershed.



Figure 2. Gage High School students demonstrate a groundwater model during an education event.

## Results

OCC conducts monitoring and data analysis as part of the state's Rotating Basin Monitoring Program. As a result of the implemented practices and the accompanying education of landowners, turbidity has decreased in the Wolf Creek watershed. The 2006 water quality assessment showed that exceedances of the turbidity standard (50 NTU) had

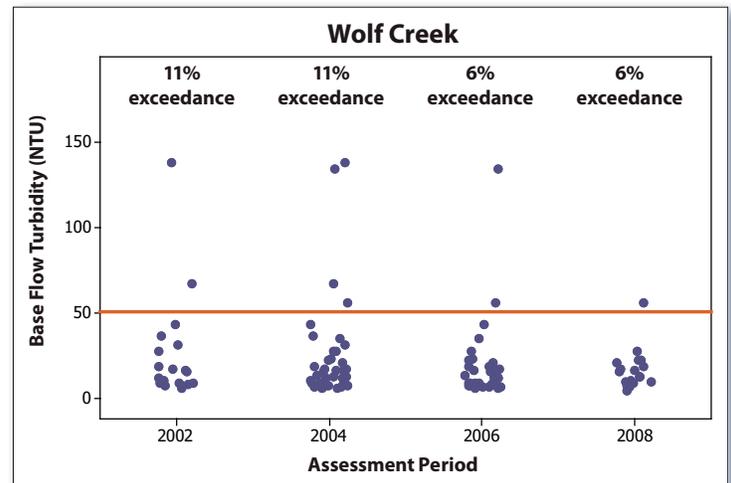


Figure 3. Turbidity in Wolf Creek declined between 2002 and 2008. The creek now meets the turbidity water quality standard, which requires that less than 10 percent of the samples exceed 50 NTU.

declined to 6 percent (Figure 3). As a result, the 44-mile segment of Wolf Creek that flows through Oklahoma now fully attains its fish and wildlife propagation designated use and was removed from Oklahoma's CWA section 303(d) list for turbidity impairment in 2006.

## Partners and Funding

OCC's statewide nonpoint source ambient monitoring program is funded using 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 5 weeks at about 100 sites. Approximately \$600,000 in EPA section 319 funds supports statewide education, outreach and monitoring efforts through the Blue Thumb program.

The Oklahoma cost-share program provided \$7,543 in state funding for BMPs in the watershed, and landowners contributed another \$12,874. The NRCS invested approximately \$76,443 to implement BMPs in the Oklahoma portion of the watershed from 2002 to 2006. Implementation has continued, with \$1,019,271 in BMPs committed for 2007 through 2009 using CRP, EQIP, WHIP, GRP, and NRCS general technical assistance funds. Landowners provided a significant percentage toward BMP implementation in the programs as well.



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